



*The University of British Columbia:  
B.C.'s Centre of Teaching and Research  
in the Health Sciences*





*The President's  
Report on  
British Columbia's  
Centre of  
Teaching and Research  
in the  
Health Sciences*





# *Contents*

I. PROLOGUE: FRONTIERS OF HUMAN SCIENCE	1
II. THE FACULTY OF MEDICINE	5
III. THE FACULTY OF DENTISTRY	15
IV. THE FACULTY OF PHARMACEUTICAL SCIENCES	26
V. THE CARE-GIVING PROFESSIONS	32
<i>The School of Nursing</i>	32
<i>The School of Rehabilitation Medicine</i>	36
<i>The School of Audiology and Speech Sciences</i>	39
VI. THE FACULTY OF GRADUATE STUDIES	42
VII. THE OFFICE OF THE COORDINATOR OF HEALTH SCIENCES	44
VIII. THE HEALTH PROMOTERS AND POLICY RESEARCHERS	46
<i>Centre for Health Services and Policy Research</i>	47
<i>Institute of Health Promotion Research</i>	48
IX. THE ETHICS OF HEALTH CARE	49
X. UBC IN THE HOSPITALS	51
<i>at Vancouver General Hospital</i>	52
<i>UBC at St. Paul's Hospital</i>	57
<i>UBC at the British Columbia Cancer Agency</i>	61
<i>UBC at British Columbia's Children's Hospital</i>	63
<i>UBC at University Hospital</i>	65
XI. CLINICS AND COMMUNITY SERVICE	73
<i>The Allan McGavin Sports Medicine Clinic</i>	74
<i>The UBC Movement Disorders Clinic</i>	75
<i>Tropical Diseases Clinic and Infectious Disease Outpatient Clinic</i>	76
<i>Medical Genetics Services</i>	76



**XII. BASIC RESEARCH IN THE HEALTH SCIENCES 77**

*The Biotechnology Laboratory 80*

*TRIUMF 81*

**XIII. HEALTH SCIENCE RESEARCH IN NON-MEDICAL FACULTIES 82**

*The Faculty of Agricultural Sciences 83*

*The Faculty of Applied Science 84*

*The Faculty of Arts 86*

*The Faculty of Commerce and Business Administration 90*

*The Faculty of Education 91*

*The Faculty of Science 93*

**XIV. MAJOR NATIONAL RESEARCH ENDEAVORS – UBC LINKS 95**

*National Networks of Centres of Excellence 96*

*The Canadian Institute for Advanced Research 101*

*The Canadian HIV Trials Network 103*

**XV. MAJOR MEDICAL RESEARCH COUNCIL FUNDING 104**

**XVI. BIOMEDICAL SPIN-OFF COMPANIES 107**

**XVII. SUPPORT SERVICES ON CAMPUS 109**

*Woodward Medical Library 109*

*Student Health Service 110*

*Disability Resource Centre 112*

*First Nations Health Care Professions Program 113*

*Occupational Health and Safety 114*

*Biomedical Communications 115*

**XVIII. FUND RAISING IN THE HEALTH SCIENCES 117**

**XIX. NEW FRONTIERS IN THE '90S 122**

# I. Prologue: Frontiers of Human Science

IN THE SUMMER OF 1991, LEADING INTERNATIONAL SCIENTISTS IN THE FIELD OF OSTEOPOROSIS ATTENDED A SYMPOSIUM AT THE UNIVERSITY OF BRITISH COLUMBIA TO MARK THE 30TH ANNIVERSARY OF A MEDICAL DISCOVERY MADE ON OUR CAMPUS. PROFESSOR EMERITUS HAROLD COPP WAS PRESENT TO TALK ABOUT HIS DISCOVERY OF CALCITONIN, A HORMONE THAT REGULATES THE BLOOD LEVEL OF CALCIUM.

IN ITS SYNTHETIC FORM, CALCITONIN IS A POWERFUL, NON-ADDICTIVE PAIN-KILLER, WHICH IS USED THROUGHOUT EUROPE AND JAPAN FOR THE TREATMENT OF OSTEOPOROSIS AND OTHER BONE DISEASES. WORLDWIDE SALES ARE TWO-THIRDS THAT OF INSULIN, APPROACHING \$1 BILLION.

STARTING FROM SCRATCH IN 1950 WITHOUT SO MUCH AS A TEST TUBE IN THE STORE ROOM, DR. COPP LAUNCHED OUR DEPARTMENT OF PHYSIOLOGY AS ONE OF THE ORIGINAL DEPARTMENTS IN THE NEW FACULTY OF MEDICINE. HE SET UP OFFICES AND A RESEARCH LABORATORY IN ONE OF THE INFAMOUS SECOND WORLD WAR HUTS, WHICH SERVED AS TEMPORARY BUILDINGS. THERE, 10 YEARS LATER, HE SYNTHESIZED CALCITONIN. THAT WAS THREE DECADES AGO. TODAY, OUR FACULTIES OF MEDICINE, DENTISTRY AND

PHARMACEUTICAL SCIENCES — YOUNG IN COMPARISON TO OTHERS ON THIS CONTINENT AND OVERSEAS — HAVE ALREADY ACHIEVED INTERNATIONAL REPUTATIONS AND ARE POISED TO ACHIEVE RENOWN. WE ARE CONFIDENT THAT UBC WILL BECOME THE HUB OF A GREAT HEALTH-CARE AND HEALTH-CARING CENTRE.

SUCH A CENTRE WILL TAKE ADVANTAGE OF THE BEST HEALTH-CARE SYSTEM IN THE WORLD AND THE TRAIL-BLAZING WORK OF OUR RESEARCHERS TO MAKE BRITISH COLUMBIA A HOUSEHOLD WORD IN THE HEALTH SCIENCES. THERE IS NO REASON WHY THIS PROVINCE CANNOT HAVE A CENTRE THAT IS INTERNATIONALLY ADMIRABLE.

ACADEMICALLY DRIVEN AND CLINICALLY FUELLED, IT WILL BE DEEPLY AND INEXTRICABLY LINKED WITH THE NEEDS OF THE IMMEDIATE COMMUNITY AND THE ENTIRE PROVINCE; IT WILL EMBRACE THE FINEST OF GENERAL AND SPECIALIZED MEDICAL CARE; IT WILL OFFER SUPERB EDUCATION FOR PHYSICIANS AND OTHER HEALTH-CARE PRACTITIONERS. AND IT WILL FOSTER WORLD-CALIBRE RESEARCH IN THE HEALTH SCIENCES, LEADING TO LIFE-SAVING MEDICAL INTERVENTIONS, TO LIFE-ENHANCING CARE OF THE DISABLED AND, IN THE LONG RUN, TO AN UNDERSTANDING OF THE SOCIETAL AND

*Academically  
driven and clinically  
fuelled, it will be  
deeply and inextricably  
linked with the  
needs of the immediate  
community and  
the entire province.*



ENVIRONMENTAL FACTORS THAT DETERMINE THE HEALTH OF OUR PEOPLE.

AS THIS DOCUMENT REVEALS IN RICH DETAIL, THERE IS WORLD-CALIBRE RESEARCH OCCURRING NOW AT THIS UNIVERSITY. WE ARE WELL REPRESENTED IN THE NATIONAL CENTRES OF EXCELLENCE, IN THE PRESTIGIOUS GROUP AND PROGRAM AWARDS OF THE MEDICAL RESEARCH COUNCIL OF CANADA, AND IN AWARDS MADE TO INDIVIDUALS BY THE MRC, THE NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL, THE NATIONAL CANCER INSTITUTE OF CANADA, HEALTH AND WELFARE CANADA, AND THE B.C. HEALTH CARE RESEARCH FOUNDATION.

INTERNATIONALLY, WE PARTICIPATE IN THE HUMAN FRONTIERS OF SCIENCE PROGRAM, WHICH BRINGS TOGETHER THE BEST RESEARCHERS IN THE G7 NATIONS. SOME OF OUR INVESTIGATORS ARE FUNDED BY THE NATIONAL INSTITUTES OF HEALTH IN THE UNITED STATES, WHILE OTHERS, BY PARTICIPATING ON A PEER-REVIEW BOARD, DIRECT THE NATURE OF DENTAL RESEARCH IN THAT COUNTRY. NO OTHER INSTITUTION IN THIS PROVINCE DOES AS MUCH HEALTH-SCIENCES RESEARCH NOR DOES IT AS WELL.

THE UNIVERSITY IS MINDFUL OF ITS SOCIAL CONTRACT WITH THE PEOPLE OF B.C. WE ARE FUNDED TO TRAIN HEALTH-CARE WORKERS, AND WE DO THAT, RECOGNIZING HOW MANY PROFESSIONALS ARE NEEDED AND WHERE THEY ARE NEEDED. WE ARE ACTIVELY

INVOLVED IN STUDIES OF PROVINCIAL MANPOWER REQUIREMENTS. EVEN THOUGH WE PRODUCE FEWER THAN OUR PER-CAPITA SHARE OF CANADIAN DOCTORS, WE PLAN NO INCREASE IN MEDICAL ENROLMENTS. THE COMMUNITY-RESPONSIVE FAMILY PHYSICIANS WE DO TRAIN HAVE HAD EXPERIENCE IN RURAL OR REMOTE AREAS AND MANY ARE CHOOSING TO PRACTISE THERE.

FURTHERMORE, WE PROVIDE AN IRREPLACEABLE COMMUNITY SERVICE IN THE MANY CLINICS WE CREATE AND OPERATE. THROUGH THESE CLINICS, LOCATED IN ALL OF OUR AFFIL

*we provide an  
irreplaceable  
community service  
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clinics we create  
and operate.*

IATED TEACHING HOSPITALS, THE PEOPLE OF THE PROVINCE WITH SPECIALIZED HEALTH PROBLEMS OFTEN RECEIVE CARE BASED UPON THE MOST ADVANCED RESEARCH, INCLUDING REVOLUTIONARY SURGICAL TECHNIQUES AND LIFE-SAVING DRUGS UNAVAILABLE TO THE AVERAGE PHYSICIAN.

WE ARE COMMITTED TO FINDING WAYS TO REDUCE HEALTH-CARE COSTS. WE TEACH ECONOMISTS, EPIDEMIOLOGISTS, SOCIOLOGISTS AND BIostatisticians WHOSE RESEARCH IN HEALTH POLICY AND POPULATION HEALTH EVALUATES CURRENT SERVICES AND PRACTICES AND EXAMINES WAYS OF ENHANCING HEALTH OUTSIDE THE HEALTH-CARE SYSTEM. AT THE SAME TIME, UBC SCHOLARS IN VARIOUS FIELDS SEEK AN UNDERSTANDING OF THE RELATIONSHIP OF LIFESTYLE, ENVIRONMENT AND EVEN NATIONAL CHARACTER TO

ILLNESS. IN ORDER TO BRING TOGETHER THE MANY DISCIPLINES REQUIRED TO ASSUME THESE TASKS, WE HAVE CREATED AN INSTITUTE OF HEALTH PROMOTION RESEARCH AND A CENTRE FOR HEALTH SERVICES AND POLICY RESEARCH, WHICH ARE PARTLY FUNDED BY THE PROVINCIAL GOVERNMENT. OUR LEADERSHIP IN THIS AREA HAS BEEN RECOGNIZED BY THE CANADIAN INSTITUTE FOR ADVANCED RESEARCH, A PRIVATE, NON-PROFIT CORPORATION, WHICH HAS CREATED FIVE WORLD-SPANNING RESEARCH NETWORKS. THE INSTITUTE'S PROGRAM IN POPULATION HEALTH, WHICH IS SEEKING TO DEVISE A BROADER INTELLECTUAL FRAMEWORK FOR APPROPRIATE QUESTIONS ABOUT THE DETERMINANTS OF HEALTH, IS LED BY A UBC HEALTH ECONOMIST AND HAS THREE OTHER UBC SCHOLARS ON A 17-MEMBER TEAM.

THE HEALTH-SCIENCES RESEARCH RADIATING FROM UBC IS A MAJOR INDUSTRY THAT SUPPORTS THE B.C. ECONOMY. OUR FACULTIES OF MEDICINE, DENTISTRY, PHARMACEUTICAL SCIENCES AND OUR SCHOOL OF NURSING GENERATED NEARLY \$45 MILLION IN SPONSORED RESEARCH FUNDS IN 1990-91 — ROUGHLY THE SAME AMOUNT THE UNIVERSITY ALLOCATED TO THESE AREAS. MOST OF THIS RESEARCH MONEY ORIGINATES FROM SOURCES OUTSIDE THE PROVINCE, AND MOST OF IT IS SPENT INSIDE THE PROVINCE. IT GOES PRIMARILY TO

PAY THE SALARIES OF FACULTY, STAFF AND STUDENTS. IT IS ALSO USED TO BUY MATERIALS AND EQUIPMENT, WITH ROUGHLY HALF THE PURCHASES BEING MADE IN THE PROVINCE.

WHAT IS NOT GENERALLY UNDERSTOOD IS THAT OUR RESEARCH HAS BEEN HIGHLY SUCCESSFUL — AND WILL CONTINUE TO BE — IN GENERATING SPIN-OFF INDUSTRIES AND ONGOING EMPLOYMENT. IN THE LAST DECADE ALONE, SEVEN B.C. BIOMEDICAL COMPANIES, BORN OUT OF RESEARCH AT UBC, HAVE CRE-

ATED 117 JOBS AND NOW EARN MULTI-MILLION-DOLLAR REVENUES.

THE UNIVERSITY'S POLICIES ON PATENT AND LICENCE ACQUISITIONS AND ON THE CREATION OF SPIN-OFF COMMERCIAL COMPANIES ARE NOT ONLY A MODEL FOR OTHER INSTITUTIONS BUT ALSO SHOULD GUIDE FUTURE HEALTH-SCIENCES RESEARCH IN THE PROVINCE. A GREAT MEDICAL-SCHOOL COMPLEX WILL MAKE MONEY FOR BRITISH COLUMBIA OUT OF ITS RESEARCH.

WHAT WILL IT TAKE TO ACHIEVE SUCH GREATNESS?

IT DOES NOT DEMAND GROWTH FOR GROWTH'S SAKE. WE DO NOT ASPIRE TO GROWTH. INSTEAD WE WILL CONTINUE TO IMPROVE QUALITY UTILIZING OUR EXISTING RESOURCES, FACILITIES AND RELATIONSHIPS.

THE GREAT HEALTH-SCIENCES CENTRE WE ENVISION WILL COME ABOUT THROUGH COLLABORATION, COOPERATION AND MULTI-

*The great health-  
sciences centre we  
envision will come  
about through  
collaboration,  
cooperation and  
multi-disciplinary  
endeavor — in a  
word, synergy.*



DISCIPLINARY ENDEAVOR IN A WORD, SYNERGY. SUCH INTERACTION MUST BE COORDINATED, DIRECTED BY THOSE WHO KNOW HOW TO CONDUCT AND REVIEW RESEARCH. TO ENSURE UNIFORMLY HIGH AND FULLY COMPETITIVE STANDARDS, ALL RESEARCH IN THE HEALTH SCIENCES IN THIS PROVINCE — WHETHER ON OUR CAMPUS OR IN AN AFFILIATED TEACHING HOSPITAL — MUST BE SUBJECT TO TRIED AND TESTED UBC RESEARCH POLICIES AND TO THE HIGHEST POSSIBLE LEVEL OF PEER REVIEW.

MEDICAL SCIENCE FACES FRESH CHALLENGES: OVER THE NEXT 10 TO 20 YEARS, ITS CONCERNS WILL INCREASINGLY BECOME ENVIRONMENTAL, SOCIAL AND ECONOMIC. OUR HEALTH-CARE SYSTEMS WILL DEMAND THE EXPERTISE OF EPIDEMIOLOGISTS, SOCIOLOGISTS AND ECONOMISTS TO DEAL WITH SUCH PROBLEMS AS CHANGING PATTERNS OF HOSPITAL UTILIZATION, ENVIRONMENTALLY CAUSED CANCERS AND THE AGING OF THE POPULATION. IN MANY AREAS OF SOCIAL POLICY, WE NEED TO INCREASE THE PARTICIPATION RATE, BUT THE BASIC OBJECTIVE OF A SUCCESSFUL HEALTH-CARE SYSTEM IS TO REDUCE THE PARTICIPATION RATE BY KEEPING PEOPLE OUT OF INCREASINGLY EXPENSIVE HOSPITALS.



**DR. DAVID W. STRANGWAY**  
*President, The University of British Columbia*  
*Vancouver, BC, Canada*  
*January, 1992*

*David W. Strangway*

THE RANGE OF PROGRAMS, THE INTELLECTUAL FERMENT, THE INTER-DISCIPLINARY COOPERATION TO MEET THESE CHALLENGES ARE RESIDENT AT UBC. ONLY THE UNIVERSITY OF BRITISH COLUMBIA HAS THE BASE NECESSARY FOR THE LEADERSHIP THAT WILL TAKE THIS PROVINCE TO THE FRONTIERS OF HUMAN SCIENCE, PLACE IT IN THE FOREFRONT OF HEALTH-SCIENCES RESEARCH AND

KEEP IT THERE.

THE RECENT REPORT OF THE BRITISH COLUMBIA ROYAL COMMISSION ON HEALTH CARE AND COSTS, ENTITLED 'CLOSER TO HOME' ADDRESSES THE VERY IMPORTANT ISSUES OF HEALTH-CARE DELIVERY. THEY FOCUS ON EFFECTIVE AND EFFICIENT APPROACHES TO MAKING THE HEALTH-CARE SYSTEM MORE RESPONSIVE TO THE NEEDS OF THE PEOPLE OF BRITISH COLUMBIA. IT DOES NOT ADDRESS THE SIGNIFICANT

TOPICS OF TEACHING AND RESEARCH IN THE HEALTH-CARE AND THE HEALTH-CARING DISCIPLINES. THIS CURRENT REPORT CAN, THEREFORE, BE SEEN AS A COMPLEMENT TO THE IN-DEPTH REPORT OF THE ROYAL COMMISSION. THIS REPORT COVERS THOSE DIMENSIONS OF THE HEALTH-CARE SYSTEM THAT WERE NOT COVERED BY THE COMMISSION.

THE UBC FACULTY OF MEDICINE IS EVERYWHERE LIKE A THREAD WOVEN INTO THE HEALTH-CARE FABRIC OF THE PROVINCE. IT WOULD BE IMPOSSIBLE TO TEASE IT OUT WITHOUT UNRAVELLING THE CLOTH. AND YET, AT TIMES, IT IS HARD TO DISTINGUISH THIS THREAD FROM OTHERS.

## II. *The Faculty of Medicine*

WOULD A VISITOR TO UBC IN 1950 not have chuckled to see its fledgling Faculty of Medicine? The dean's office, for a time, was the walled-off end of a corridor in the Physics Building. Neurosciences had launched a brain research centre in a three-foot-wide passageway at the back of the Chemistry Building. And the basic science departments were housed in huts, 24-feet-wide by 60-feet-long, liberated from demobilized army camps around the province.

The first class — 60 students selected from 270 applicants — registered the day after Labor Day for courses barely ready to receive them. Slides to illustrate histology lectures, made by a technician in Oxford and sent by way of the Panama Canal, arrived just in time, but lectures in Physiology had to be postponed for six weeks, while the department head borrowed equipment from the University of Toronto and stocked laboratory shelves that had been empty at the beginning of September.

Those 60 students — 57 of them from B.C.; 20 of them World War II veterans — began their study of medicine three years before Watson and Crick would construct the double helix model of the DNA molecule. The age of molecular biology had already begun when Canada's twelfth Faculty of Medicine opened the doors of its huts.

There was irony in this late and humble start. A medical faculty had been included as one of four in the 1890 act that established the university, and an amending act in 1908 obliged the university to provide degree work in medicine if it had the resources to do so.

The university's first president, Franklin Fairchild Wesbrook was a medical graduate of the University of Manitoba. He had been dean of Medicine at the University of Minnesota, where his school got an A from Abraham Flexner, whose 1910 report led to the closing of commercial diploma mills in the United States, and also criticized American medical schools for their failure to appreciate the great advances in the scientific basis of the discipline. Wesbrook was respected as a medical scientist. At UBC, he founded and became head of a Department of Bacteriology and Preventive Medicine. He began laboratory work in 1915 in close association with the Vancouver General Hospital. But he didn't live to see a UBC Faculty of Medicine.

In the 20s, even with Rockefeller Foundation money available for medical education in Canada, the province simply couldn't get together on founding a medical school. Vancouver doctors wanted UBC to start one, but Victoria doctors didn't. The Liberal government was opposed to the university and wouldn't provide



*Myron Weaver UBC's first dean of Medicine (1950-1956)*



funds to develop it. And UBC was involved in moving itself from its downtown site, near the Vancouver General Hospital, 11 kilometres west to the still-forested lands of Point Grey. Finally, even though the Rockefeller Foundation director of medical education declared B.C. to be the best place for a strong medical school in Western Canada, the Foundation's money went to the University of Alberta, which had a partial three-year medical course already in place.

In the 30s, of course, there was no money. But in 1933 a Vancouver physician, Dr. Alexander Monro, left the university its first legacy — \$80,000 for the support of medical research. In light of this, students organized a society and informed President Leonard Klinck that they were beginning a drive for a medical faculty with a hospital on campus. Dr. Klinck, faced with public talk of closure and annual cuts in budget, could only laugh.

By 1935, an important contestant in the upcoming medical school debate, Dr. Claude Dolman, had been hired from the Connaught Laboratories in Toronto to be head of the Department of Bacteriology and Preventive Medicine. At UBC, Dr. Dolman investigated undulant fever, botulism and staphylococcus infection, and made plans with provincial public health authorities for an Institute of Preventive Medicine, plans that were interrupted by the beginning of the Second World War. During the war, courses such as Comparative Anatomy and Histology and a refresher course for returning medical practitioners showed the university was able to teach pre-medical subjects.

At the end of the war, a delegation representing the B.C. Medical Association and the university petitioned the government for a medical school to train physicians for the province's one million residents. B.C. students had to attend medical schools elsewhere, and it was clear that places would not always be available for them. In 1945, the legislature included \$1,500,000 in the university's capital grant to begin a medical faculty. The plan was to provide pre-clinical instruction at UBC and clinical work at Vancouver General Hospital.

UBC President Norman MacKenzie, newly appointed from the University of New Brunswick, wanted to have the first class enrolled by 1946. Instead, he would spend the next two years negotiating the university's position against that of doctors at Vancouver General Hospital who wanted to control medical education and entry to their profession and who were arguing for a medical school in buildings close to the hospital.

The university's position was established in a report written in 1946 by Dr. Dolman. He surveyed 22 American and all 11 Canadian medical schools to produce his *Report on a Survey of Medical Education*, a report that became the blueprint for medical schools outside Canada. In it, he recommended that B.C. settle for nothing less than a first-class medical school and that this school be wholly on the university campus, with its own hospital to provide the necessary beds for clinical teaching.

The long and divisive debate that followed focussed on location and cost. Opponents of the university-hospital plan argued that it was an unnecessary expense and not useful to the city because the campus was so far from downtown. Supporters of the university scheme pointed out that VGH was in physical disrepair and had a weak administration.

The turning point came when the government approved funds to upgrade VGH. The plan called for a new 700-bed acute-care unit, which would free 400 existing beds for university teaching. President MacKenzie announced that the university had overcome its objections to a split school. The search for a dean

began in 1948. It concluded the following year with the appointment of Dr. Myron Weaver, who was Assistant Dean of the medical school at the University of Minnesota, the same school that had supplied UBC's first president. The first class was enrolled in September, 1950.

## *The Faculty Today*

### *Where is the Faculty of Medicine?*

**IT'S ON THE UBC CAMPUS**, where most of the basic science departments have their offices and laboratories, and where the office of the dean of Medicine is located. It's 800 air kilometres north in a family doctor's office in Queen Charlotte City. It's in Prince George where a faculty member of the Department of Psychiatry conducts his academic activities.

It's at Vancouver General Hospital: in the Eye Care Centre, the British Columbia Cancer Agency and the Cancer Research Centre, and the Jack Bell Research Centre.

It's at St. Paul's Hospital: in the Pulmonary Research Laboratory, and the Canadian HIV Trials Network, which operates in an office building on Denman Street.

It's on the Shaughnessy site at Children's Hospital, Grace Hospital, G. F. Strong Rehabilitation Centre and the Children's Variety Research Centre.

It's at the University Hospital, which has three sites — the Point Grey campus, Shaughnessy and the George Derby intermediate care centre.

It's in the offices of 1,400 clinical faculty preceptors who, while they practise medicine, teach undergraduates and residents.

The UBC Faculty of Medicine is everywhere — like a thread woven into the health-care fabric of the province. It would be impossible to tease it out without unravelling the cloth. And yet, at times, it is hard to distinguish this thread from others.

Patients who are referred to an ophthalmologist at the Eye Care Centre at Vancouver General Hospital may not realize that they are also encountering one strand of the Faculty of Medicine. The centre, owned and operated by VGH, incorporates clinical space where patients with highly specialized eye-care problems are seen. It also contains the office of the head of UBC's Department of Ophthalmology, offices of faculty members, and university research and teaching facilities.

Another example of the interweaving of university and hospital is the Children's Variety Research Centre on the Shaughnessy site. Built jointly by B.C.'s Children's Hospital, the Variety Club and UBC in 1985, the centre is a research facility maintained and operated by UBC. It is explicitly part of the UBC campus. Its director — Dr. Aubrey Tingle — is a Professor in Pediatrics and Pathology at the university and Director of Research for Children's Hospital. "All the people on this site view themselves as having parallel reporting relationships. They view the university as their primary relationship for the research side, and the hospital for the clinical side. The hospital has put money into infrastructure support. The

### THE DEANS OF MEDICINE

1950-1956

MYRON WEAVER

1956-1959

JOHN W. PATTERSON

1959-1972

JOHN MCCREARY

1972-1977

DAVID V. BATES

1977-1990

WILLIAM WEBBER

1990-

MARTIN J. HOLLENBERG

university maintains and operates the centre. The hospital has put money into supporting career scientists. The university has put money into supporting graduate students."

To teach medicine, UBC is as dependent today on resources controlled by hospitals as it was in 1950. But the atmosphere has changed. "We are doing wonderful things in collaboration with the hospitals," says Dr. William Webber, who recently stepped down as Dean of Medicine and is now an Associate Vice-President, Academic. "I have been pleased at the hospital developments and at the relationships between the faculty and the individual teaching hospitals. The hospitals have developed not only clinically but have academic aspirations to want to have heads of university departments at their institution."

The Children's Variety Research Centre was just one construction task that occupied Dr. Webber from 1977 to 1990, the period he spent as the faculty's fifth dean. That was a time of physical and academic growth in which the dean became as expert about copper pipes as about capillaries. On the Point Grey campus, a 240-bed acute-care unit was added to a 60-bed psychiatric unit and a 300-bed extended care unit. (The three units are now one entity — University Hospital-UBC Site.) B.C.'s Children's Hospital and Grace Hospital were constructed. The B.C. Cancer Agency was rebuilt and the first phases of redevelopments at St. Paul's and Vancouver General were completed while Dr.

Webber was dean. "Teaching space was incorporated in these buildings and we negotiated and collaborated with the hospitals to do that," says Dr. Webber. "That physical growth was needed to allow the clinical and academic development that has gone on."

And so, the visitor who in 1950 found the Faculty of Medicine at the end of corridors and in a quadrangle of huts would need an airplane and many days to see what has been created in 41 years. On campus alone, he'd tour the Health Sciences Centre where faculty departments are located in the Friedman, Copp and Wesbrook buildings, the Instructional Resources Centre, Medical Block C, and

University Hospital. Other parts of the faculty are located in the Mather Building, which sits somewhat apart from the Health Sciences Centre.

### *An Anatomy of the Faculty*

**IN 1950 THE FACULTY HAD DEPARTMENTS** of Anatomy, Biochemistry, Physiology, Medicine, Obstetrics and Gynecology, Pediatrics, Pathology, Surgery and Pharmacology. It was unique in having a Department of Neurological Research — the first one in Canada and likely in North America, which in a 1980s restructuring became a division of the Department of Psychiatry.

Today there are 17 departments. Anatomy, Biochemistry and Physiology are the cornerstone basic-science departments. Medical Genetics, Pathology, and Pharmacology and Therapeutics function at the interface between basic and applied science. The other 11 — Anesthesiology, Family Practice, Health Care and Epidemiology, Medicine, Obstetrics and Gynecology, Ophthalmology, Orthopedics, Pediatrics, Psychiatry, Radiology and Surgery — are clinical departments.

The clinical departments are located wholly or substantially in hospitals, where university department or division heads might also administer the corresponding hospital department or division. For example, the largest academic department in the faculty (and one of the largest at the university) is the Department of Medicine, which has 78 full-time faculty, eight part-time faculty

**THE CLINICAL  
DEPARTMENTS  
ARE LOCATED  
WHOLLY OR  
SUBSTANTIALLY  
IN HOSPITALS ...**

members, and 194 clinical appointees in its 13 formal specialty divisions. Only two of its full-time faculty members are physically located on campus. The others can be found in 17 locations. It conducts academic activities at the British Columbia Cancer Agency, St. Paul's Hospital, Vancouver General Hospital and the three sites of University Hospital. Faculty members in this department are also heads of the Departments of Medicine at St. Paul's, Vancouver General and University Hospital – Shaughnessy Site.

Faculty members are either full-time, part-time or clinical. In 1990-1991, there were 399 full-time faculty members and 1,500 part-time and clinical faculty. Clinical appointees, who are private-practice physicians, undertake teaching, research and administrative duties as well as academic-related patient care. About 20 per cent of the physicians in the province are involved in some capacity with the faculty, which depends upon their goodwill.

The faculty also has a division of Continuing Medical Education and a Division of the History of Medicine and Science. There are two professional schools – the School of Audiology and Speech Sciences, which trains audiologists and speech therapists, and the School of Rehabilitation Medicine, which trains physiotherapists and occupational therapists.

*So, Where's the  
School of Medicine?*

**OUR INTREPID VISITOR,** having found the Faculty of Medicine here, there and everywhere, will seek in vain for the school of medicine. Dr. Webber says, "The layperson tends to think of the Faculty

of Medicine as the medical school, but it's only a portion of the faculty, accounting for about a third of the teaching. There isn't an entity called the school of medicine, but one could think of that part of the faculty that produces doctors as the medical school."

This non-entity is the only school of medicine in the province. It has produced about 23 per cent of B.C.'s 6,000 physicians. Having begun with classes of 60 and stepped up to 80, the faculty now enrolls 120 medical students each year, a number that is under the Canadian average but allows professors to get to know their students as individuals. There is no plan to increase enrolment. "If we were producing doctors at the Canadian average," says Dr. Webber, "we would have over 200 places. I would think that when you get somewhere around 160 there is probably a good argument for starting another medical school."



*The site of the original UBC campus – the huts at Fairview.*



## *The Undergraduate Program*

**THE FACULTY OFFERS A FOUR-YEAR PROGRAM** designed to produce physicians who will become general practitioners, specialists and, increasingly it is hoped, clinical scientists.

Most undergraduates intend to be family physicians. In some classes, more than two-thirds of graduates will choose general practice. Unlike their predecessors, these doctors will have spent less time being taught in lectures and more time learning alone or in clinical situations. The classic post-Flexnerian model — two years of basic science and two years of clinical training — has been replaced by a much more student-centred type of instruction. Modifications begun at UBC in the 70s have decreased lecture hall hours by as much as half, substituting small-group teaching and independent learning.

In order to make basic-science knowledge relevant, students are introduced to real or simulated patients and to clinical scenarios in their first month and continue that exposure to patients throughout their four years. They are given many opportunities to experience the practice of medicine first hand. In the summer between their second and third year, they may spend six weeks with a doctor who practises in a rural area of the province. Ninety out of the class of 120 choose this option. A fourth-year elective gives students the chance to spend six weeks as clinical clerks in a third-world country. As many as one quarter of fourth-year students choose this option, and UBC medical students have recently undertaken to raise funds so that more can do so.

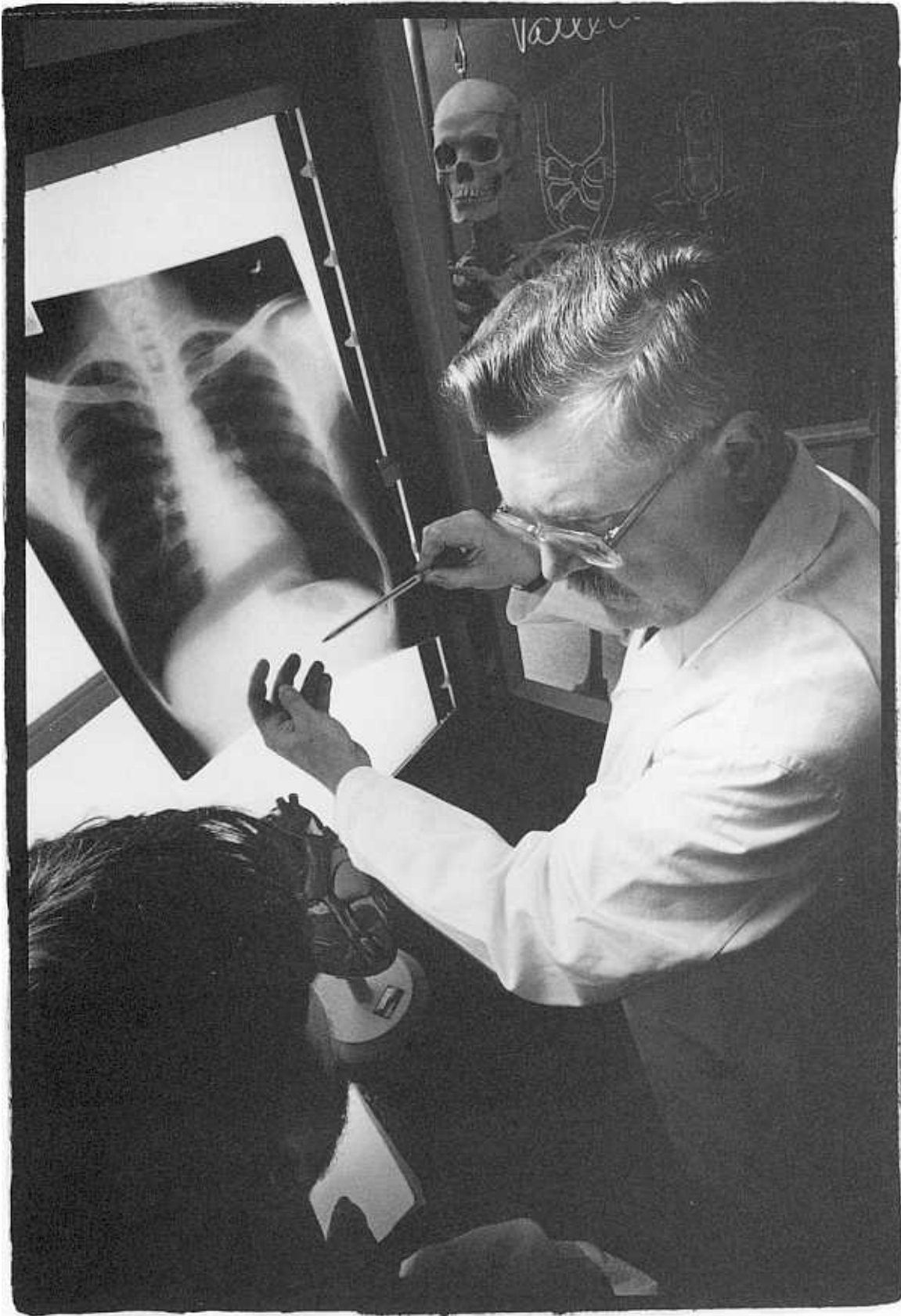
**THEY ARE  
GIVEN MANY  
OPPORTUNITIES  
TO EXPERIENCE  
THE PRACTICE  
OF MEDICINE  
FIRST HAND.**

Throughout their four years, UBC medical students are required to take courses that reflect the complexities and stresses of modern medicine: Biomedical Ethics, Medicine and the Law, Drug and Alcohol Abuse and Behavioral Sciences in Medicine. Noting that the general practitioner of the year 2000 will need a host of skills not strictly medical in nature, Dr. Roland Lauener, associate dean of Undergraduate Education, says, "We are looking at doctors who will be counsellors and communicators, who will have the ability to practise independently away from an urban area, who will be able to critically appraise what they are doing and what others are telling them to do, who will have a greater understanding of medical economics and who will understand that learning in medicine does not stop at the time of graduation."

## *Post-Graduate Education*

**AFTER RECEIVING THEIR MD DEGREES,** graduates are not qualified to practise until they have completed a one-year (soon to be two-year) internship in an accredited hospital. This may be done as a rotating internship, as an internship leading to specialty qualification, or as the first year of two years' training in Family Practice.

The majority of UBC medical graduates enter Family Practice. By 1993, two years of pre-licensure training will be the norm for family doctors across Canada. UBC's two-year family residency program, an option that has been available for some time, will need to double its capacity. Dr. Carol Herbert, head of the Department of Family Practice, explains that the program seeks to train professionals who can respond to the needs of their communities, whether that community is urban, rural or remote. "We are publicly funded to train individuals in the health sciences to do the job that is required in the place where they are required." The department looks with favor upon those who come from rural communities or whose previous activities have



*Each year, about  
120 new students  
are admitted into  
UBC's Faculty of  
Medicine. Seventeen  
departments provide  
training for B.C.'s  
future physicians –  
among them,  
Anatomy is one  
of the cornerstone  
basic-science  
departments.*

demonstrated a grounding in the community. "To me," she says, "it is basic that the school has a social contract which has to do with providing new knowledge, but also of educating people to attend to community needs."

The faculty offers 47 medical, surgical and laboratory residency programs that conform to the requirements of the Royal College of Physicians and Surgeons of Canada for the training of specialists.

In Masters and PhD programs administered by faculty departments, it had 299 students registered in the 1991-92 academic year. Of note among these programs are a newly approved MSc and PhD in Medical Genetics and the only departmental Obstetrics and Gynecology graduate program in the country. In addition, there were 120 post-doctoral or clinical research fellows associated with faculty investigators.

### *Research*

**OF THE MORE THAN \$107 MILLION** in grants and contracts awarded UBC researchers in 1990-91, the Faculty of Medicine received close to 37 per cent, with the Department of Medicine, funded to the amount of \$9.6 million, leading all other departments in the university. Within the faculty, seven other departments received more than \$2 million: Biochemistry, Health Care and Epidemiology, Medical Genetics, Ophthalmology, Pathology, Psychiatry and Pediatrics. This funding is for research located on campus, and in the hospitals and research centres. Of the 399 full-time faculty members, 253 receive research funding.

The funding sources are: Medical Research Council, Natural Sciences and Engineering Research Council, National Cancer Institute of Canada, B.C. Heart Foundation, Health & Welfare Canada, B.C. Health Care Research Foundation, and industry.

### *Experimental Medicine*

**EXPERIMENTAL MEDICINE IS THE STUDY** of the pathogenesis and treatment of disease. The emphasis of this graduate program is training in medical research. It allows students to work towards an MSc or PhD with investigators in one of seven divisions within the Department of Medicine in the Faculty of Medicine: Cardiology, Gastroenterology, Infectious Diseases, Molecular Medicine, Nephrology, Neurology and Respiratory Medicine. The objectives of the program include developing the ability to design experiments according to scientific standards and the ability to read scientific literature critically. Dr. Gary Quamme, Department of Medicine, is the director. In 1991-92, nine MSc and 10 PhD candidates were enrolled.

### *Preparing for the Year 2000*

**UBC'S FACULTY OF MEDICINE BEGAN ITS FIFTH DECADE** under a new dean. Dr. Martin J. Hollenberg, a neuroscientist, was Associate Dean of Research in the Faculty of Medicine at the University of Toronto when he was invited to lead the faculty. Dr. Hollenberg accepted the assignment knowing of UBC's strengths in teaching and research. "We have an exceptionally good curriculum for medical students. It's just been revised; it's up to date and it's evolving well. As for research — in lung disease, this is the Mecca in Canada. In hematology, we are close to the best. We have marvellous research in ophthalmology, in genetics, in infectious diseases and in epidemiology, and we have excellent molecular

### RESEARCH FUNDING

<b>1985-86</b>	\$22,834,168
<b>1986-87</b>	\$24,159,868
<b>1987-88</b>	\$26,929,301
<b>1988-89</b>	\$29,528,588
<b>1989-90</b>	\$34,174,595
<b>1990-91</b>	\$39,475,079

biological research going on here. In fact, I think we have a few people who are headed for a Nobel prize."

The faculty's strength in research stems in part from its immersion in a great university where inter-disciplinary collaborations abound and are encouraged. Medical research at UBC draws on and is accelerated by the basic-science expertise in such departments as Chemistry, Microbiology, Physics and Zoology. Its pure-science side is balanced by the many opportunities to apply and do research in clinical settings and by the willingness of its teaching hospitals to cooperate with the faculty in the development of research. Commenting that medical research need no longer be constrained by departmental, faculty or even university boundaries, Dean Hollenberg envisages UBC-directed medical research increasing its important contribution to the national endeavor.

Although it has the fifth-highest total enrolment in the country, it actually offers fewer undergraduate positions on a per-capita basis than the other 15 schools. Nearly 600 applicants compete each year for 120 first-year vacancies, and many qualified B.C. applicants are forced to seek their medical education elsewhere in Canada or internationally. Nevertheless, the faculty has no desire to increase the number of undergraduate placements. Instead, in light of the rising costs of health care and the increasing complexity of medical services, it believes its obligation to the province is to produce physicians versed in moral and ethical issues, concerned about cost-efficiency and effectiveness, and willing to practise in remote and rural areas. In order to encourage young students to pursue a scientific career, it has proposed a specialized stream within the 120 first-year placements for the aspiring clinician-scientist — the doctor who combines research with patient care.

In the past year, the faculty has outlined its plan to establish one of the world's leading medical research enterprises in Canada. Already, the faculty attracts \$39 million in direct research grants. Its total Medical Research Council support is exceeded only by the amounts awarded the much larger schools at the University of Toronto, the University of Montreal and McGill.

"The faculty," Dean Hollenberg says, "will be developing a very ambitious plan over the next couple of years which will emphasize several key areas in research. We are looking to build on our current strengths and develop them into internationally famous centres or programs or institutes that will bring international recognition to the place as a medical centre."

*Medicine 2000*, a document produced by the faculty in 1991, describes research proposals derived from departmental programs already in place:

- **A CENTRE FOR PREDICTIVE AND PREVENTIVE MEDICINE TO SCREEN FOR GENETIC SUSCEPTIBILITY TO DISEASES AND TO PREVENT OR DELAY THEIR ONSET.**
- **A CENTRE FOR TRANSPLANTATION BIOLOGY TO STUDY THE IMMUNE SYSTEM AND TO IMPROVE ORGAN AND TISSUE TRANSPLANTS.**
- **THE INSTITUTE FOR CHILD, MOTHER AND YOUTH STUDIES TO STUDY DISORDERS THAT AFFECT MOTHER AND CHILD IN THE PERINATAL PERIOD AND DISORDERS THAT AFFECT INFANTS AND YOUTHS.**

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MEDICINE, FUNDED  
TO THE AMOUNT OF  
\$9.6 MILLION, LEADING  
ALL OTHER  
DEPARTMENTS IN  
THE UNIVERSITY.**



- **THE CENTRE OF EXCELLENCE IN CANCER BIOLOGY TO DEVELOP DIAGNOSTIC AND TREATMENT PROCEDURES BASED ON GENE TRANSFER AND CELL-TARGETING PROCEDURES.**
- **THE BRAIN RESEARCH CENTRE TO STUDY, DIAGNOSE AND TREAT NEUROLOGICAL DISEASES.**
- **THE PULMONARY RESEARCH CENTRE TO INVESTIGATE COMMON PULMONARY AND CARDIOPULMONARY DISEASES, SEEKING NEW METHODS FOR THEIR PREVENTION AND TREATMENT.**
- **THE CLINICAL TRIALS FACILITY TO PROVIDE EARLY ACCESS FOR BRITISH COLUMBIANS TO NEW DRUGS, TO SELECT COST-EFFECTIVE DRUGS, AND TO TRAIN PROFESSIONALS SKILLED IN EVALUATING DRUG INFORMATION SO THAT THEY CAN GUIDE RATIONAL DRUG THERAPY.**
- **A CENTRE FOR HEALTH CARE EVALUATION TO CARRY OUT SCIENTIFIC RESEARCH ON CURRENT AND NEW METHODS OF HEALTH-CARE DELIVERY, ON NEW AND EXISTING TECHNOLOGIES, AND ON PROPOSED DRUGS AND PROCEDURES.**
- **THE DISCIPLINE DEVELOPMENT PROGRAM TO ASSURE THAT FACULTY RESEARCH GROWS RAPIDLY WITHIN EXISTING DEPARTMENTS, DISCIPLINES AND SCHOOLS.**

**THE FACULTY HAS SET A COURSE** towards the year 2000, guided by its social contract with the people of B.C. Reacting to the realities of medical practice in a province whose geography keeps many people distant from the major referral centres, in a time when expensive high-tech diagnostic and treatment procedures threaten to overwhelm an already burdened medical-care system, the faculty is training doctors who understand ethical and cost-management issues, who are advocates of preventive medicine and health promotion, who are able to participate in clinical research, who are familiar with community services and who are enthusiastic about practising in remote and rural areas.

Major funds in support of these objectives have already been raised through the university's World of Opportunity campaign. There are four endowed chairs in support of the Brain Research Centre, as well as chairs in areas such as Cardiology, Pediatrics, Surgery, Medicine, Anesthesia, Rheumatology, AIDS and Ophthalmology. Details of these generous gifts from individuals and organizations are outlined later in this report, including recognition of the key role played by the B.C. Government's matching program. ▀

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WITH THE FACULTY OF MEDICINE LAUNCHED IN 1950, THE PUSH FOR A FACULTY OF DENTISTRY BEGAN. THE PROCESS WAS LENGTHY BUT NOWHERE NEAR AS CONTROVERSIAL.

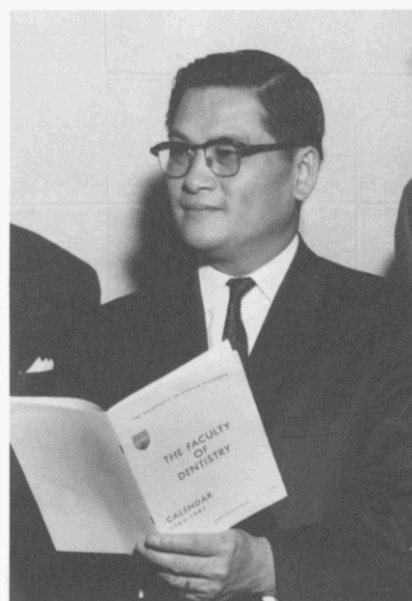
### III. *The Faculty of Dentistry*

**DENTISTS IN THE PROVINCE** were keen to have a faculty at UBC. Since 1882 when the first Dental Act was proclaimed, British Columbians had been trained in other provinces or in the U.S. Those who returned to practise in their native province had been forced to organize their own form of continuing education to keep up to date. For years, they had held study clubs, sometimes meeting in practitioners' offices where they might see visiting specialists demonstrate new techniques. Increasingly, however, they hoped for a faculty to provide continuing education.

The university wanted a faculty. Two committees on dental education, one in 1952 and another in 1954, agreed that one should be established, and Senate had concurred. The provincial government gave funds so that the university could employ a consultant in dental education. Dr. John Barfoot Macdonald, a young academic who was chair of the Division of Dental Research at the University of Toronto, began his survey in 1955. His thorough *Prospectus on Dental Education* was widely admired. Following Dr. Macdonald's report, the Board of Governors recommended the establishment of the faculty, but the provincial government would not provide funds, having perhaps paid heed to Dr. Macdonald's opening sentence: "A clear distinction needs to be drawn between *need* for dental services and *demand* for services ... the *need* for dental treatment is virtually universal. That the *demand* for treatment does not approach the need is natural."

In 1961, the university asked Dr. Macdonald, then in charge of a research institute at Harvard and a candidate for the presidency of UBC, to revise his report "in the light of any significant events bearing on problems of dental education which might have transpired in the past six years." He pointed out several significant events — one being the fact that the ratio of dentists in the rural areas of B.C. had worsened from one for every 5,500 persons to one for every 9,300. He then summarized his conclusions in simple declarative sentences, as if drilling home his points: "The need for a Faculty of Dentistry at the University of British Columbia is more urgent than it was in 1955. The ratio (of dentists to population) in British Columbia is already as bad as predicted for 1970. A dean should be appointed during the 1961-62 academic year. The first class should graduate in 1967."

Dr. Macdonald's timetable wasn't perfectly adhered to. On January 25, 1962, in a throne speech in Victoria, it was announced that the legislature would be asked to authorize funds to establish the faculty. A dean was appointed in 1962. Eight



*Dr. S. Wah Leung, the first dean of the Faculty of Dentistry at UBC. He was appointed in 1962 and remained dean for 15 years.*

students, who were enrolled in 1964, received their degrees in 1968 – in the presence of UBC's fourth president, John Barfoot Macdonald.

The first dean of dentistry was the first Chinese person appointed a dean at any Canadian university. Ironically, Dr. S.Wah Leung returned to a country where he had been unable to practise dentistry because of his race. Born in China, educated at UBC, McGill and the University of Rochester, Dr. Leung had established an academic career in the United States, where he was chair of the Department of Physiology in the School of Dentistry at the University of Pittsburgh. He conducted research in the biochemistry of saliva and the mechanism of dental calculus formation. When the invitation came from UBC, he had been at the University of California at Los Angeles for a year.

Dr. Leung recruited faculty and oversaw the construction of a building, which began in 1965. It should surprise no one familiar with UBC history that the Faculty of Dentistry had opened for business in a temporary hut in an orchard on the campus. The building contained a tiny lecture room, a laboratory and offices and research space for a few faculty. When it came time to set up a clinic for the patients who were to be treated by the first dental class, two large commercial trailers, bolted together, joined the hut in the orchard. These temporary facilities were abandoned in September, 1967, when the faculty moved into its present home – the John Barfoot Macdonald Building.

**THE FIRST DEAN  
OF DENTISTRY  
WAS THE FIRST  
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A DEAN AT  
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UNIVERSITY.**

The training of dentists wasn't the only mandate of the new faculty. In his first report, Dr. Macdonald had discussed the need for hygienists to work with dentists, improving their services and lowering the cost of dental care. UBC's two-year program of dental hygiene enrolled its first class of 20 in 1968. In 1970, the first graduates placed in the top five per cent in American National Board examinations, a feat that was repeated each year thereafter. In 1986, during a period of financial restraint, this successful program was transferred to Vancouver Vocational Institute (now Vancouver Community College), where its high standards have been maintained.

Dental students today do a rotation at the institute learning to integrate their work with that of a hygienist, and senior hygienists have contributed their services to the faculty's free summer clinic for children.

After 15 years, Dean Leung stepped down. His successor was Dr. George Beagrie, whose ambition was to surmount the widespread focus on dental training at universities in order to provide a profound education for dentists. In his 10 years as dean, the faculty added several academic programs: specialty training in periodontics, an MSc in dental sciences, a doctorate in oral biology, and a continuing education program in local anesthesia for graduate dental hygienists. It launched several initiatives: an oral pathology biopsy service, which today serves the entire country; a general practice residency program, now operating in four university-affiliated hospitals; and a dental clinic in the extended care unit of University Hospital-UBC site. It restructured itself from the original six departments to the current three: Clinical Dental Sciences, Oral Biology, and Oral Medical and Surgical Sciences.

Dean Emeritus Beagrie has recently been made an honorary member of the American Dental Association, an honor conferred on those who have made outstanding contributions to the advancement of the art and science of dentistry. Deeply involved in international dental health, Dr. Beagrie chaired the Fédération Dentaire Internationale Commission on Dental Education and Practice and was a

member of a World Health Organization Expert Advisory Panel on Oral Health.

The faculty's current dean, Dr. Paul Robertson was appointed in 1988. He came to UBC from the University of California, San Francisco, where he was a professor of Stomatology (the study of the shape, structure, function and diseases of the oral cavity). He completed graduate training in experimental pathology and certification in periodontology at the University of Alabama. Six months after Dean Robertson assumed office, the faculty's teaching, research and patient-care programs were reviewed by the Council on Education and Accreditation of the Canadian Dental Association. It reported, "The program in dentistry at the University of British Columbia is a mature educational program with many strengths." The council recommended full approval of both the undergraduate and periodontal postgraduate programs for a period of seven years.

Today, the faculty has 36 full-time faculty members and 112 clinical faculty. For the degree Doctor of Dental Medicine, it admits a class of 40 and graduates a number equal to about half the dentists who retire in the province every year. Although the province could accommodate more made-in-B.C. dentists, the faculty, taking into account the size of its physical plant, does not plan to increase its undergraduate class.

In the PhD program in Oral Biology, begun in 1986, faculty now supervise 12 or 13 candidates, while there are seven places in the MSc (Dental Sciences) program. Post-graduate specialty training is offered in periodontics, oral medicine, oral pathology and oral radiology, and seven hospital residency positions are available in a one-year program.

**PERFORMANCE  
TRAINING  
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FIRST YEAR  
IN THE SIMLAB,  
A TEACHING  
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IN NORTH  
AMERICAN  
DENTISTRY  
SCHOOLS.**

## *Undergraduate Program*

**BECAUSE NO INTERNSHIP OR RESIDENCY** experience is required to enter general practice in the province, the faculty must prepare graduates who have a high degree of technical skill as well as a sound background in the biological sciences. The four-year DMD program comprises 4,100 hours of didactic and clinical instruction. About 80 per cent of the program is taught by Dentistry faculty and a substantial proportion of the clinical instruction depends upon part-time faculty members.

Dental students study the same basic sciences as medical students and take many of those courses with them for the first two years. But in the final two years, dental students concentrate on acquiring the unique clinical skills necessary in the profession.

Performance training begins in the first year in the SIMLAB, a teaching unit, which is one of only two installed in North American dentistry schools. The SIMLAB setup provides each student with an adjustable stool, instrument tray, air suction, drill, overhead light and a permanently gape-mouthed mannequin on which to practise.

For the past two years, Dr. Lance Rucker, chair of the Operative Dentistry Division, has used peak performance training to enhance the efficiency of his students in achieving the levels of precision necessary to work in the mouth. "We are talking about the use of dental drills and hand instruments inside the mouth with better than one-millimetre accuracy, using mirrors no less," he says. "Peak



performance training teaches people how to apply visualization and imagery to achieve their highest levels of physical, emotional and mental performance." Studies of students using the technique have shown a five-per-cent improvement in measurable performance.

In their third and fourth years, students transfer the techniques practised on mannequins to real patients, whom they treat in the faculty's clinic in the Macdonald Building — the largest outpatient clinic in the province. With 80 chairs, filled five days a week, nine and a half months a year, the clinic is a formidable operation. It has x-ray facilities; units for developing radiographic film; laboratories where bridgework and dentures are designed and fabricated; and a dispensary where one endless chore is the sterilizing of instrument kits.

Necessary in the training of students, the large clinic is also a community service, providing dental care at about one-third the fee recommended by the College of Dental Surgeons. During the university term, students treat adults, selected because their requirements will provide experience in the various dental specialties. They also treat children, selected within the school system on the basis

of treatment and financial needs, and others whose parents have applied for service. Twice a week in first term and once a week in second term, 40 children under 15 come by bus from localities in the Greater Vancouver region. Dr. Penelope Leggott, who has organized the pediatric dentistry teaching program, explains that while the children's needs come first, a goal is to make sure that undergraduates get experience with various dental problems. "Students here get the best clinical pediatric dental education in North America."

An ambitious extension of the academic program is a Summer Dental Clinic, begun in 1974, and operating now for six weeks in May and June. Funded by the provincial government, the clinic provides free treatment for about 700 school-age children in Vancouver, Richmond and Burnaby and from Health Units in Surrey, New Westminister/Coquitlam and Maple Ridge. Twenty-four students,

who have just finished the third-year program and will be promoted to fourth year, take part in the clinic, supervised by faculty members in the Division of Pediatric Dentistry. Most children whose treatment cannot be completed in the summer return in the fall and spring clinic sessions — a service for which they are not charged.

This university-based community service is organized and directed by faculty from the Division of Preventive and Community Dentistry. In six weeks, it provides services estimated at more than \$200,000, and chairside education of inestimable value.



*The temporary huts (1964) which first housed the Faculty of Dentistry's teaching clinical facilities*

## *Specialty Service for the Community*

### **BRITISH COLUMBIA ORAL PATHOLOGY BIOPSY SERVICE**

AN INITIATIVE OF THE FACULTY OF DENTISTRY, the Oral Pathology Biopsy Service

is funded through and operated from University Hospital–Shaughnessy Site. Dr. Robert Priddy, Assistant Professor in the Department of Oral Medical and Surgical Sciences, started this mail-order diagnostic service in 1980. It is available to health-care professionals in the province, and is used primarily by dentists or maxillofacial surgeons, and sometimes by dermatologists and ear, nose and throat specialists. Its purpose is to microscopically review abnormal tissues from mouths and jaws. Dr. Priddy points out that the service is enhanced by the availability of both hospital diagnostic tests and university sophistication. Recently, he turned to colleagues in the Physics Department at UBC to determine whether metal used in a jaw surgery had been defective. Dr. Priddy says, “It’s a unique service. We have material coming to us from all over B.C. A dentist in an isolated community can remove something from a patient’s mouth, send it to us in the mail, and a week or so later have a report. That is quite a sophisticated tertiary diagnostic service.” Approximately 2,800 biopsies are performed in a year.

#### **NATIONAL STERILIZER MONITORING SERVICE**

THE DEPARTMENT OF ORAL BIOLOGY’S STERILIZER MONITORING SERVICE, which for some time was limited to dentists’ offices in B.C., has just gone national, having been chosen by the Canadian Dental Association as a member service. Its purpose is to test the efficiency of office autoclaves — pressurized-steam devices used to sterilize instruments. The department sends subscribers a strip of paper bearing spores of a hardy organism. If it is killed by the office’s sterilizing process, disease-causing microorganisms would also be killed. Approximately one-third of the dentists in the province use this service.

**UNDER DEAN  
LEUNG, A  
DECISION WAS  
MADE TO FOCUS  
ON CRANIOFACIAL  
BIOLOGY AND  
PERIODONTAL  
MICROBIOLOGY.**

#### **HOSPITAL DENTAL CLINICS**

THE DEPARTMENT OF ORAL MEDICAL AND SURGICAL SCIENCES is responsible for the development of hospital dentistry and the related disciplines of oral medicine, oral pathology, oral radiology and oral maxillofacial (or upper jaw) surgery. It has developed departments in five locations in university-affiliated hospitals. As well as teaching at the undergraduate and graduate levels, these departments provide specialized dental care for accident victims, children, cancer patients, and people with facial pain, Hepatitis B and disorders of the temporomandibular joint, which connects the lower jaw bone to the skull. Their facilities include an operating suite fully equipped for major oral and maxillofacial surgery and operatories for inpatient and outpatient services.

#### **RESEARCH**

HAVING BEGUN DENTAL RESEARCH WHEN IT WAS YOUNG AND SMALL, the faculty made a commitment to being great in a few areas and good in the rest. Under Dean Leung, a decision was made to focus on craniofacial biology and periodontal microbiology. The present dean supports that early choice. “I think we’ve continued to make major contributions to science and to health in the areas we deem the most important,” says Dr. Robertson. “At the moment, we consider infectious diseases — infections that affect the mouth and other parts of the body — to be a major problem in society and we have chosen to concentrate there. And we’ve decided that the development of the head, face, eyes and ears and the things in the environment that cause them to develop abnormally are a critical problem.”

By the time of its 25th anniversary in 1987, the faculty had a strong international reputation in research and its grant-funding relative to size was among the highest in Canadian dental faculties. It had hosted two international research symposia and had organized the Northwest section of the International Association for Dental Research, holding periodic meetings of the group. Dean Beagrie was the past president of the International Association for Dental Research, and other faculty members had served as its officers. In that association's programs, the faculty was cited as having one of the highest participation rates.

In Canada, faculty members have served on the Medical Research Council of Canada, the Medical Research Council Fellowship Committee and the research committees of the Canadian Association for Dental Research and the Association of Canadian Faculties of Dentistry.

Today, the dean chairs the Special Grants Review Committee of the National Institute for Dental Research in the United States, while Dr. Alan Hannam, Professor of Oral Biology, chairs the Dental Sciences Peer-Review Committee of the Medical Research Council. With the participation of other UBC professors on these committees, the faculty has a major influence on the direction of dental research in North America.

Craniofacial morphology — abnormal development in the face, mouth and teeth — is still the strongest research area of the faculty. It includes neuromuscular control of the tongue and airways, as well as dental occlusion and related jaw biomechanics. Sleep apnea — cessation of breathing — and cleft palate are two clinical manifestations of abnormal development studied at UBC. "In both those subjects, we are leading the research in Canada and we are one of several large North American centres," says Dr. Robertson.

Other research in oral biology stresses the biochemical, microbial, immunologic, and developmental aspects of oral tissues. It has been facilitated by the presence in the faculty of the current Dean of Science. Dr. Barry McBride, who was head of Oral Biology for seven years, is a world-renowned microbiologist, specializing in oral organisms. He has a joint appointment in Dentistry.

Clinical research encompasses such diverse topics as pediatric AIDS, the effects of smokeless tobacco, the performance of restorative dental materials, the diagnosis of temporomandibular joint disorders, methods for improving oral radiological diagnosis, and the ergonomics of practice — those performance-enhancing principles taught to students.

Basic dental science research is not isolated from biological research. Many Dentistry Faculty members have a doctorate in a basic science and apply their knowledge of neurophysiology, forensics, biochemistry and molecular biology to dental research. They also collaborate with colleagues in disciplines, such as medical genetics, and in areas of expertise, such as the biomaterials program in the Faculty of Applied Science. "The faculty is looking to expand its collaborative efforts with other faculties," says Dean Robertson. "Our intent has been not to have any dividing lines between this faculty and others, and we have tried over the years to collaborate and cooperate with other strengths on the campus."

## RESEARCH FUNDING

1986-87	\$ 985,412
1987-88	\$1,132,628
1988-89	\$1,025,096
1989-90	\$1,604,670
1990-91	\$1,771,500

## *Faculty Researchers Studying Oral Diseases and Abnormal Development*

### **DONALD BRUNETTE AND BIOMATERIALS**

TO UNDERSTAND THE PROBLEM that Dr. Donald Brunette is trying to solve, one has only to think of the body's response to a sliver. Epithelial tissue grows down and under anything foreign, attempting to push it up and out. Because of this, implants — such as catheters for kidney dialysis — tend to be gradually expelled. Dr. Brunette, who is head of the Department of Oral Biology, is particularly interested in improving the retention of dental implants that penetrate the gingiva — gum tissue. His research has focussed on how the surface topography of an implant affects the behavior of epithelial cells. Adapting techniques developed in the Department of Electrical Engineering to make solar cells, Dr. Brunette has put patterns on biomaterial surfaces — parallel grooves with a specific orientation. These impede downward growth by affecting the path of cell migration — a phenomenon that Dr. Brunette has been able to observe with his department's newly acquired confocal laser scan microscope and to record through time-lapse photography.

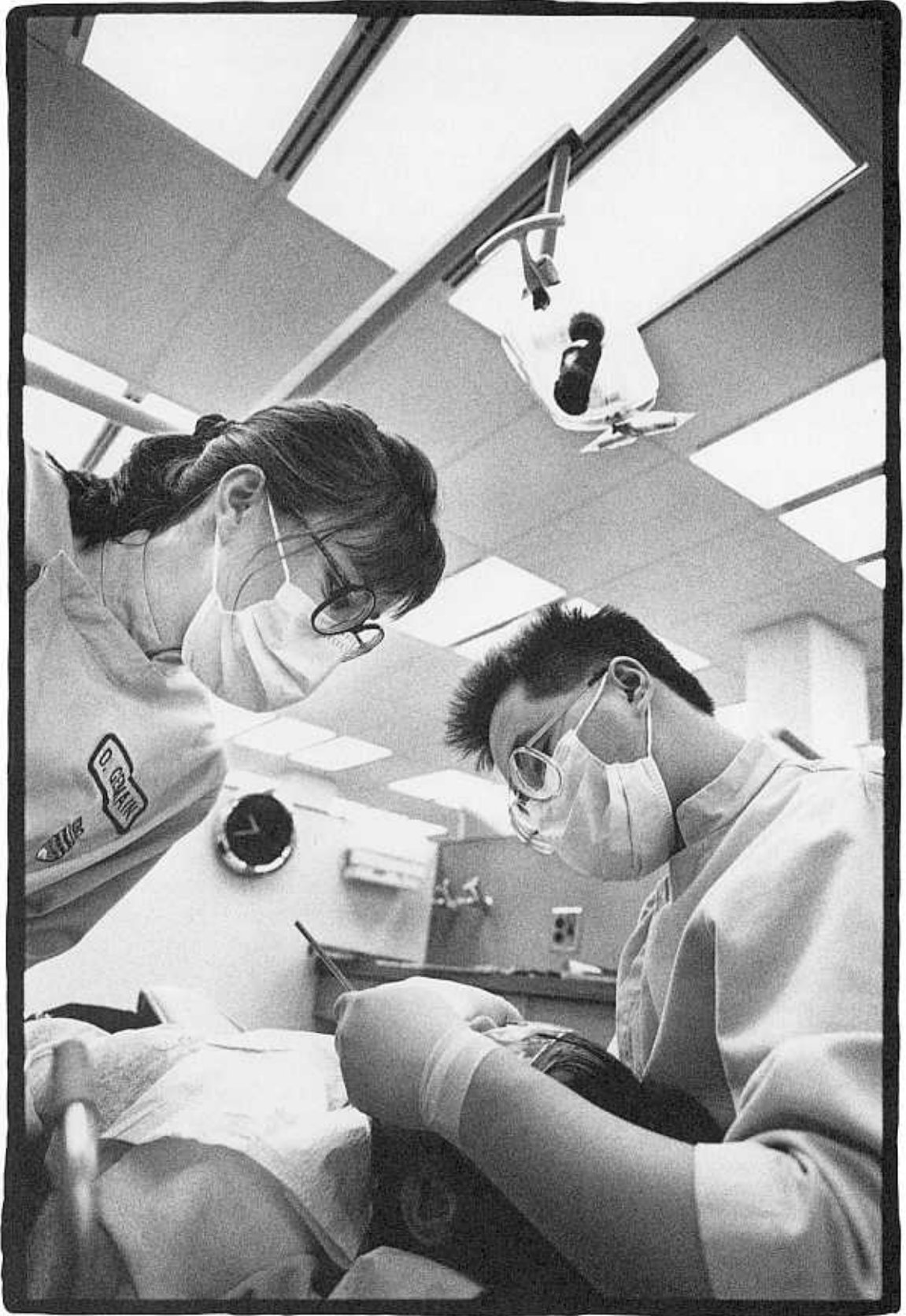
### **VIRGINIA DIEWERT AND CLEFTING**

DR. VIRGINIA DIEWERT, chair of the Division of Orthodontics in the Department of Clinical Dental Sciences, is one of only a handful of people in the world studying the early development of the face and the relationship to birth defects, such as cleft palate. Using different strains of mice, some of which get spontaneous cleft lip, she is analyzing the development of the face and what interferes with it at the critical time. "It looks like the gene or genes that cause cleft lip have some of their expression in the morphology of the face. They make it more difficult for the facial prominences — the little bulges that form the lips — to grow properly." Since not all mice with the gene develop a cleft, Dr. Diewert suggests that an environmental insult may be the key. In humans, that insult might be cigarette smoking, hypoxia or drug use. In order to understand normal development, she studies early human embryo collections in Washington, D.C., and Kyoto, Japan, where there are embryo collections made early in the century. "When we have a better understanding of normal development, we can then go to experimental work to test the effect of environmental insults, hoping one day to find out if there are ways of over-riding the gene effect."

### **ALAN HANNAM AND JAW MUSCLE FUNCTION**

IT IS DIFFICULT to electrically measure forces three-dimensionally in the small, damp space of the human mouth, but Dr. Alan Hannam, professor of Oral Biology, and his team have pioneered a technique for doing so. The team is also able to do something else that not many labs in the world can do: using Magnetic Resonance Imaging it has pioneered the recording of jaw reflexes at the level of the basic functional units in muscle. Computer reconstructions from the MRI scans contribute to this fundamental research on how the complex, multi-layered jaw muscles are organized. In another area of research, Dr. Hannam has borrowed a well-known engineering technique — finite element modelling — to look at the deformation and bending of the jaw when muscles contract. Dr. Hannam's work has practical applications in the surgical reconstruction of the face and in the planning of therapeutic procedures on the teeth.

*The Faculty of Dentistry offers dental services to residents throughout the Lower Mainland at its dental clinics at UBC. Senior students gain confidence through clinical practice under the supervision of faculty instructors.*





### **PENELOPE LEGGOTT AND PEDIATRIC AIDS**

DR. PENELOPE LEGGOTT, WHO CAME TO UBC in 1989, started working on pediatric AIDS in 1984 with well-known American AIDS researchers, John and Debra Greenspan. As an associate professor in the Department of Clinical Dental Sciences, she continues her association with the Oral AIDS Center at the University of California, San Francisco, working on projects with American colleagues. One, which involved psychologists, neurologists and pediatricians, is a long-term prospective study of children born to HIV-infected mothers in the Bay area. Another study with the University of Miami involves 100 children. Dr. Leggott is examining correlations between their immune status and any oral lesions. She explains that the oral manifestations of AIDS are quite different in children. "The most striking lesion we see is swelling of the saliva-producing gland in children. A third of the children get parotid swelling, but very few adults do."

A second focus of Dr. Leggott's research involves the effect of radiation on craniofacial development. She explains that children who receive bone marrow transplants used to be given a single dose of radiation to the whole body. They are now given fractionated radiation — more limited, twice daily doses over three days. While research has shown that single-dose radiation affects both long-bone and endocrine growth in children, it is not known if craniofacial development is also affected. Dr. Leggott has demonstrated that in rats, craniofacial development proceeds more slowly after single-dose radiation and normally after fractionated radiation.

### **ALAN A. LOWE AND OBSTRUCTIVE SLEEP APNEA**

ONLY IN THE LAST DECADE have scientists begun to study sleep apnea, which is a progressive and potentially fatal condition. UBC's contribution to that research is unique and has received a great deal of international attention.

Apnea — cessation of breathing — during sleep may not be well known, but it is widespread, affecting two per cent of men over 50. People with moderate to severe conditions may stop breathing for so long that low oxygen levels cause heart arrhythmia. "A large number of people who died in their sleep in years gone by were diagnosed as having had a heart attack or stroke, which were actually secondary events after apnea," says Dr. Alan Lowe, head of the Department of Clinical Dental Sciences.

There are two schools of thought concerning the cause of sleep apnea. One holds that it occurs because the tongue is too large or the airways are too small; the other suggests that brain function interferes with the respiratory muscles.

Dr. Lowe has focused on the size of the tongue and airways. Having done his PhD on neural control of tongue posture, he began to work with UBC's Dr. John Fleetham, an associate professor in the Department of Medicine and director of the Respiratory Sleep Disorders Clinic at University Hospital-UBC Site. Beginning in 1984 with CAT-scan measurements, they developed a computer program to quantify tongue and airway size and to pinpoint where breathing is obstructed. The program is recognized internationally as the most advanced diagnostic tool in the field. It is being used extensively at UBC to screen patients being considered for surgery. It is also being used to evaluate CAT-scan images sent by physicians in other provinces and the United States. "At the moment, the Faculty of Dentistry is the only place equipped to do three-dimensional reconstruction for patients with obstructive sleep apnea," says Dr. Lowe. "No one else has the software and no one else is providing the service."

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OVER 50.**

The service identifies patients suitable for surgery because they have enlarged soft palates, and those with large tongues who can benefit by using a dental appliance. Concomitantly, Drs. Lowe and Fleetham are now testing all known appliances that reposition the jaw and tongue, to see which are effective in sleep apnea. They have recently acquired a home monitoring device, which may circumvent the need for hospital admission, and will facilitate the testing of appliances.

#### **PAUL ROBERTSON AND SMOKELESS TOBACCO**

WITH DR. TIMOTHY GOULD, associate professor in the Department of Clinical Dental Sciences, Dean Paul Robertson is taking part in an American study of smokeless tobacco, a product used by 20 per cent of young males in the U.S. and Canada, and 55 per cent of baseball players. The research team, coordinated out of the University of California, includes cardiologists, epidemiologists and sports medicine experts. As the team dentist, Dean Robertson has attended baseball spring training camps in Phoenix for the past three years, examining major and minor league players. "About half those who use smokeless tobacco have obvious lesions in the mouth," says Dean Robertson. "We don't know if the lesions will result in cancer. A much higher proportion have gum disease at the site where the tobacco is used. The gum has been destroyed and the recession is permanent. Depending on the cancer results, that may be the saddest thing because gum disease predisposes one to a lot of other problems."

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#### **JOSEPH TONZETICH AND PERIODONTAL DISEASE**

IN 1970, DR. JOSEPH TONZETICH adapted a technique called "gas chromatography" in order to determine the components of bad breath. He was able to demonstrate that the culprits are sulphur compounds, which occur in small quantities in the mouth and are hard to separate from other compounds.

There have been three outcomes of that discovery: Companies from all over the world have asked him to test the efficacy of their mouth washes. He and two American scientists developed a breath test that pinpoints the precise time of ovulation by tracking the sulphur compounds in a woman's breath — a test that was patented with the idea that it might be used as a birth-control measure or as an aid to conception. And, today, Dr. Tonzetich is examining the role sulphur compounds — hydrogen sulfide and methylmercaptan — play in periodontitis, a disease that causes more loss of teeth in adults over 30 than do cavities.

Noting that levels of hydrogen sulfide and methylmercaptan were elevated in periodontitis, he has demonstrated that they fuel a chain reaction that results in the destruction of collagen in gum tissue. Methylmercaptan is the more destructive compound. He explains: "It augments the effect of endotoxin — a bacterial product — on macrophages [scavenger cells], causing them to produce more interleukin-1, which affects the metabolism of cells, such as fibroblasts, causing them to produce enzymes that destroy collagen in the tissues that support the teeth."

Early diagnosis of periodontitis is difficult because the disease has high-active and low-active periods. Dr. Tonzetich hopes that his gas chromatograph test will assist diagnosis of the active state of the disease, allowing early application of remedies and helping people to keep their teeth longer.

## *The Prospects for the Faculty*

**WHILE THE FACULTY OF DENTISTRY** does not plan to enlarge its undergraduate class, change will occur in other areas.

A post-diploma degree program in dental hygiene, approved in 1991, will prepare future academic and clinical leaders in the field. It builds on the Vancouver Community College diploma course for dental hygienists, which was originally developed and conducted by the faculty. The new degree course work will allow students to focus on community dental health care, advanced clinical practice or allied dental education and research. The program will be the first at a western Canadian university.

Graduate programs will be developed in oral radiology, oral medicine, oral pathology, and oral and maxillofacial surgery.

On the teaching side, oral biomaterials used in esthetic dentistry and in teeth implants will assume greater importance in the curriculum. The faculty will forge links with the faculties of Science and Engineering to enhance a developing expertise in materials science and bioengineering.

The curriculum will respond to the changing Canadian demography. Dean Robertson explains that with a longer-lived population, dentists have to be trained to meet different needs. "Seventy per cent of 60-year-old Canadians have retained their teeth. That requires care we didn't have to be prepared for 15 or 20 years ago. Because people are living longer, their teeth and surrounding tissues are at greater risk. Our curriculum is shifting towards the care of the older and medically compromised patient and the institutionalized person. Dentists must be trained to manage patients who have systemic diseases which require the use of medications that may affect the saliva and the way the teeth work."

To understand and meet the dental needs of the rising number of elderly Canadians living in institutions, the faculty is seeking funds to establish a chair for Geriatric Dentistry in partnership with University Hospital-Shaughnessy Site, and the Department of Veteran's Affairs. An endowed Chair in Geriatric Dentistry is the faculty's primary development campaign goal.

Having doubled its research funding in the past five years, the faculty is committed to increasing this rate of growth. ♥

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WHEN THIS UNIVERSITY WAS BEING PLANNED IN THE EARLY YEARS OF THE CENTURY, THE PHARMACEUTICAL ASSOCIATION OF BRITISH COLUMBIA APPROACHED THE MINISTER OF EDUCATION RECOMMENDING THAT A COURSE IN PHARMACY BE INCLUDED TO KEEP THE PROVINCE IN LINE WITH DEVELOPMENTS IN PHARMACEUTICAL EDUCATION ELSEWHERE IN THE COUNTRY. THAT PRUDENT PRESCRIPTION WOULD REMAIN UNFILLED THROUGHOUT, AND LARGELY BECAUSE OF, TWO WARS AND A DEPRESSION.

## *IV. The Faculty of Pharmaceutical Sciences*

AT THE END OF THE Second World War, the association renewed its efforts, presenting a brief that emphasized that the province was losing stature nationally because a university degree was not required to enter the profession. The association offered \$5,000 to equip a Department of Pharmacy, and the owner of a large chain of B.C. pharmacies, George T. Cunningham, said he would give \$25,000 for a building. In August, 1945, the Board of Governors and Senate approved the establishment of a degree course, which was to be offered by a Department of Pharmacy in the Faculty of Arts and Science. Esli L. Woods, who was on the faculty of the College of Pharmacy of the University of Saskatchewan, was hired to organize the course. He was assigned four of the ubiquitous army cast-off huts, which were outfitted as offices, laboratories and a lecture hall. Qualifying examinations were held in the summer of 1946 and 68 students were approved for admission. Eight of them were women and 54 were war veterans.

### DEANS OF PHARMACEUTICAL SCIENCES

1946-1951

ESLI L. WOODS

1952-1967

A. WHITNEY MATTHEWS

1967-1984

BERNARD RIEDEL

1985-

JOHN MCNEILL

When Dean Woods died in 1951, he was succeeded by Dr. A. Whitney Matthews, the first Canadian pharmaceutical sciences teacher to have a doctor of philosophy degree. By the end of its first decade, the faculty was confidently meeting its responsibility to the professional community by providing the basic scientific and practical training for the practice of retail pharmacy.

The growing need for pharmacists in hospitals was adding new responsibilities for the faculty. At the undergraduate level an option in Hospital Pharmacy Administration was provided, and internships were established in UBC's teaching hospitals. Faculty members, collaborating with hospital pharmacists, directed an instructional program that included study of hospital administrative policies, accounting procedures, inventory control and budget.

With the appointment in 1967 of its third dean, the faculty began to develop graduate training and research efforts. Having earned a doctorate in biochemistry at the University of Western Ontario, Dr. Bernard Riedel joined the Faculty of Pharmaceutical Sciences at the University of Alberta and helped to begin a research program there. Before coming to UBC, he had surveyed pharmaceutical sciences research in the country on behalf of the Medical Research Council. Because of his recommendations, grant funding in this area was moved from the National Research Council to the MRC.

At UBC, Dean Riedel prepared to build a strong research faculty. An appropriate step was a new name: the Faculty of Pharmaceutical Sciences. In 1970, a research wing was added to the George T. Cunningham Building and, with \$100,000 given by the Cunningham family, a mass spectrometer was purchased. A PhD program was approved and research-strong teachers were hired. "We had three areas of strength," says Dean Emeritus Riedel. "Pharmaceutical chemistry — the mass spectrometer added to the strength of that group — pharmacology and pharmaceuticals." By the time Dean Riedel retired in 1985, the faculty was bringing in research funding equal to its portion of the university budget.

Maintaining its social contract in this period, the faculty began producing more pharmacists for the province, increasing its graduating class from 25 in 1967 to around 125. Under Dean Riedel, a program of clinical teaching in hospitals and pharmacies and a residency program in the hospitals were also developed.

## *The Department of Pharmacology*

**CONFUSING TO THE OUTSIDER** is the presence on campus of two seemingly similar instructional and research programs. As well as the Faculty of Pharmaceutical Sciences, there is within the Faculty of Medicine a Department of Pharmacology and Therapeutics. At the undergraduate level, the department offers a four-year BSc in Pharmacology while the faculty offers a five-year professional degree in Pharmacy. Both offer MSc and PhD degrees.

Dr. John McNeill, dean of the Faculty of Pharmaceutical Sciences since 1985, says that he is often referred to as the Dean of Pharmacology, which is understandable because he is a pharmacologist. But Pharmacology is only one of the pharmaceutical sciences. "The pharmaceutical sciences include pharmacology, which is the study of the effects of drugs; medicinal chemistry, the study of the chemistry of drugs; and pharmaceuticals, which has two branches involving the formulation of drugs, and the way drugs get into the body, where they go and how they get out." These sub-specialties are reflected in the organization of the faculty which has divisions of Pharmacology and Toxicology; Pharmaceutical Chemistry; Pharmaceuticals and BioPharmaceuticals; Pharmacy Administration; and Clinical Pharmacy. Medical, dental and science students study pharmacology but not to the same extent as the pharmacy student.

Today, with 35 full-time faculty and 292 clinical assistant professors and clinical instructors, the faculty has approximately 425 undergraduate students. It can take in a maximum of 132 new students. Recent classes have had high incoming averages. While the University Calendar gives a 60 per cent average in the first-year science program as a requirement, the mean for the 1990-91 class was 74 per cent. Dean McNeill points out that there used to be a significant attrition rate in



*UBC benefactor, George T. Cunningham, after whom the building that houses Pharmaceutical Sciences is named, is flanked on the left by former President Norman A. MacKenzie (1944-62) and on the right by former Chancellor Albert E. Grauer (1957-1961) with Dr. A. Whitney Matthews, UBC's second dean of the Faculty of Pharmaceutical Sciences.*



pharmacy classes because students would fail or switch to other disciplines. That no longer happens, says the dean, because students are academically superior and because they are committed to pharmacy.

The faculty has recently revised its curriculum, increasing the pharmacy practice content in the entire program and introducing it into the first- and second-year curriculum. These changes respond to a need to equip a pharmacist quite differently today. "The cliché is that we have gone from a product-oriented profession to a people-oriented profession," says Dean McNeill. He explains that there was a time when pharmacists compounded the remedies they sold. As the complexity and number of pharmaceutical preparations increased, pharmacists began to dispense products they obtained from industry in a finished form. "We went through a bad time, not so long ago, when we counted, poured, licked and sticked," he says. But today the profession is in a new phase. Pharmacists act as supervisors and controllers of drug therapy — making sure that people get the right drug with the right directions and with some assurance that there will be no adverse reaction. In hospitals, they are involved in deciding what drug should be used and how it should be given — decisions that used to be totally in the realm of medicine. "A capsule comment," Dean McNeill quips, "would be that pharmacists are now drug-information specialists."

RESEARCH FUNDS  
RECEIVED BY THE  
FACULTY

1985-86
\$2,290,139
1986-87
\$2,112,587
1987-88
\$2,073,050
1988-89
\$1,852,337
1989-90
\$1,972,079
1990-91
\$3,092,556

While pharmacy students still learn chemistry and compounding, the required courses in their final year, taught by the Division of Clinical Pharmacy, are devoted to learning the practical aspects of the profession. Approximately 110 community pharmacies in the province are used as training sites where students spend 160 hours in a four- to five-week period in the summer before their final year and four weeks in their final year. In addition, students spend two weeks in one of 18 hospitals in the Lower Mainland. Graduates must also work for 160 hours in community pharmacy before they take their licensing examination. This puts a heavy burden on the pharmacist who is trying to run a business. "Our profession is very good to us," says Senior Instructor Marguerite Yee, who assigns students to their community clerkships. "Without their help we would be hard-

pressed to give practical experience to our students."

In graduate studies, there are 16 MSc candidates and 22 PhD candidates. The faculty initiated the first professional PharmD program in Canada in September, 1991. It is intended to provide a more highly trained pharmacy practitioner. The faculty has also gained a Chair in Pharmacy Administration and two Professorships in Clinical Pharmacy.

## *Research*

UBC'S FACULTY IS ONE OF THE MOST ACTIVE in pharmaceutical research in Canada. Currently, the faculty receives substantial awards from the Medical Research Council, B.C. Heart Foundation, the B.C. Health Care Research Fund, the Cystic Fibrosis Foundation and the National Centres for Excellence. Researchers in the faculty continue to achieve national and international recognition for their

expertise in the areas of diabetes, cardiovascular disease, cystic fibrosis, pharmaceuticals and drug metabolism, and drug analysis and kinetics. A team of three faculty researchers — Dr. James Axelson, Dr. Frank Abbott and Dr. Wayne Riggs — has one of the few program grants ever awarded to a pharmacy faculty. As well, Dr. Peter Soja, assistant professor of Pharmacology and Toxicology, has a major MRC development grant — also a rarity in pharmacy schools.

#### **FRANK ABBOTT AND DRUG METABOLISM**

DR. FRANK ABBOTT, chair of the Division of Pharmaceutical Chemistry, is also an associate member of the Department of Pediatrics. The emphasis of his research is drug metabolism. He is developing methods of identifying and quantifying drugs and metabolites in biological tissues. Among the drugs Dr. Abbott is investigating is the anticonvulsant, valproic acid, which is used in the treatment of seizures. Its metabolites are thought to cause a rare but fatal liver toxicity. Dr. Abbott works in close collaboration with Dr. James Orr, whose specialty is pharmacokinetics, and with Dr. Kevin Farrell, a neurologist and head of the epilepsy clinic at B.C.'s Children's Hospital.

#### **JAMES AXELSON AND DRUG EFFECTS IN PREGNANCY AND THE NEONATE**

DR. JAMES AXELSON, a professor in the Division of Pharmaceutics and BioPharmaceutics, is coordinator of a multi-disciplinary group of investigators funded by the Medical Research Council. The group includes Dr. Frank Abbott and Dr. K. Wayne Riggs of the Faculty of Pharmaceutical Sciences, as well as others in the Faculty of Medicine. It has \$2.7 million over five years to study drug effects and toxicology in pregnancy, the newborn child and the young child. In announcing the grant, Dr. Lewis Slotin, MRC program director, said, "The team ... has been identified by the MRC to be unique in Canada for their collective expertise and ability to focus on drug toxicology in early life." Currently, Dr. Axelson is studying the effects on the fetus and in the mother of antihistamines, antiemetics, tocolytic agents used to suppress premature labor, and drugs used to treat pregnancy-induced hypertension.

#### **GAIL BELLWARD AND CYTOCHROME P450S**

DR. GAIL BELLWARD, professor of Pharmacology and Toxicology, studies a family of enzymes known as cytochrome P450s, which break down foreign chemicals so that the body can dispose of them. From a medical standpoint, Dr. Bellward is interested in the activity of P450s when people are taking several prescription drugs, with the ultimate goal of suggesting more rational drug therapies. She explains that when the synthesis of one P450 has been activated by exposure to a chemical in a prescription drug, there is commonly a decrease in the synthesis of other P450s. If these latter enzymes are unavailable to deal with chemicals in a second prescription drug, toxic levels can build up rapidly. Her recent research has shown that the drug Cymetadine inhibits only one form of cytochrome P450, indicating that it is a safe drug except in extremely specific situations when it could be dangerous. In another area of research, Dr. Bellward studies imprinting, which is a term for the action of a sort of gender-related DNA alarm clock that is set ticking at about six months of age and activates an event, such as puberty,

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ASSISTANT  
PROFESSORS AND  
CLINICAL  
INSTRUCTORS,  
THE FACULTY HAS  
APPROXIMATELY  
425  
UNDERGRADUATE  
STUDENTS.**

years later. Dr. Bellward has been able to show that imprinting can occur after the neonate period — that a female rat treated with testosterone for a few days during puberty will begin to express a cytochrome P450 that is found only in males. The findings have relevance for female athletes who are taking high amounts of corticosteroids which have androgenic side-effects similar to testosterone and might permanently affect their metabolism. Dr. Bellward's imprinting research has implications for the babies of opiate addicts who were maintained on narcotic substitutes during pregnancy.

#### **JACK DIAMOND AND CYCLIC NUCLEOTIDES**

DR. JACK DIAMOND is chair of the Division of Pharmacology and Toxicology. In the past few years, his research has been concerned with the roles of two cyclic nucleotides in the control of cardiovascular function. Cyclic AMP and cyclic GMP are believed to mediate the effects of various drugs and hormones on a number of tissues. Evidence from Dr. Diamond's laboratory suggests that the major role of cyclic GMP in the cardiovascular system is as a mediator of the vascular relaxation caused by relaxants such as acetylcholine and by vasodilators such as nitroglycerin.

#### **DAVID FIELDING AND CONTINUING PROFESSIONAL COMPETENCE**

DR. DAVID FIELDING, chair of the Division of Pharmacy Administration, has been working on a three-year joint venture with the College of Pharmacists of British Columbia, investigating ways of ensuring the continuing competence of licensed pharmacists. More than 500 pharmacists in the province have participated in the study, helping the UBC team from Medicine, Statistics, Education and Pharmaceutical Sciences to define and validate areas of competence and to check possible test instruments. Dr. Fielding explains that there are different philosophical approaches to the issue of continuing competence. Many jurisdictions make continuing education mandatory but do not test practitioners. Feeling that competence is the ultimate goal, the B.C. college has chosen to make continuing education voluntary but testing mandatory. The UBC team's task has been to develop a test that is reliable, valid, acceptable to the membership and able to be administered all over the province and to members who have left B.C. but want to maintain their status.

Continuing education in Pharmaceutical Sciences is a cooperative venture of the college and the faculty. In 1976, a coordinated system of continuing education courses was begun. It now involves 30 communities around the province. "We have a program that would rival any other in the country in terms of the number of diversity of courses," says Dr. Fielding. Some pharmacists in the province participate in correspondence programs; others do a lot of self-directed learning. "One of the things that the college competency assessment program is saying is we don't care how you do it," says Dr. Fielding. "All we say is we will define what we consider the minimum level and you must meet it or do something about it."

#### **SIDNEY KATZ AND BASIC ION-TRANSPORT DEFECTS**

DR. SIDNEY KATZ, a professor in the Division of Pharmacology and Toxicology, is investigating basic ion-transport defects in cystic fibrosis. In the area of heart research, he is looking at the role of calcium and protein kinases (regulatory enzymes) in heart contraction. "We are well on the way to understanding how the cystic fibrosis gene causes problems," says Dr. Katz. "We hope to play a role in understanding the defect and finding a treatment." Dr. Katz is known nationally as

a public speaker and broadcaster on science. The Canadian Federation of Biological Societies has given him the first Gordin Kaplan Award for his exceptional contribution to raising public awareness of science. Dr. Katz is a member of the Respiratory Health Network of Centres of Excellence and has recently been appointed executive director of Science World British Columbia.

#### **JOHN MCNEILL AND VANADIUM USE IN DIABETES**

DEAN MCNEILL'S RESEARCH involves vanadium, a simple inorganic trace element. He has created vanadium compounds that can mimic the effects of insulin or enhance the effect of small amounts of insulin produced by diabetic animals. Recently, with Dr. Chris Orvig in the Department of Chemistry, he has applied for a patent on an organic vanadium compound that works better than previous compounds he has tested. Dean McNeill has been appointed to the board of directors of the Pharmaceutical Manufacturers' Association of Canada Health Research Foundation. The foundation provides funds for research and personnel support in Canada in the fields of pharmacology, clinical pharmacology and therapeutics. Dean McNeill will review funding applications and participate in setting the policy of the board.

#### **B.C. DRUG AND POISON INFORMATION CENTRE**

THE B.C. DRUG AND POISON INFORMATION CENTRE, located at St. Paul's Hospital, was established in 1975 by the Hospital Programs Branch of the B.C. Ministry of Health and the Faculty of Pharmaceutical Sciences. It is staffed with pharmacists, nurses and physicians who have expertise in the provision of drug and poison information services. Expanding on its original mandate to create services to help health professionals in the province provide the best possible drug therapy and poison management, the centre has added publications and telephone request services. It produces several publications:

- THE DRUG INFORMATION REFERENCE WITH 325 MONOGRAPHS ON FREQUENTLY USED DRUGS. AVAILABLE IN TEXTBOOK AND ELECTRONIC VERSIONS, THE DIR IS WIDELY USED IN ACUTE-CARE AND LONG-TERM FACILITIES IN B.C. AND ACROSS CANADA. THE ELECTRONIC VERSIONS ARE INSTALLED IN HOSPITAL INFORMATION AND PHARMACY DEPARTMENTS IN 27 CANADIAN HOSPITALS AND FOUR AUSTRALIAN HEALTH-CARE FACILITIES.
- DRUG INFORMATION PERSPECTIVES IS A QUARTERLY NEWSLETTER SENT TO SUBSCRIBERS OF THE DIR. IT IS USED TO UPDATE INFORMATION, MENTIONING NEW DRUG INTERACTIONS AND ADVERSE EFFECTS.
- THE MASTER DRUG LIST LISTS ALL DRUG PRODUCTS APPROVED FOR SALE IN CANADA. ITS UNIQUE CLASSIFICATION SYSTEM PROVIDES AUTOMATIC ALERTS ON DRUG ALLERGIES AND INTERACTIONS. IN HOSPITALS, THE MDL CAN SERVE AS A BASELINE FOR DEVELOPING FORMULARIES, DRUG INVENTORY CONTROL AND DRUG-USE REVIEW PROGRAMS.
- THE POISON MANAGEMENT MANUAL FOR MANAGING POISONED PATIENTS IS MADE AVAILABLE TO ALL EMERGENCY DEPARTMENTS IN THE PROVINCE AND IS USED EXTENSIVELY ACROSS CANADA.
- POISON PERSPECTIVES NEWSLETTER IS A QUARTERLY DISTRIBUTED TO HEALTH-CARE PROFESSIONALS IN ACUTE-CARE HOSPITALS AND PUBLIC HEALTH UNITS.

The centre provides drug and poison telephone consultations for professionals throughout B.C. and poison information for the public in Greater Vancouver and the Lower Mainland, and in the Capital Regional District.

The centre operates a Drug Use Review program to assist physicians and pharmacists in improving the quality of prescription drug usage in the province. Patterns of exceptional prescribing and use of drugs are identified through patient prescription records. These exceptional cases serve as the basis of educational programs. Physician and patient confidentiality is maintained through a coding system. ▀

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IN 1922, WHEN UBC STUDENTS MARCHED EN MASSE FROM THE UNIVERSITY'S DOWNTOWN LOCATION TO ITS PROMISED BUT MUCH-DELAYED NEW SITE AT POINT GREY, THREE STUDENTS PROUDLY CARRIED A BANNER, PROCLAIMING, "WE'RE THE FIRST THREE WOMEN IN THE BRITISH EMPIRE TO GET DEGREES IN NURSING."

## *V. The Care-Giving Professions*

### *The School of Nursing*

**BEATRICE JOHNSON, MARION FISHER, AND MARGARET HEALY** were graduated from the UBC Department of Nursing in May, 1923. Beatrice Johnson, who later married Professor Frederic Wood, founder of UBC's Players' Club, recalls the challenge and excitement surrounding the early days of the nursing school: "Like all pioneers, we found a tremendous satisfaction in accomplishing our purpose. It was exciting to be first in the new field."

Ever since its inception as a department in the Faculty of Applied Science in 1919, the UBC School of Nursing has been committed to pioneering new directions in the profession. Established very much in the spirit of ground-breaking, the school has throughout its long history resolved to develop the role of the nurse in the medical team by constantly re-evaluating and revising its teaching in nursing practice, research and instruction.

Change often meets with resistance, and the Department of Nursing certainly faced its share of opposition, especially in its fledgling years. When presented with the suggestion of a university degree program for nurses, the College of Physicians and Surgeons responded in 1919 that "the overtraining of nurses is not desirable and results largely in the losing of their usefulness." The antipathy of medical men towards advanced training for nurses was fortunately not shared by all doctors, however. In fact, it was Dr. Malcolm MacEachern, Medical Superintendent of Vancouver General Hospital, who first broached the notion of a UBC nursing program.

Dr. MacEachern, a well-known proponent of the Hospital Standardization movement then gaining popularity throughout North America, saw the establishment of a uniform, standardized university nursing course as part of a plan to improve hospital services as a whole. In 1918, at the first meeting of the British Columbia Hospitals Association, he proposed that a nursing chair or department be



set up at the University of British Columbia — at that time located right next door to the hospital on the Fairview site. He also suggested that the university take over instruction at the Vancouver General Hospital Training School for Nurses.

UBC President Franklin Fairchild Wesbrook was not enthusiastic about the idea. Although himself a medical doctor who had previously been involved in the inauguration of the Department of Nursing at the University of Minnesota, Dr. Wesbrook held that the poor financial situation of UBC precluded the establishment of a nursing school at that time. The lack of funding from the newly elected Liberal government, combined with wartime cutbacks, had left the university in no position to branch out in a new, untested direction.

Dr. MacEachern responded, in a February, 1919, letter to the UBC Senate, that the hospital would be responsible for all expenses associated with the nursing program. This included the salary of the hospital's director of nursing, who would also serve as the director of the university's department. The UBC Senate subsequently recommended to the Board of Governors that the scheme be adopted.

At that time, spurred by the aftermath of the First World War and the devastation of the Spanish Flu epidemic that had swept the world, the university had been concerned about providing useful vocational skills to its students as well as purely academic preparation. The establishment of a practical training program, such as the nursing school, thus fit well with the university's needs at that time, especially since nurses were in short supply throughout the province. In October of 1919, the UBC Board of Governors approved the Senate recommendation, and the first university school of nursing in Canada was born.

The department was fortunate to acquire as its first director, Ethel Johns, who was principal of the training school at Winnipeg Children's Hospital and an executive member of the Canadian Association of Nursing Education. Miss Johns was initially a concern because she did not have a university degree, but she quickly proved herself to be highly competent. Her exceptional insights into nursing education formed the backbone of the instructional program, while her rousing speeches and eloquent writings on the subject of broader and more advanced training for nurses no doubt converted many a skeptic.

The five-year baccalaureate degree developed by Miss Johns and her colleagues, comprising three years of university study and two years of hospital training at VGH, was known as the "combined course." In addition to practical clinical training, students attended university classes in nutrition, sanitation and hygiene, the history of nursing, and motor mechanics. The latter was designed for public health students whose careers would entail a good deal of travelling by car in rural and remote areas.

The emphasis on advanced education for nurses was to prepare them to fill expanded roles as administrators and educators and, especially, to provide public health nursing. These goals were closely linked to the health concerns of the time, which included spread of communicable diseases and high infant mortality.

The affiliation between UBC and VGH was never intended to be exclusive, but the successful joint program continued in this way for more than 40 years, with the



*Ethel Johns, the first director (1919 - 1925)  
of UBC's School of Nursing.*

last class to complete the combined course graduating from the hospital in 1960 and the university a year later.

In 1951 the department had become a school. Its director at the time was Evelyn Mallory. Never happy about an arrangement that had nursing students at the university for two years, at the hospital for two years and then back at the university for a final year, Mallory revised the degree program to entail extensive clinical work at various hospitals — in the Lower Mainland and throughout the province. A new uniform, cap and pin were introduced, and the curriculum was changed to reflect emphases on technical requirements for nurses in hospitals. Plans for a graduate program were made at this time, although it was not until 1968 that the two-year masters actually came into being. In 1973, the baccalaureate degree program was reduced to four years — a format that continues to this day.

### *Instructional Programs*

**THE SCHOOL, STILL A SEPARATE ENTITY** within the Faculty of Applied Sciences, now offers a four-year baccalaureate program for initiate nurses and a two-year baccalaureate program for registered nurses — both leading to the degree of Bachelor of Science in Nursing. Also offered is a two-year Master of Science in Nursing. The school has earned a national reputation for excellence in its undergraduate and masters programs, and will be among the first to offer a doctorate in nursing beginning in September, 1991. According to Director Marilyn D. Willman, the doctorate program will provide a major avenue for advancing nursing science and care as laid out in the UBC Model of Nursing, which is a sort of mission statement for the university's student nurses.

The UBC model was introduced into the program in the early 1970s to provide direction for nursing research, teaching and practice, and it continues to provide a framework for instruction and learning today. The model stresses the role of the nurse as a nurturer of health rather than a curer of diseases. The nurse makes this unique contribution of care, as opposed to cure, as an integral member of the team of health professionals whose ultimate goal is the optimal health of the population. The model has been adopted by a number of hospitals in British Columbia as a framework for providing care.

The school continues to develop within the framework of the model. In particular, there has been a substantial increase in research activity in recent years, including the establishment of a Nursing Research Unit in 1988. The unit was established to support the development of nursing research within the school and is designed to improve the quality of health care in the province by generating knowledge through nursing research. In 1989-90, research funding in the school rose from \$225,909 to \$341,486. An Endowed Chair in Nursing and development of the PhD program in nursing will also contribute to the application of research findings in the improvement of health and nursing care.

Four major areas of research activity are being actively pursued by faculty and students: family health care; the management of chronic illness; cross-cultural health care; and aging. The school is committed to addressing these dominant health problems through its research projects.

### RESEARCH FUNDING

1986-87	\$ 70,016
1987-88	\$ 78,530
1988-89	\$176,874
1989-90	\$225,909
1990-91	\$341,486

## *Research*

### **SIBLING DEATH TRAUMA:**

Dr. Elizabeth Davies is exploring the effects of death and disease on the patient's family, particularly siblings, to discover the ways in which nurses and other health-care professionals can help during the terminal phase so that long-term bereavement is less traumatic. Professor Davies is the first nurse recipient of an investigatorship funded by the B.C. Children's Hospital Research Division.

### **BREASTFEEDING STUDIES:**

In various studies conducted by Donelda Ellis, associate professor, and Roberta Hewat, assistant professor, problems experienced by nursing mothers are being examined. The two researchers have also established a free breastfeeding clinic at UBC to instruct and inform mothers about proper breastfeeding techniques. The clinic is one of only two in Canada.

### **CARING FOR MS PATIENTS:**

Helen Niskala, associate professor, and Marilyn Dewis, assistant professor, are studying the well-being of the family members caring for an MS patient to understand the ways these caregivers can be emotionally supported by nurses and other medical professionals.

### **MIDWIFERY STUDIES:**

Elaine Carty, associate professor, and Alison Rice, assistant professor, are qualified midwives, working to establish midwifery as a recognized profession in order to complement existing provincial health-care services and help cut maternity-care costs.

**IN ADDITION TO THE RESEARCHERS DISCUSSED ABOVE,** Dr. Joan Anderson has brought a particularly high level of recognition to UBC's nursing program through her activities as National Health Research Scholar (1988-1993). Dr. Anderson's work has centered on caregiving in a multicultural context. Nurses in British Columbia are increasingly coming into contact with people from a variety of different ethno-cultural groups, and according to Dr. Anderson, it is important that they understand the impact of cultural and social factors on how people manage their health.

Dr. Anderson's research includes comparative studies of Chinese and White families caring for a chronically ill child at home; an examination of the health status of immigrant women; and research into the cultural context of caregiving. Along with Dr. Nancy Waxler-Morrison, in the Department of Anthropology and Sociology, she has recently published a unique handbook for health professionals in Western Canada. It deals with cross-cultural caregiving, and gives specific guidelines for providing care to recent immigrant groups from Vietnam, South and Southeast Asia, China, Japan, Central America, the West Indies and Iran.

**WHILE CONTINUING TO DEVELOP ITS RESEARCH** and scholarly programs, the School of Nursing is also committed to remaining loyal to its founding principle — training students to provide high-quality nursing care to the public. With its collaborative approach to the health sciences, the UBC School of Nursing is working to reduce health-care costs through more effective care-giving in

### **THE DIRECTORS OF THE SCHOOL OF NURSING**

1919 - 1925  
ETHEL JOHNS

1925 - 1941  
MABEL F. GRAY

1941 - 1967  
EVELYN MALLORY

1967 - 1971  
ELIZABETH KENNY MCCANN

1971 - 1977  
MURIEL UPRICHARD

1977 -  
MARILYN WILLMAN

conjunction with physicians, therapists, social workers, and other medical professionals for the betterment of the B.C. and Canadian health-care systems.

## *The School of Rehabilitation Medicine*

**IN SOME WAYS, THE SCHOOL OF REHABILITATION MEDICINE** is a square peg in a round hole. Administratively placed in the Faculty of Medicine, it approaches health problems in a way that is more closely allied with social sciences. "We don't view things within a medical frame of reference," says its current director, Dr. Charles H. Christiansen. "We aren't oriented by the idea that a diagnosis has to be made in order to determine what has to be done. In rehabilitation, the first thing that must be asked is how does the deficit affect the person's lifestyle?"

Not to be confused with the Division of Rehabilitation Medicine in the Department of Medicine, the school offers a professional program for physiotherapists and occupational therapists, whose role is caring for chronically disabled patients at the point where medical or surgical care stops. Dr.

Christiansen explains: "Our view in this school is that people who have conditions that are not amenable to surgical or medical cure should not be tucked away and forgotten."

The school's first director, Dr. Brock Fahrni, had come to the university in 1952 as a clinical instructor in the Department of Medicine. Renowned for his radical approach to geriatrics, Dr. Fahrni challenged traditional ideas about aging and worked to provide programs of assistance to keep elderly people in the community. Thus founded on the basis of opposing traditional stereotypes of aging, the school has had a long history of helping the elderly and the chronically disabled overcome both the physical and emotional deficits brought about by their conditions.

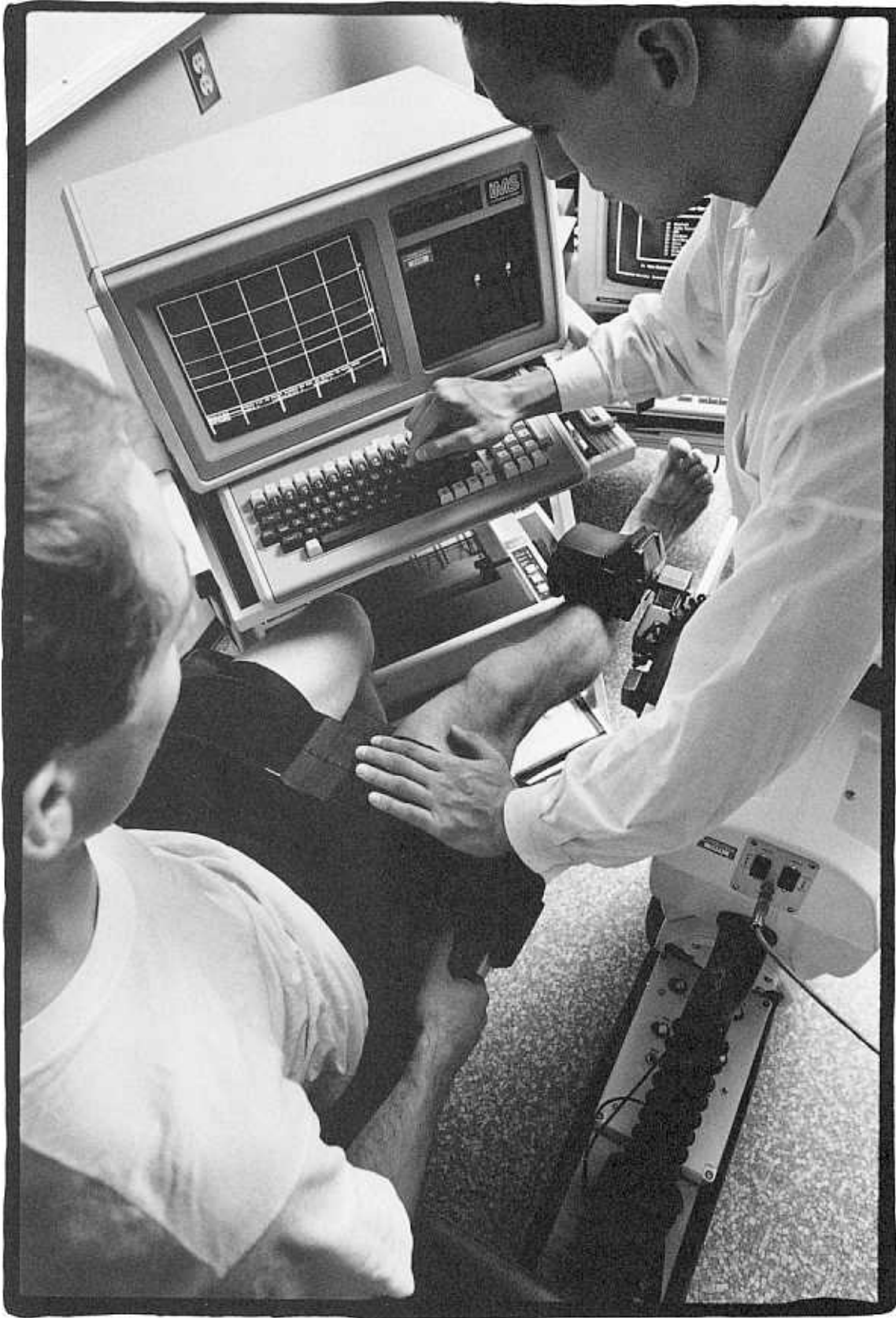
In 1961, the school launched its Certificate Course in Physical Medicine Therapy. It was a combined course in physiotherapy and occupational therapy. A year later a degree program was offered. In 1983, the combined program divided, offering separate BSc degrees in Occupational Therapy and Physical Therapy.

Today, the school occupies a portion of the third floor of the University Hospital-UBC site, where 19 full-time faculty members prepare more than 200 students in three-year programs following first-year Arts or Science. Thirty-five students are admitted into each stream. A new program in Vocational Rehabilitation has also recently been added to the curriculum. This degree will prepare students to assist chronically disabled persons perform specifically work-related roles. It will include the design of training programs and working with employers to place people in satisfying jobs. A masters degree program in Rehabilitation Medicine is planned to begin in 1992.

While the term "occupational therapist" tends to be associated with vocation, these professionals address any goal-directed daily activity. Occupational therapists look at the effects of deficits on the requirements of living — from brushing teeth and fixing meals, to finding satisfaction through work and play.

Physical Therapy degree students, meanwhile, specialize in problems related to movement. Through various treatments and with the aid of mobility devices

**THE SCHOOL OFFERS A  
PROFESSIONAL PROGRAM  
FOR PHYSIOTHERAPISTS  
AND OCCUPATIONAL  
THERAPISTS, WHOSE ROLE  
IS CARING FOR  
CHRONICALLY DISABLED  
PATIENTS.**



*Physical Therapy  
students in  
UBC's School of  
Rehabilitation  
Medicine have the  
benefit of learning  
with the aid of  
sophisticated  
equipment.*

(such as braces, crutches and wheelchairs), physiotherapists enable their patients to move as independently as possible in spite of muscular, respiratory or cardiovascular impairment. The development of these biotechnology tools is central to rehabilitation therapy.

Graduates of the school work in community-oriented rehabilitation centres, special facilities for people with chronic conditions, and in hospitals. They are in great demand in the province and routinely have job offers in hand when they finish their training. Because of B.C.'s growing population of older individuals, for example, there has been a progressively greater need for chronic-care services provided in homes and community facilities, in addition to hospital-based acute-care services. "In short," Dr. Christiansen says, "greater emphasis will need to be placed on maintaining performance capabilities so that persons can remain active in their older years and lead satisfying lives while continuing to reside in their own homes. Improved understanding of the ways in which technology can be used to extend independence in persons with chronic or debilitating diseases will be essential to this effort."

### *Research*

**FOR A LONG TIME** the theory of rehabilitation sciences was borrowed from other disciplines. Only within the past 10 or 15 years have enough practitioners earned doctoral degrees and become scientists in their own right. Now, a body of knowledge unique to the rehabilitation sciences is emerging.

Our school has reached the point in its evolution where its faculty members have the credentials to receive grant funding, which comes largely from the provincial government. In physiotherapy, it is assembling people with an interest in muscle fatigue and how that results in injury. In occupational therapy, a developing area of interest is the objective assessment of function.

Other areas of inquiry include:

THE PATHOPHYSIOLOGY OF PULMONARY FATIGUE • FACTORS AFFECTING  
CARDIOPULMONARY EFFICIENCY • MANAGING THE FUNCTIONAL EFFECTS OF  
MULTIPLE SCLEROSIS • FUNCTIONAL SPLINTING IN ARTHRITIS • CULTURAL  
FACTORS AFFECTING TREATMENT COMPLIANCE • FACTORS AFFECTING  
RECOVERY FOLLOWING STROKE

Through its research activities, the school has developed important links with various medical facilities throughout the province, including Vancouver General Hospital, University Hospital-UBC Site, Queen's Park Hospital, the G. F. Strong Rehabilitation Centre, the Sports Medicine Clinic of the Department of Family Practice, and the Arthritis Centre of Vancouver.

### *Faculty Research Programs*

#### **CEREBRAL PALSY IN HIGH-RISK INFANTS:**

Dr. Susan Harris, associate professor, is one of the top five researchers in physical therapy in the world. Concerned primarily with motor development in infants and the early diagnosis of cerebral palsy in high-risk children, she is currently funded by a research fellowship from the National Institute of Disability and Rehabilitation Research of the U.S. Department of Education. Dr. Harris is working to develop an assessment tool for early diagnosis of cerebral palsy so that these young patients can be referred to appropriate intervention therapy. It has recently been confirmed that early treatments, such as correct positioning through



the use of cushions, bolsters and mobility devices, can reduce the negative influences of the patients' conditions. Her work has brought international attention to the UBC school.

**PREVENTION OF DECUBITUS ULCERS:**

A former director of the school, Dr. Tali Conine is studying the effectiveness of cushions in the prevention of decubitus ulcers, or pressure sores, caused when disabled patients sit in one position for a long time. She is working with elderly persons in B.C. extended-care facilities to test the efficacy of various biotechnology devices and cushions in the prevention of pressure sores. Dr. Conine is currently funded by Health and Welfare Canada to explore how these various devices can be used to help improve the lives of elderly and disabled patients.

**POST-POLIO SYNDROME TREATMENT:**

Funded by the B.C. Medical Services Foundation, Dr. Elizabeth Dean is comparing two treatment approaches to the management of patients with post-polio syndrome. Hundreds of British Columbians between the ages of 30 and 70, all with histories of polio, have come forward with symptoms that appear to be a progression of the disability that incapacitated them years ago. Dr. Dean is hoping to find out whether a general conditioning program will improve the strength patients need to overcome the limitations brought on by this syndrome.

**THE RESEARCH CONDUCTED** within the School of Rehabilitation Medicine at UBC is contributing to a new body of knowledge unique to the rehabilitation sciences. The disciplines of Physical Therapy and Occupational Therapy are just now "coming of age" as academically based areas of study, and it is a very exciting time for scholars in these fields. Practices that prevailed in the clinic for decades are currently being questioned and investigated by researchers in rehabilitation science. The development of biotechnology devices, many of them having microprocessors, is now showing that the negative influences of chronic conditions can indeed be reduced. In the spirit of the original founder of the school, Dr. Brock Fahrni, traditional ideas about the elderly and the chronically disabled are being ignored at UBC, and new ways of helping these patients deal with their everyday life activities are triumphantly being developed. A new Endowed Chair in Arthritic Diseases will help in this quest to find more effective medical solutions.

## *The School of Audiology and Speech Sciences*

**THE NEWEST MEMBER OF THE CARE-GIVING TEAM** at UBC trains audiologists and speech-language pathologists among whose clients will be children with language-learning problems, adults who have had cancer of the larynx, post-stroke patients, and people who stutter or have hearing losses. The range of services required is broad, and the demand for their expertise is high.

Since its establishment in 1969, the School of Audiology and Speech Sciences has developed high standards of excellence in teaching and research.

A program in speech sciences was first proposed in 1961 in the Hall Commission Report on Health Services. The B.C. Speech and Hearing Association

(now the B.C. Association of Speech-Language Pathologists and Audiologists) worked with a UBC committee to convince the university's Faculty of Graduate Studies to develop a Master of Science degree program in speech sciences. The program as laid out by Dr. John Gilbert was approved in 1968, and the first six students were enrolled in 1969. Dr. Gilbert became the school's first director.

Today, the school is housed in the James Mather Building on campus. It has a faculty of 10, seven of whom are PhD holders. A large proportion of the faculty was added after the school received a Provincial Funds for Excellence Award in 1987.

Twenty-three students are accepted in each year. They enter the school having already completed a four-year undergraduate degree with specialization in linguistics or psychology, and they spend a further two years in the school to obtain their Master of Science degree.

The school requires that its graduates be familiar with current research in speech, language and hearing, and that they clearly demonstrate clinical competence in a wide variety of settings. To this end, students complete 300 hours of clinical experience in hospitals, clinics and extended-care facilities throughout the Lower Mainland. While students are in these community settings, they are trained by the school's 130 clinical faculty members.

**A SECOND  
PURPOSE OF THE  
UBC SCHOOL  
OF AUDIOLOGY  
AND SPEECH  
SCIENCES IS TO  
PREPARE FUTURE  
ACADEMICS FOR  
TEACHING AND  
RESEARCH.**

Graduates become audiologists or speech pathologists in hospitals, private agencies, schools, clinics and health units. They provide professional services to help the communicatively impaired — those with speech, language or hearing disabilities. This may include detecting hearing loss in small children so that they can receive the appropriate treatment as soon as possible; helping stroke patients maximize their language recovery at rehabilitation centres; or selecting appropriate hearing aids and other special devices for elderly people who suffer from hearing loss. In all of these settings, UBC graduate audiologists and speech pathologists work to help people with communication impairments cope with their conditions and, where possible, regain their lost hearing or speech abilities.

The school's second director, who took over in 1988, is Dr. Judith Johnston. Guided by a desire to create opportunities for a greater level of specialization for professionals and to develop more flexibility in the curriculum, the school has devised and will soon put in place a three-year curriculum, the first year of which may or may not be taken at the undergraduate level. "What we've done," says Dr. Johnston, "is to recognize the need for increased professional training against the background of a knowledge explosion in our field." Having for a long time received its students from a feeder program in the Department of Linguistics, the school has now created an alternative track through Psychology. "We're trying to recognize that the field is interdisciplinary and that people with different disciplinary commitments might be interested in this as a profession."

A second purpose of the UBC School of Audiology and Speech Sciences is to prepare future academics for teaching and research. A PhD degree program was approved in 1983, and is now one of only two doctoral programs in speech and hearing sciences in Canada. Candidates specialize in experimental phonetics, speech production, speech perception, neurolinguistics, language acquisition, psychoacoustics and physiological acoustics.

First-rate students from across Canada and from other countries are attracted to the UBC school, not only because of its excellent reputation as an educational

facility, but also because of its faculty research programs, many of which have gained international attention. Research funding, which jumped by 85 per cent between 1989 and 1990, comes primarily from the B.C. Medical Science Foundation. A Chair in Audiology and Speech Science has also been added to the school. "In our own way," says Dr. Johnston, "we have started to develop areas of expertise. We have recognized expertise in matters concerning language learning and speech development."

### *Faculty Research*

#### **COMPUTER ANALYSIS OF VISUAL ELEMENTS IN THE SPEECH SIGNAL:**

Dr. André-Pierre Benguerel is designing and building a computer-controlled system for the automatic acquisition, organization and display of speechreading data. Video images of a speaker's face provide information about the movements of the lips, tongue tip, teeth and jaw. Automation allows the painless processing of large amounts of data, with the long-term outcome of creating training programs for speech-reading.

#### **EARLY VOCAL BEHAVIOR:**

As well as performing an acoustical analysis of the vowel system of one phonologically disturbed child and developing a software program to analyze a number of different biological signals, Dr. John Gilbert is attempting to demonstrate that in all infants (regardless of their language community) speech sounds emerge with relatively similar properties because the vocal tract and ear have inherent limiting characteristics.

#### **INNER EAR RESPONSE TO SOUND:**

Dr. Don Greenwood is studying the way the inner ear processes sounds of different pitches. His research has implications for the design of hearing aids and the understanding of the effects of some drugs, such as aspirin and chemotherapeutic agents, on the inner ear.

#### **LANGUAGE DEVELOPMENT IN TWINS, ONE OF WHOM IS BLIND:**

Dr. Carolyn Johnson is analyzing various aspects of language acquisition in a set of twins whose biological endowment and home environment are identical except for the fact that one of them is blind. She has demonstrated that blind children use auditory signals to make intellectual generalizations — putting objects into categories by sound in the same way that seeing children do using visual clues. Findings from this study will provide better information about the role of vision in language learning and will thus help educators to improve the preschool curriculum for blind children.

#### **PREDICATE ACQUISITION IN LANGUAGE-IMPAIRED PRESCHOOLERS:**

Young children usually learn cognitive-state predicates such as know and think only after they have learned the verbs that express actions. The purpose of Dr. Judith Johnston's work, which involves collaborations with researchers at the University of Wisconsin, Rutgers and UCLA, is to understand why this is so. There are two explanations: one is that a more advanced level of intellect is required to talk about mental activities; the other is that cognitive-state predicates lack perceptual correlates. Dr. Johnston is using a clinical population of children with language-learning problems to see if their more advanced physical age at the time

they are learning language affects their use of cognitive-state predicates. If it is found that perceptual correlates are important in language learning, Dr. Johnston suggests that therapists might want to provide a visual accompaniment when they are teaching language-impaired children.

**AGE-RELATED HEARING LOSS:**

Dr. Kathleen Fuller is researching how everyday communication in the elderly is affected by specific age-related changes in audition and cognition. Auditory performance in real-life situations depends not only on the nature of hearing loss but also on the listener's ability to cope with distraction and to supplement the acoustic signal with information drawn from other sources. Dr. Fuller's research will provide a basis for the development of new clinical tools — such as rehabilitation techniques that emphasize compensatory strategies — to help the elderly communicate better in the noisy situations typical in daily life.

**THE RESEARCH CONDUCTED** by the students and faculty of the School of Audiology and Speech Sciences is carried out according to the same exacting standards to which its clinical community work conforms. Graduates have earned a strong reputation for outstanding clinical service in the B.C. medical system and are in extremely high demand throughout the province. This demand will see the school continue to expand its teaching and research programs in the coming decades, and develop its widening reputation within the field of audiology and speech-language pathology. ♣

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## *VI. The Faculty of Graduate Studies*

**UBC HAS DECLARED ITS GRADUATE PROGRAMS TO BE A MAJOR PRIORITY RECENT YEARS HAS ENCOURAGED NEW INITIATIVES. AMONG THOSE IN THE HEALTH SCIENCES HAVE BEEN THE FOLLOWING:**

**WESTERN CANADA'S FIRST MSC PROGRAM IN OCCUPATIONAL HYGIENE. • CANADA'S SECOND PHD PROGRAM IN NURSING. • CANADA'S FIRST CLINICAL PROFESSIONAL DOCTORATE IN PHARMACEUTICAL SCIENCES. • CANADA'S FIRST MENG PROGRAM IN CLINICAL ENGINEERING. • CANADA'S ONLY GRADUATE PROGRAM IN OBSTETRICS AND GYNECOLOGY.**

### *Clinical Engineering*

**UBC'S CLINICAL ENGINEERING PROGRAM** trains graduates to work in hospitals and other health-care institutions where they apply engineering principles to the use and development of technology in patient care. A 12-month internship in one of several B.C., Quebec and Ontario hospitals gives students experience in the design, development and management of technological devices, such as imaging

and monitoring systems, life-support systems, transportation devices, communication aids and artificial limbs. Dr. Charles Laszlo, Department of Electrical Engineering, is the director of this masters level program, which had six students enrolled in 1991-92. While the clinical engineering program is primarily aimed at engineering support in the clinical environment, a newly approved Biomedical Engineering masters degree will educate engineers primarily in the design functions in industry and biomedical research centres. It is intended to increase engineering expertise and apply it to biomedical devices, and to create high technology jobs in British Columbia.

### *Genetics*

**ALTHOUGH THERE IS NO DEPARTMENT OF GENETICS AT UBC**, studies leading to MSc and PhD degrees in genetics are available with faculty members in Animal Science, Anthropology, Botany, Biochemistry, Forest Sciences, Medical Genetics, Microbiology, Pathology, Plant Science and Zoology. The program is flexible to accommodate the diverse backgrounds of students wishing to enter it and to take account of the broad nature of genetic research. In 1991-92, 15 MSc and 33 PhD students were registered. Dr. Diana Juriloff, Department of Medical Genetics, is the program chair. An MSc/PhD program in Medical Genetics approved in 1991 is run by the Department of Medical Genetics in the Faculty of Medicine.

### *The Institute of Health Promotion Research*

**THIS BROADLY BASED INSTITUTE**, established in 1990, is coordinating research relating to such topics as smoking cessation, lifestyle, diet and exercise from a social science viewpoint, as well as from a health sciences vantage point. Under its new director, Dr. Lawrence Green, the institute is cooperating with groups at Simon Fraser University, the University of Victoria and the B.C. Ministry of Health to form a British Columbia Consortium for Health Promotion Research.

### *Neuroscience*

**THIS IS A MULTI-DISCIPLINARY PROGRAM** involving 60 faculty members in 13 departments from the faculties of Medicine, Science and Arts. The objective of the program is to educate neuroscientists with a broadly based knowledge and with intensive experience in at least one area of research. Core courses cover all aspects of the discipline, from molecules to behavior, and students are expected to engage in research from the start of their studies. Candidates can work towards MSc and PhD degrees and are accepted from a variety of disciplines — Biology, Biochemistry, Computer Sciences, Engineering, Mathematics, Neurosciences, Pharmacology, Physics, Physiology, Psychology and Zoology. In the 1991-92 year, 13 MSc and 20 PhD candidates were listed. Dr. Christian Fibiger, Division of Neurological Sciences, Department of Psychiatry, is the director.

### *Occupational Hygiene*

**IN 1992, WE WILL OFFER WESTERN CANADA'S** first graduate program in occupational hygiene. An endowment of \$3 million from the Workers' Compensation Board of B.C., matched by the provincial government, has allowed us to create three new faculty positions, which will complement existing expertise in the area in the faculties of Applied Science, Medicine and Science. The objective of the program is to train professional and academic occupational hygienists able to identify and evaluate the risks of exposure to physical, chemical

and biological hazards in the workplace, and able to effect changes that will eliminate or control these hazards. Dr. Susan Kennedy, Department of Medicine, is the acting coordinator. ▀

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**CANADIANS HAVE DAILY REASON TO BE GRATEFUL TO DR. JOHN F. MCCREARY. HE WAS A MEMBER OF THE HALL ROYAL COMMISSION ON HEALTH SERVICES, WHICH RECOMMENDED THE ESTABLISHMENT OF OUR NATIONAL MEDICARE SYSTEM.**

## *VII. The Office of the Coordinator of Health Sciences*

**WE AT UBC REMEMBER HIM AS THE VISIONARY CREATOR** of concepts that aimed to revolutionize the way we teach health-care professionals.

Dr. McCreary joined our Faculty of Medicine in 1951 as head of the Department of Pediatrics. From 1959 to 1972, he was dean of the faculty. From 1972 until his retirement in 1975, he was the Coordinator of Health Sciences, a position created largely through his efforts and because of his beliefs.

As Dean of Medicine, Dr. McCreary recognized that increasing pressures on physicians were demanding a change in the way medical students were taught. If primary-care physicians were to continue to be effective, they would need to know how to utilize the expertise of other health-care workers. It was Dr. McCreary's belief that all health-care professionals had the same basic motivation but their separate training programs did nothing to help them learn to work together in the real world.

In this regard, Dr. McCreary's goal was the creation of a Health Sciences Centre, where students of various disciplines might learn together and perhaps collaborate more effectively when they were qualified professionals. The process of coordination was initiated by a committee in 1961. At that time, our students in the health professions were separate — as if they were on different campuses. The first effort to bring them together occurred in the planning of the Woodward Biomedical Library, which provided space for students in all the health sciences. When the Faculty of Dentistry was started in 1964, the first two years of its program were made almost identical with Medicine's program, so that dental and medical students were virtually inseparable. The Psychiatric Unit, a 60-bed hospital opened in 1968, was jointly planned by all those who used it. And the 1972 Instructional Resources Centre provided shared audio-visual facilities, lecture halls, and seminar rooms, as well as offices for Health Sciences deans and directors.

**THE OFFICE OF THE COORDINATOR OF HEALTH SCIENCES**, created in 1970, was the formal embodiment of Dr. McCreary's coordination efforts. Its divisions



set to work promoting interprofessional education on campus, health services research and development, and continuing education for professionals. Today, several of its original divisions have been amalgamated or discontinued. The Division of Health Services Research and Development is now the Centre for Health Services and Policy Research. It is physically located in the Coordinator's Office and reports to a decanal committee chaired by the coordinator.

### *Division of Education Support and Development*

**IN 1974, WHEN THIS DIVISION WAS ESTABLISHED**, its mandate was to provide guidance and services to improve the quality of education in the health sciences. Its personnel are trained in the process of planning, implementing and evaluating instructional programs, and they work with health professionals in developing teaching materials, evaluating students, defining objectives and preparing research proposals. Since 1986, it has added a funded-research focus to its service component, and it has been highly successful in acquiring significant funding to support this emphasis.

In the recent past, the division has introduced microcomputers into the biomedical libraries at the university and the university teaching hospitals for literature database searches and computer-assisted instruction. It has taken part in the review and revision of the medical school curriculum. It offered two-day workshops in effective teaching techniques. It processed students' evaluations of faculty teaching. It has helped develop instructional modules for several Faculty of Medicine departments. For off-campus professional organizations, Dr. Gordon Page, director, has contributed to the development of tools to assess continuing competence. He has offered a workshop to nursing instructors at the British Columbia Institute of Technology, conducted an external review at Sherbrooke University's Faculty of Medicine, and served on the Executive Committee of the Canadian Association of Medical Education, an organization set up to help medical faculty become more effective in teaching.

A major project in the division has been the revision of the fourth booklet of the Medical Council of Canada Qualifying Examination. Dr. Page has been a co-principal investigator on this five-year funded project with Dr. Georges Bordage of Laval University. The project began in 1987.

### *Division of Continuing Education in the Health Sciences*

**BEGUN IN 1968**, the division provides continuing education for health professionals in or near the communities where they live as well as on campus. Continuing education has been organized in Audiology and Speech Sciences, Dentistry, Medicine, Nursing, Nutrition and Dietetics, Pharmaceutical Sciences, and Rehabilitation Medicine. More than 5,000 physicians, 7,000 dentists and 3,000 pharmacists as well as other health professionals participate annually in a variety of types of learning activities. They may attend lectures on campus or seminars in Hawaii. They may borrow videotapes to study independently or sit in on audio-teleconferencing lecture-demonstrations. As well, the division helps health professionals in the community initiate their own continuing education activities.

One of the division's objectives is to stimulate learning among members of two or more health professions. To that end, it held a four-day interprofessional conference

#### HEALTH SCIENCES COORDINATORS

1972-75

JOHN F. MCCREARY

1975-77

HAROLD COPP

1977-84

BERNARD RIEDEL

1984-85

PETER LARKIN (ACTING)

1985-89

MORTON LOW

1989-

PAUL ROBERTSON

on AIDS and Related Issues in the Native Community, the first conference of its kind in Canada. Other similar events, held either on campus or in downtown Vancouver, have had such topics as Demystifying the Burn Injury and Controversies in Diabetes.

Research grants have been obtained by division members to study an alternative way of providing continuing medical education for geographically isolated physicians and to develop a way of assessing the continuing competence of pharmacists.

### *Health Sciences Week*

**THE HIGHLIGHT OF OUR EFFORTS** to stimulate interprofessional learning among undergraduates is the Health Care Team Clinical Competition, which takes place annually as part of Health Sciences Week in October. The idea of the competition is to enhance students' knowledge about other health professionals and their clinical roles. The two-hour public event involves three teams of nine students from the senior year of each UBC health science faculty, school and department. The teams are organized by the Health Sciences Students Association. Presented with a hypothetical, complex case study, the teams answer questions that test critical judgment in handling acute and long-term care. "The Health Care Team Clinical Competition is absolutely unique in Canada," says Dr. Ravindra Shah, who chaired the 1990 competition committee. "We have received inquiries from other post-secondary institutions across North America that would like to organize one for their health sciences students." ▀

**A NUMBER OF ACTIVITIES AT UBC ARE EXAMPLES OF A GROWING INTEREST IN STUDYING THE LIMITS OF TECHNOLOGICALLY BASED MEDICAL CARE AND THE SIGNIFICANCE OF THE BROAD DETERMINANTS OF HEALTH. DR. ROBERT EVANS' PARTICIPATION IN THE POPULATION HEALTH PROGRAM OF THE CANADIAN INSTITUTE OF HEALTH IS ONE EXAMPLE.**

## *VIII. The Health Promoters and Policy Researchers*

**ANOTHER IS THE MULTIDISCIPLINARY TASK FORCE** created on our campus to look at ways of making communities healthier and better equipped to sustain themselves in the future. In the first phase of this research program, eight faculty members — from the Family Practice Unit, the schools of Rehabilitation Medicine, Social Work, and Community and Regional Planning, the Centre for Human Settlements and the Department of Health Care and Epidemiology — will spend 18 months looking at indicators of health in one rural and one urban community. Recognizing that our society has long judged its progress in economic terms, this task force will consider other indicators, such as infant mortality rates, longevity

figures and the incidence of disease. To further test the communities' sustainability, members will gather data on commute times and the average consumption of fossil fuels.

Yet another example is the 1991 conference sponsored by the university and the local section of the American Industrial Hygiene Association, which focused on health risks in the construction industry in an effort to better equip industrial hygiene and safety professionals to recognize disease-causing materials and to control exposure to them. Among the topics addressed were the potential dangers of asbestos substitutes such as glass and ceramic fibres; excessive dust exposures from concrete grinding; and asthma among painters and machinists. In this area, the departments of Health Care and Epidemiology and Medicine have been funded by the Workers' Compensation Board to study the effects of cobalt and other metals on sawmill saw filers. Recently, UBC epidemiologists have conducted a \$500,000 Health and Welfare Canada study of B.C. sawmill workers exposed to chlorophenols.

Much of the activity in health promotion, health policy and health services research springs from or is associated with our Department of Health Care and Epidemiology in the Faculty of Medicine. The department has over the past 10 years increased the visibility of clinical epidemiology by providing in-depth training to residents and by collaborating with the teaching hospitals to enhance the presence of clinical epidemiology in the hospital context. One example is the Clinical Epidemiology Unit at Children's Hospital. The department's graduate program in Health Administration is designed to provide the educational and professional foundations necessary for those aspiring to management and leadership positions in the health-care field. In addition, the department has an MHS program for physicians in the areas of clinical epidemiology, occupational health and community health. Its MSc and PhD programs are designed to provide needed research expertise for B.C.

Because we feel that solutions to today's health-care problems will be found by bringing together many disciplines, we have recently created two new entities on campus. Described below, the Centre for Health Services and Policy Research and the Institute of Health Promotion Research strengthen our studies of the dynamic between health and health care and our efforts to enhance the health of communities and to use increasingly scarce health-care resources efficiently.

### *Centre for Health Services and Policy Research*

**PROBLEMS IN THE DELIVERY OF HEALTH SERVICES**, in the understanding of health and health-care system dynamics, and in the formulation and evaluation of health policy transcend the traditional boundaries of academic disciplines. To examine and solve these problems we must draw upon a broad range of disciplines and provide environments conducive to collaboration among them. The Centre for Health Services and Policy Research provides a way to facilitate team research in these areas.

Launched in 1990, the centre grew out of a division that had been part of the Health Sciences Coordinator's Office since 1971. It continues to be based within the office and reports to a decanal committee chaired by the Coordinator of Health Sciences.

The division became home to several endeavors which are now part of the centre:

**THE HEALTH HUMAN RESOURCES RESEARCH UNIT: LOCATED IN THE HEALTH SERVICES RESEARCH DIVISION SINCE 1973, IT HAS EIGHT FULL-TIME STAFF MEMBERS FUNDED BY THE MINISTRY OF HEALTH. ITS ACTIVITIES INCLUDE AN**

ANNUAL STATUS REPORT ON THE PRODUCTION OF HEALTH AND HUMAN SERVICES PERSONNEL IN B.C. IN ADDITION, IT EXAMINES SUCH TOPICS AS THE USE IN THE PROVINCE OF OPHTHALMOLOGICAL AND OPTOMETRIC SERVICES.

- AN EDITORIAL OFFICE OF THE INTERNATIONAL JOURNAL SOCIAL SCIENCE AND MEDICINE: IT HAS EDITORIAL RESPONSIBILITY FOR SUBMISSIONS IN THE AREA OF HEALTH-CARE ECONOMICS.
- HEALTH POLICY RESEARCH UNIT: WITH SUPPORT FROM THE VANCOUVER FOUNDATION, THE WOODWARD FOUNDATION AND THE MINISTRY OF HEALTH, THIS UNIT WAS ESTABLISHED IN 1988. ITS MEMBERS — UBC FACULTY FROM THE DEPARTMENTS OF HEALTH CARE AND EPIDEMIOLOGY, PEDIATRICS AND ECONOMICS, THE FACULTY OF COMMERCE AND THE SCHOOL OF NURSING — SPONSOR SEMINARS AND WORKSHOPS, AND PRODUCE DISCUSSION PAPERS DEALING WITH SUBJECTS SUCH AS RECENT TRENDS IN CAESAREAN SECTION RATES OR THE SOURCES OF INCREASED HOSPITAL SERVICES UTILIZATION AMONG ELDERLY PEOPLE IN B.C.
- THE OFFICE OF THE DIRECTOR OF THE POPULATION HEALTH PROGRAM OF THE CANADIAN INSTITUTE FOR ADVANCED RESEARCH: DR. ROBERT EVANS, PROFESSOR OF ECONOMICS, IS THE DIRECTOR OF THIS PROGRAM WHICH FOCUSES ON LARGE POPULATIONS AND ON THE FACTORS THAT AFFECT THE DISTRIBUTION OF HEALTH WITHIN THEM. RESEARCH IN THIS FIELD AIMS TO INCREASE KNOWLEDGE ABOUT THE DETERMINANTS OF HEALTH AND OF THE MEASURES THAT CAN BE TAKEN TO IMPROVE THE HEALTH OF POPULATIONS IN CANADA AND OTHER COUNTRIES.
- OFFICE OF HEALTH TECHNOLOGY ASSESSMENT: WITH \$250,000 IN START-UP FUNDS PROVIDED BY THE MINISTRY OF HEALTH, THE CENTRE HAS ESTABLISHED THIS OFFICE TO ASSESS AND EVALUATE NEW AND EXISTING HEALTH-CARE TECHNOLOGIES. A QUARTERLY NEWSLETTER REPORTS ON SPECIFIC TECHNOLOGIES.

With inter-disciplinary research as its major activity, the centre continues to investigate in such areas as the socioeconomic determinants of health; the impact of the health-care system on the health of populations; options for financing and organizing the delivery of health care; and international comparisons of health-care systems. It continues to develop its databases which have information on more than 30 health human-resource groups, on medical and hospital utilization, and on hospital services and facilities for all Canadian hospitals for the past 30 years. The databases are seen as a provincial and national research resource, among the richest anywhere.

### *Institute of Health Promotion Research*

**IN 1990, THROUGH AN ENDOWMENT, UBC ESTABLISHED** the Institute of Health Promotion Research as an entity in the Faculty of Graduate Studies. It provides a focus for research, education, collaboration and service in the field of health promotion. Linked to faculty members in the behavioral, biomedical, educational, environmental and social disciplines, it aims to meet the challenge of improving health and quality of life.

Its goals include developing, evaluating and diffusing effective methods of promoting health; integrating health promotion into the clinical education of health professionals; and extending research and teaching at UBC into health promotion and into the evaluation of health promotion programs and policies. It will develop an MSc/PhD graduate program and expects to take in students by September, 1992.

The institute had its genesis in the Division of Health Systems, established by Dr. John Milsum. Now retired, Dr. Milsum was the institute's acting director and

worked with Dr. Morton Low, then Coordinator of Health Sciences, to get Ministry of Health funding for the institute's first five years.

The institute's first director is Dr. Lawrence W. Green, who was appointed in July, 1991. Dr. Green recently completed three years as the Kaiser Family Foundation's vice-president and director of the Health Promotion Program. Prior to coming to UBC, he was a Visiting Research Social Scientist with the Institute for Health Policy Studies at the University of California, San Francisco. He has served on the public health faculties at Berkeley, Johns Hopkins, Harvard and the University of Texas and on the medical faculties at Johns Hopkins, Harvard and the University of Texas. From 1979 to 1981, Dr. Green served in the Carter administration as the first director of the Office of Health Information, Health Promotion, Physical Fitness and Sports Medicine. At the University of Texas Health Sciences Center at Houston from 1981 to 1988, he was the founding director of the Center for Health Promotion Research and Development. ▀

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**DO YOU GIVE A KIDNEY TRANSPLANT TO AN UNREGENERATE ALCOHOLIC? WHICH CASES OF GENETIC ABNORMALITY JUSTIFY TERMINATING A PREGNANCY? IF A CHILD HAS HAD TWO LIVER GRAFTS AND THE SECOND FAILS, DO YOU SEND THE PATIENT FOR A THIRD — AT A COST OF \$300,000?**

## *IX. The Ethics of Health Care*

**THESE ARE THE KINDS OF CRUCIAL ETHICAL QUESTIONS** that health-care practitioners are increasingly being asked to weigh and decide. Recognizing the profound need to provide a forum for students and graduates to consider these issues in a structured and informed context, the university has been offering courses in biomedical ethics both to those within and those outside the health sciences. We are in the process of launching the centre for Applied Ethics, one of the few such centres in Canada, as a formal entity within the Faculty of Graduate Studies. Designed to offer inter-faculty, campus-wide intellectual leadership in the field, including business and professional ethics, the centre has mounted a campaign to actively seek funding for a Chair in Biomedical Ethics.

Dr. Vincent Sweeney, Professor of Neurology in the Department of Medicine, was a member of the centre's organizing committee. "This is a field whose time has come," he says. "It's an ever-increasing problem with medical technological advances and our ability to keep people alive with a high degree of secondary misery. There is tremendous interest in the subject on the part of the public and the professions." Most major hospitals in the U.S. and a few in Canada have clinical ethicists on staff.

Dr. Sweeney, who formalized his own training with studies of moral philosophy at Oxford and the Kennedy Centre of Ethics in Washington, D.C., has helped to create compulsory courses for first- and fourth-year medical students, which will eventually be offered to those in the intervening years as well. For the past decade, an introductory course for interns has included two days of medical ethics. More recently, a 12-hour course has been given to first-year students, who learn by case example in small groups led by a team of two facilitators, one a physician, the other from various caring professions. The non-medical facilitators come from the areas of philosophy, theology, nursing, law, medical administration and hospital pastoral services. The current cadre of about 50 facilitators attend their own unique course of instruction, an annual evening of presentations on the teaching of applied ethics. The issues raised range from non-initiation of treatment to withdrawal of life-support systems, from new reproductive technology to living wills.

**AMONG THE PROBLEMS  
ARE ABORTION, DEATH  
AND EUTHANASIA,  
GENETIC ENGINEERING,  
BEHAVIOR  
MODIFICATION,  
COMPULSORY  
TREATMENT,  
EXPERIMENTATION  
WITH HUMAN BEINGS  
AND ANIMALS, AND  
THE RELATIONSHIP  
BETWEEN  
PROFESSIONALS AND  
THEIR PATIENTS,  
SUBJECTS OR CLIENTS.**

The Royal College of Physicians and Surgeons of Canada recently announced that medical schools must soon provide a post-graduate program in medical ethics for its specialist members — a challenge that Dr. Sweeney says UBC will meet. Meanwhile, the university is seeking funds to expand the undergraduate courses into other health-science disciplines, such as nursing, dentistry, pharmacy and rehabilitation medicine.

**NURSING AND PRE-MED STUDENTS** constitute the largest groups among the 500 who each year take a similar course offered by the Philosophy Department. About the same time Dr. Sweeney was helping to launch the course for interns in the Faculty of Medicine, Dr. Earl Winkler, Professor of Philosophy, created a Bio-Medical Ethics course within his department. "At the time, public debates were raging and there was more and more in the media about such issues as abortion and euthanasia," he recalls. In its first year, the course attracted about 35 students; demand has since far exceeded supply for a course that is taught in several sections, days and evenings, throughout the year.

Its content covers moral problems arising in the health sciences, especially in medicine but also in biology, psychology, social work and other professions, which are considered both concretely and in relation to general ethical theory. Among the problems are abortion, death and euthanasia, genetic engineering, behavior modification, compulsory treatment, experimentation with human beings and animals, and the relationship between professionals and their patients, subjects or clients.

Dr. Winkler was a pioneer planner of the new UBC Centre for Applied Ethics. Today, he is a Senior Research Fellow in the centre, which he says not only provides inter-faculty synergy in research, teaching and consulting to the community, but also serves to coordinate national efforts in the area of applied ethics. Its founding director, the first occupant of the Maurice Young Chair in Applied Ethics, is Dr. Michael McDonald. As an associate professor of Philosophy at the University of Waterloo, he was the principal author of a report by the Canadian Federation for the Humanities to the national Social Sciences and Humanities Research Council. The report motivated the council to establish a strategic research theme in applied ethics. Dr. McDonald, president of the Canadian Philosophical Association, came to UBC in 1990.



His mandate has been to create a centre that will develop a serious research capacity while serving various disciplines in the applied-ethics field, including the health-oriented faculties in both their health-science and health-caring aspects. "We intend to create a credible research base that will form the intellectual foundation for teaching and consulting and help us attract good students and researchers." Dr. McDonald stresses the importance of building and maintaining strong links with the university's teaching hospitals and health professionals' organizations. As well as offering workshops and organizing a graduate-level seminar course in applied ethics that began in the fall of 1991, the centre's staff is consulting to medical students, nurses, rehabilitation therapists and various public-interest groups. ♣

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**UBC HAS SEVEN AFFILIATED TEACHING HOSPITALS WHERE FACULTY MEMBERS TRAIN DOCTORS, DENTISTS, PHARMACISTS, NURSES, NUTRITIONISTS AND DIETITIANS, SPEECH PATHOLOGISTS AND AUDIOLOGISTS, OCCUPATIONAL AND PHYSICAL THERAPISTS, SOCIAL WORKERS AND PSYCHOLOGISTS.**

## *X. UBC in the Hospitals*

**SEVERAL FACULTIES HAVE A MAJOR PRESENCE** in these teaching hospitals. Twelve of the 17 departments in the Faculty of Medicine are located wholly or substantially in hospitals affiliated with us, and several of these departments have a presence in more than one hospital.

The UBC Department of Medicine, the largest department in the faculty, conducts academic activities in space provided by the B.C. Cancer Agency, St. Paul's, the two sites of University Hospital, and Vancouver General Hospital. Organized into 13 specialty divisions, this complex department provides state-of-the-art patient care for B.C. residents.

The Faculty of Dentistry trains general practice residents at four hospitals, where it provides in-patient and out-patient services, maintaining operating rooms designed and equipped for oral surgery and dental laboratories. In these hospitals, it gives specialized treatment for cancer patients, children and the elderly. At University Hospital, it maintains clinics for oral mucosal disease, facial pain and jawbone-joint disorders.

The Faculty of Pharmaceutical Sciences has clinical faculty members in every hospital in the Lower Mainland. They work closely with physicians, suggesting drug therapy and monitoring it. The faculty's Drug and Poison Information Centre operates at St. Paul's Hospital.

Beyond these patient-care activities, UBC faculty do research in the hospitals. Some of it is basic-science research — as fundamental as that undertaken in our

campus laboratories. Some of it is clinical in nature, depending upon an interaction between investigator and patient. Much of it brings the latest medical advances directly to patients who are ill today.

The investigators profiled on the following pages either head large UBC research endeavors in the hospitals or lead large groups of colleagues involved in national research networks.

## *UBC at Vancouver General*

**VANCOUVER GENERAL HOSPITAL** is a 1,100-bed facility on a 35-acre site in central Vancouver, a tertiary-care referral hospital for all of British Columbia and one of the most modern referral and trauma health-care centres in Canada. UBC has been associated with VGH since 1919, when the first university nursing school in the British Empire was created. In 1950, the university used clinical facilities on the hospital site and a team of medical specialists with dual appointments was named to head the various departments at the new medical school and the hospital.

Today, UBC/VGH departments of Medicine, Surgery, Anesthesia, Pathology and Psychiatry are housed in academic and office space in the hospital's Emergency Centre; some UBC medical departments have their offices entirely on site. The university conducts research in the hospital, much of it advanced in nature, as recorded throughout this report.

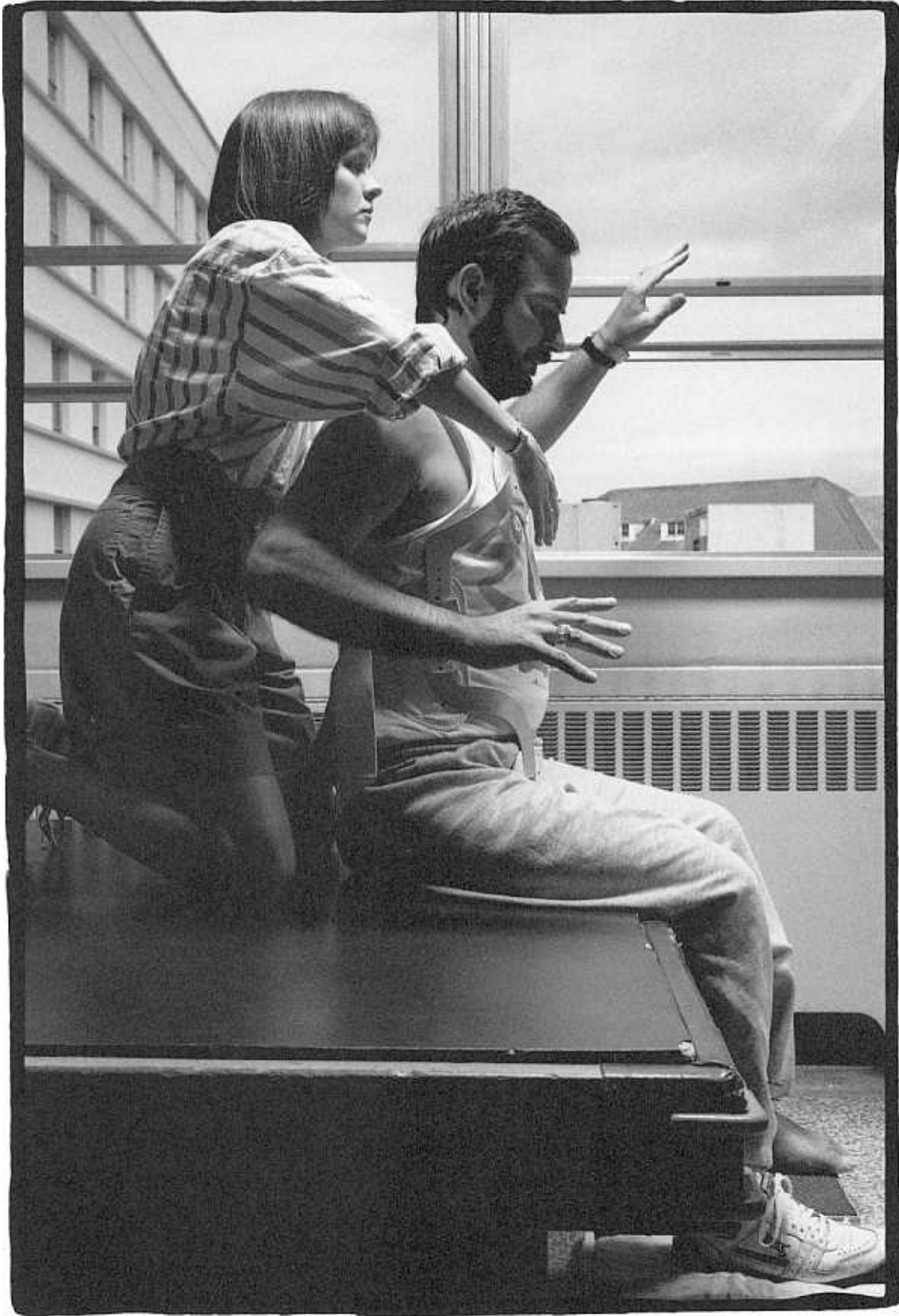
The work of the following UBC professors — in areas as disparate as organ transplants, ophthalmology and toxic shock — merely suggests the variety and quality of the groundbreaking research being done at Vancouver General.

### **PAUL KEOWN AND THE UNIVERSITY CENTRE FOR TRANSPLANTATION IMMUNOLOGY**

IN THE PAST THREE YEARS, B.C.'s organ transplant program has become one of the biggest in Canada. The success of renal transplants within the province equals or exceeds that of major units throughout the world. Heart, lung, liver and heart-lung transplants, previously done exclusively outside the province, are performed now in units at Vancouver General Hospital, British Columbia's Children's Hospital and St. Paul's Hospital, with regional transplantation units being developed in Victoria, Prince George, Kamloops, Kelowna, Penticton and Trail. UBC participates in every facet of this program.

Dr. Paul Keown, professor of Medicine in our Division of Nephrology, is director of the B.C. Transplant Society, a comprehensive health organization that brings together the activities of the Ministry of Health, the British Columbia Health Association, the health-care professions and UBC in the provision of organ transplants and care of patients with vital organ failure.

The society administers the University Centre for Transplantation Immunobiology. Located at Vancouver General Hospital, the UBC centre encompasses research, teaching and clinical care. Within the clinical sphere, it draws on five Faculty of Medicine departments: Surgery, Medicine, Pediatrics, Pathology and Anesthesiology. Research projects involve these departments as well as people in Chemistry, Physiology, Nursing, Economics, Philosophy and the Faculty of Pharmaceutical Sciences.



*University Hospital –  
Shaughnessy site is  
home to one of  
Canada's leading  
spinal cord injury  
treatment centres,  
with over 220  
patients a year.*

It was this rich pool of expertise at UBC that attracted Dr. Keown away from the University of Western Ontario, which for many years had had the largest transplant program in the country. "When I came here," he says, "I think perhaps the single determining factor was the depth of academic ability at UBC. There's no comparison; the opportunities here far exceed anything we ever had in London."

Having spent three years getting B.C.'s clinical program going and having seen it equal in size the top five or 10 per cent in the world, Dr. Keown anticipates an equally rapid growth in research. There are several major projects under way and proposed. They involve developing different kinds of transplants, improving the storage of organs, and overcoming the problem of rejection by altering immunosuppressant drugs or by manipulating the immune system.

Dr. Keown foresees a revolution in the treatment of vital organ failure. With the 90-per-cent success of kidney transplants, he predicts the demise of expensive chronic dialysis. Pointing out that the number of needed hearts will always exceed those available, he predicts the reinvention of totally implanted cardiac devices and the cloning and growth of whole organ structures in vitro. "That relies upon the discovery of the differentiation factors in tissue development," he admits. "But just as surely as the understanding of the communication between lymphocytes and the immune response has come, so an understanding of tissue differentiation will come. We will then have replaceable parts — banks of organs. We will be able to match them or adjust the immune response of the recipient. So everything we do now with crude immunosuppression will be a horror story of the past."

*Dr. Paul Keown is professor of Medicine in the Division of Nephrology and director of the British Columbia Transplant Society.*

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KINDS OF TRANSPLANTS,  
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STORAGE OF ORGANS,  
AND OVERCOMING  
THE PROBLEM OF  
REJECTION BY ALTERING  
IMMUNO-SUPPRESSANT  
DRUGS OR BY  
MANIPULATING THE  
IMMUNE SYSTEM.**

**MAX CYNADER AND THE VGH/UBC EYE CARE CENTRE**

SICK NEURONS IN THE VISUAL CORTEX are the focus of Dr. Max Cynader's work, and basic science research is what he does. But he and his research team wanted the chance to work in a hospital with specialists who are treating interesting clinical problems. "Basic sciences have tremendous technology but we often lack the detailed knowledge of clinical problems," he says. "The physicians out there in the trenches know what the problems really are."

And so, offered the opportunity to direct research in our Department of Ophthalmology, which functions in the VGH/UBC Eye Care Centre in the general hospital, Dr. Cynader made the move from Dalhousie University to UBC in 1988. He brought with him four colleagues — Dr. Christopher Shaw, Dr. Nicholas Swindale, Dr. Robert Douglas and Dr. Joanne Matsubara — all now on our faculty.

Not an ophthalmologist but a neuroscientist, Dr. Cynader finds himself leading a group that includes medical doctors working on PhDs or doing research at the interface between basic and clinical science, as well as graduate students in several different departments — Electrical Engineering, Computer Sciences, Pathology, Psychology and Neuroscience. Approximately 40 people are in the group.

On the medical side, their research has relevance to conditions such as strabismus (crossed eyes) or amblyopia, which is reduced vision in an eye that appears to be structurally normal. (There are five million amblyopics in North America.) On the computational side, it is of interest to those who are trying to

build visual processing machines. And, if a way can be found to regenerate activity in neurons, it may have relevance to diseases such as Alzheimer's and Parkinson's.

Basically, Dr. Cynader's team is trying to find ways of seeing neural activity in real time and regenerating neurons that aren't working. He explains that if for some reason an eye doesn't work, it loses access to the cortex. "It's like survival of the fittest," he says. "This eye is not giving useful information and so the brain won't devote a lot of space to it." Dr. Cynader's two-pronged approach to his research involves using fluorescence imaging to see neural activity and using viruses to transfer genes into populations of non-functioning neurons with the idea of causing them to regenerate.

"Other people are trying to transplant neurons, which I think is not really the answer," he says. "What we'd like to do is get the neurons that are in there to make new products." Although there are four other groups in the world working in the same area, Dr. Cynader feels that the UBC group has the combination of talents necessary to succeed.

Dr. Cynader explains that there is a critical period in youth when the eye can still regrow connections to the brain. "What I hope to do in the next 10 years is to extend the critical period into adulthood. We will insert genes into specific populations of neurons and get them to express genes they may once have expressed but don't express anymore. So what we're doing is positioning ourselves to be able to go in there and manipulate the brain."

Dr. Cynader's lab has eight major grants. Two from drug companies allow the lab to follow a bit of a tangent. Both companies are supporting research looking at important molecules within the human eye. Diseases like glaucoma, diabetic retinopathy and retinitis pigmentosa are the eventual targets of this research. With a new confocal microscope, UBC researchers are able to examine a cross-section of the eye and see where treatment drugs are actually processed — where the receptors are. "People have been getting beta-blocking drugs for glaucoma for 50 years," says Dr. Cynader. "But this has never been done. It's amazing."

Dr. Cynader participates in two Canadian Networks of Centres of Excellence, in the Canadian Institute for Advanced Research's Artificial Intelligence and Robotics program and in The Human Frontiers of Science program, which melds international research teams. In the latter, his lab and four others in Japan, England, France and the United States are examining mechanisms of plasticity and principles of neuronal computation in the cerebral cortex. An outcome, advantageous to his research, is the sharing of frozen brain tissue from Japan. The Japanese, he explains, are leaders in being able to culture pieces of brain so that they grow together, allowing investigators to watch as connections are made.

Understanding the principles of computation in the cortex contributes to yet another research theme: building a vision system — a computer that can see. The Cynader team has already improved present image-processing systems by suggesting that designers should mimic the human eye's ability to compute how curved something is. Dr. Cynader predicts that the development of seeing-eye machines capable of such tasks as reading x-rays will have profound implications for health-care delivery. "Ten years from now, I would hope that we would have seeing machines that would resemble nothing so much as the structure of the

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MOLECULES WITHIN THE  
HUMAN EYE.**

human cortex, and that this will emerge from an understanding of how the cortex — the biological system — processes information, and from synergistic interaction between biologists, engineers and computer scientists.”

*Dr. Cynader is British Columbia Fellow, Canadian Institute for Advanced Research, Professor and Director of Research in the Department of Ophthalmology, and professor of Psychology and Physiology.*

**ANTHONY CHOW AND THE G.F. STRONG  
INFECTIOUS DISEASE RESEARCH LABORATORIES**

DR. ANTHONY CHOW IS AN EXAMPLE OF A RARE BREED in Canadian medical research — the clinician scientist. He might very well, as he says, hide away in a basic science laboratory doing his research without interruption, but he functions in a hospital where patients give a life-and-death urgency to theoretical pursuits. “We would like to bridge the gap between the scientists and the clinicians so that we can very rapidly bring new discoveries in the laboratory to the bedside, and at the same time be able to take the problems from the bedside into the research laboratory.”

**“WE WOULD LIKE TO  
BRIDGE THE GAP BETWEEN  
THE SCIENTISTS AND THE  
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The problems encountered at the bedside by Dr. Chow and his colleagues in the Division of Infectious Diseases can be very urgent indeed. Dr. Chow’s expertise is in gram-positive bacteria, such as Staphylococcus and Streptococcus, micro-organisms responsible for a host of problems but most dramatically for toxic shock, which can kill so rapidly. Working on three levels — at the molecular level, in animal models, and in patients — Dr. Chow and his colleagues seek to understand the pathogenesis of toxic shock and to test new treatments.

Based on new understanding of the interaction of gram-positive bacteria and the immune system, Dr. Chow and clinical professors Dr. Martin Tweeddale and Dr. James Russell are conducting a trial of an exciting therapy never before tried on patients in Canada. The current thinking about shock syndrome is that gram-positive bacteria produce proteins that over-stimulate the immune system’s monocytes and lymphocytes, causing them to make substances that are harmful to the patient rather than beneficial. The UBC researchers will treat patients with a monoclonal antibody which is directed at one of the substances produced by the monocytes. “For the first time we may have a substance that can act on both gram-positive and gram-negative bacteria,” says Dr. Chow. “Here is an example where you start by understanding the pathogenesis, go through the animal model system, and then to the patient population, within a period of 10 years.”

Another area of Dr. Chow’s investigative activities, which is more clinical in nature, involves controlling infections that develop in hospitals. Because hospital patients who are weakened by surgery or potent immuno-suppressant drugs are very susceptible to infection, improving precautionary procedures is critical. Dr. Chow chaired a working group set up by Health and Welfare Canada to devise infection-control guidelines for Canadian health-care facilities. He has, as well, participated with UBC colleagues in the Department of Health Care and Epidemiology, the Department of Statistics and the Division of Medical Microbiology in a survey of the impact on Canadian acute-care hospitals of recommended universal infection-control precautions. “In the age of AIDS,” he says, “we find that Canadian hospitals are not coping very well.” In a second phase



of that study, intensive care units in several hospitals will be studied. A third phase will focus on the unit's own intensive care unit, examining the incidence of and trying to prevent infections from intravenous catheters.

In yet another area of research interest, Dr. Chow is involved in new-drug development. "We are in a unique position to determine what diseases require newer treatments, to evaluate new drugs, and to encourage the development of drugs for diseases for which there is no treatment available." Recently, Dr. Chow was the only Canadian appointed to an American committee set up by the Food and Drug Administration along with the Infectious Disease Society of America to recommend standards for the development of new drugs. In this instance, he chaired a subcommittee on respiratory remedies, making recommendations that have been incorporated into FDA regulations.

Dr. Chow conducts his studies of the pathogenesis of toxic shock with two major grants. Within the Canadian Bacterial Diseases Network, his research involves the genital tract as a target for toxic shock. His MRC grant work looks at the blood stream as the target.

Clinician-scientists like himself are finally being accepted, says Dr. Chow. Physicians see that there are practical applications of scientific research, and patients prefer to go to a place where research is going on because they will be examined much more critically. "In 10 years we have made tremendous strides in being understood for what we are trying to do," he says. "It's an exciting time to be a researcher."

*Dr. Anthony Chow is professor of Medicine, head of the Division of Infectious Diseases in the Department of Medicine, director of the G.F. Strong Infectious Disease Research Laboratories at the Vancouver General Hospital, and UBC coordinator of the Canadian Bacterial Diseases Network.*

## *UBC at St. Paul's Hospital*

**LOCATED NEAR THE VERY HEART** of downtown Vancouver, St. Paul's suffers and surmounts the classic stresses of the inner-city hospital. But its central site, and the array of patients it attracts, offer advantages to the UBC care-givers, teachers and researchers who serve its 22,000-plus patients each year.

In its recently adopted strategic plan, the hospital reaffirmed its commitment to increased involvement as a teaching hospital for UBC. Most of the medical staff members are active in teaching undergraduates and postgraduates and providing continuing medical education to doctors and other health professionals throughout B.C. St. Paul's strategic plan also emphasized its strengths as a comprehensive community health centre and its leadership in cardio-vascular, thoracic and critical care; digestive and nutritional disorders; geriatrics; endocrine, kidney disorders and transplantation; and HIV and related viral diseases.

UBC medical researchers have long had a profound relationship with the hospital. Currently, St. Paul's takes particular pride in Dr. Jim Hogg's Pulmonary Research group, which plays a vital role in the National Centres of Excellence Respiratory Diseases Network; and in the HIV Disease team, led by Drs. Julio Montaner, John Ruedy and Martin Schechter, which has been selected by Health and Welfare Canada as the National Coordinating Centre for clinical trials in HIV disease. These UBC faculty members are profiled below.

**JULIO MONTANER, JOHN RUEDY AND MARTIN SCHECTER AND  
THE CANADIAN HIV TRIALS NETWORK**

AIDS RESEARCH AT UBC is one of the strongest programs of its kind in the country. It is fostered by collaborations among members of the departments of Medicine, Pathology, Health Care and Epidemiology, and Botany. UBC faculty members participate on provincial, national and international advisory committees.

At St. Paul's Hospital, three UBC investigators lead a clinically based national attack on AIDS. Dr. Martin Schechter is an epidemiologist who is on the World Health Organization's Steering Committee on AIDS Epidemiological Research. Dr. John Ruedy is head of the Department of Medicine at St. Paul's Hospital and specializes in clinical pharmacology. Dr. Julio Montaner, whose expertise is in respiratory medicine, conducts trials for the national network these three investigators have developed with federal funding.

By 1982, Dr. Schechter was directing the Vancouver Lymphadenopathy-AIDS Study, now one of the oldest and largest studies in Canada. He explains that the name of the study is a throwback to the days when patients appeared with lymphadenopathy, or swollen glands, but were not yet developing AIDS. "We have assembled a cohort of 700 gay men who are seen by family doctors at St. Paul's," says Dr. Schechter. "Half of them are infected and we are monitoring their clinical condition. The others are HIV-negative and we are rating new infections, risk factors and behavioral changes."

**AT ST. PAUL'S  
HOSPITAL, THREE  
UBC INVESTIGATORS  
LEAD A CLINICALLY  
BASED NATIONAL  
ATTACK ON AIDS.**

The general objectives of the study, which is supported by \$2.4 million from National Health and Welfare, are to investigate the natural history, epidemiology and modes of transmission of HIV infection and to develop models of the likely progression of the disease. The study has demonstrated a fact of relevance to the study of the role of the immune system: among those infected for the same amount of time, some have been able to contain the virus while others have not. It suggests, says Dr. Montaner, that there is something right about the former group.

Like most physicians, the Vancouver researchers were slow to recognize the implications of HIV infection. "We didn't know in the beginning that we were involved with a serious epidemic," says Dr. Montaner. "We were dragged into HIV care by the fact that we were in the West End hospital, which serves the population at risk." Becoming more interested and supportive as they dealt with patients, Drs. Montaner, Schechter and Ruedy sought a way to treat *Pneumocystis carinii* pneumonia — or PCP — which is the disease that brought most HIV patients into hospital. They began using anti-inflammatory medication to mitigate the symptoms of PCP. This form of treatment, questioned for several years by some American researchers, has been proven effective in other centres and has now been adopted by the National Institutes of Health in the United States.

At the same time, they found that aerosolized pentamidine provided an 80 per cent protection against PCP relapse. This has become a standard mode of preventing PCP. "When we started fighting against PCP, it had a very dismal prognosis," says Dr. Montaner. "We have modified the mortality rate and we have modified the recurrence rate very dramatically."

By 1983, the cause of AIDS was thought to be the HIV virus, and the drug zidovudine (previously known as azidothymidine or AZT) was being tested in the U.S. and used on patients in an advanced state of disease. Drs. Ruedy and Montaner decided to investigate the use of the drug in people in earlier stages.

They set up a multicentred Canadian trial with 72 subjects, which is now the longest-running therapeutic study of AZT, boasting a group of patients who have lived the longest on the drug.

As a result, Dr. Montaner says, they have been able to monitor its long-term effectiveness and have demonstrated that the virus learns biological tricks to deal with the drug. Now, warned that early administration of AZT may not be the answer, the UBC team is looking at another compound — dideoxyinosine or ddI — which they are giving on a compassionate basis to 700 Canadians who cannot tolerate AZT or who are failing on it. They are considering two approaches to get around the body's ability to develop resistance to AZT — early intervention with ddI or alternating use of both drugs.

Because AIDS patients develop many different types of problems, the UBC group is promoting trials of therapies for sarcoma, gastro-intestinal complications and bone-marrow malfunctions.

Dr. Schechter is also an investigator in the B.C. Prenatal Survey, which is anonymously screening blood specimens obtained from all pregnant women in the province in order to establish an estimate of the extent of HIV infection in this group. Between April and September, 1989, more than 22,000 specimens tested revealed that in Vancouver and Victoria, roughly one in 1,200 women aged 15 to 29 was infected. "Pregnant women are a biased subset in that they usually don't have multiple sexual partners," says Dr. Schechter. "That figure is quite a surprise. It is higher than we suspected."

Internationally, Drs. Schechter and Montaner have collaborated with the Pan American Health Organization in the development of a case definition that is being used for surveillance purposes in South and Central America. For the World Health Organization, they developed a procedure for staging treatment based on clinical features rather than on laboratory blood tests which may not be available in some parts of the world.

UBC researchers have made some progress in treating AIDS and in slowing its progress. As a result, says Dr. Montaner, AIDS patients are surviving longer, living better and being hospitalized less often. But he warns, "AIDS remains a lethal, fatal disease."

*Dr. Martin Schechter is an associate professor of Health Care and Epidemiology. Dr. John Ruedy is professor of Medicine and head of the Department of Medicine at St. Paul's Hospital. Dr. Julio Montaner is an assistant professor of Medicine.*

#### **JAMES HOGG AND THE CANADIAN RESPIRATORY DISEASES NETWORK**

DR. JAMES HOGG is a pathologist — a basic scientist whose research is conducted in a hospital where he has access to human tissue and to patients with obstructive-airways disease which is the focus of his work. Obstructive-airways disease is the medical term for conditions that create an obstruction of the respiratory tract — diseases such as cancer, emphysema and asthma.

Although he doesn't study lung cancer *per se*, the effects of cigarette smoking on the lung are part of his research, and his presence in St. Paul's Hospital, where there are 500 admissions for lung cancer every year, has given him a unique opportunity to correlate lung structure and function. Since only 10 per cent of lung cancer cases are operable, approximately 50 lung resections are done in a year at St. Paul's. Most of those cases involve only small peripheral tumors, but because an entire lobe must be removed, a great deal of normal tissue is made available for study. Before the

operation, most patients are willing to participate in studies of their function. Having done this now for 10 years, Dr. Hogg and his team have 450 cases in their study. "I think we have the biggest study in the world by far in terms of the structural-function relationships in obstructive lung disease," he says.

Over the years, Dr. Hogg has been able to look at a number of aspects of the pathogenesis of chronic obstructive lung disease. The most interesting thing about this disease, he says, is that not all heavy smokers get it. About 30 per cent do. His current hypothesis is that those who get airways obstruction have latent viruses living in their lungs. Most of his studies have been done on the adenovirus — which is a family of viruses that cause upper respiratory infections — and on respiratory syncytial virus, which is a common cause of epidemics of acute bronchiolitis, bronchopneumonia and the common cold in young children and sporadic acute bronchitis in adults.

Having shown that patients with airways obstruction have more adenovirus infection, Dr. Hogg and his group have set up a molecular biology laboratory, funded through the National Centres of Excellence, to study how the virus acts on lung tissue. "We all get viral infections and we throw them off," he explains. "But

sometimes some viruses hang around, and they may interact with the smoking to produce the inflammatory reaction in the peripheral areas that we think causes airways obstruction. The virus can sit in your airways and produce the proteins it needs for reproduction without reproducing. Some of these proteins have very interesting properties that can sensitize your cells. So that means when you smoke cigarettes and get a little inflammatory reaction, the virus might make the tissue much more sensitive by producing this protein."

Using his computerized records accumulated over the past 10 years, Dr. Hogg can easily match and compare smokers with or without airways obstruction and then analyze their filed tissues. "I believe that we are the only people in the world who have this opportunity at this moment," he says. In recognition of their international excellence, Dr. Hogg's group has been asked to function as the pathology core for a University of Iowa study funded by the National Institutes of Health in the United States.

Dr. Hogg's laboratory has ongoing projects on asthma, including building a computer model of the condition. Some patients whose lungs are in the tissue bank also had asthma, which has provided an opportunity to study asthmatic airways and measure their characteristics. "We think," says Dr. Hogg, "that our lab has pointed out more than any other lab that asthma is not necessarily a smooth muscle disease. Most people think you get bronchial constriction because the muscle function is abnormal. Our data have shown that the major problem is the airway becomes thickened by an inflammatory reaction. Then normal smooth muscle contraction can narrow the airway." Dr. Hogg says that information suggests that therapy should also involve anti-inflammatory agents. In this research, Dr. Hogg has been a consultant on an asthma study in New Zealand, where two hospitals have been collecting tissue and sending it to him for examination.

Dr. Hogg's other area — the kinetics of neutrophils — is important in emphysema. Neutrophils are protective white bloods cells which, when needed, migrate from vascular spaces into tissue, pick up microorganisms and eat them. To do this they produce very powerful enzymes. Neutrophils are concentrated in the lungs, and it is Dr. Hogg's hypothesis that cigarette smoking delays the movement

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VIRUS ACTS ON  
LUNG TISSUE.**

of the neutrophil, allowing it to be activated within the vascular space where it releases its enzymes, which cause tissue damage. "I think this hypothesis is unique with us," he says.

In collaborative work with the hospital's intensive care unit, Dr. Hogg is also looking at the role neutrophils play in adult respiratory distress syndrome, which can occur as a result of trauma or sepsis elsewhere in the body. Dr. Hogg suggests that activated neutrophils delayed in their passage through the lungs release their enzymes, destroying the lung's surface and producing a hemorrhagic pulmonary edema that causes respiratory failure and death (in half those stricken). As a method of predicting who will get ARDS, UBC professors at St. Paul's are labelling neutrophils with isotopes and following their movements through the lungs. They are part of a National Institutes of Health clinical trial of therapies.

As part of the pathology department's outreach, pathologists anywhere in the province can consult Dr. Hogg if they have problem cases. Over the years, he has accumulated files on 1,500 such cases. "We have seen almost every kind of lung disease you could possibly imagine," he says.

*Dr. James Hogg is a professor of Pathology and Vancouver coordinator of the Canadian Respiratory Diseases Network.*

### *UBC at the British Columbia Cancer Agency*

**THE GOAL WAS STRAIGHTFORWARD:** to establish a Cancer Research Centre of international renown. UBC was one of the partners in 1979 when the B.C. Cancer Foundation opened the centre on a former Vancouver bakery site, in collaboration with the Canadian Cancer Society and an organization that has since been renamed the B.C. Cancer Agency. The provincial government agency, which is responsible for the diagnosis, treatment and prevention of cancer in the province, operates a teaching hospital in which UBC carries out teaching and research.

While UBC faculty members undertake cancer research in other locations, such as Children's and Vancouver General hospitals, they do the majority of such work at the Cancer Research Centre and the adjacent A. Maxwell Evans Clinic. There, scientists and physicians investigate new cancer drugs and treatment protocols; study the incidence of cancer in society and the workplace; and work to solve the puzzle of how and why the disease originates.

Their research protocols have won global acclaim. Among the trailblazers is Dr. Hans Stitch, who founded the centre's Environmental Carcinogenesis Unit in 1968 when he joined UBC's cancer research group, headed by the eminent researcher Dr. Robert Noble. Working with tobacco-chewing populations in such developing countries as the Philippines and India, Dr. Stitch and his ECU team proved conclusively that pre-cancerous lesions — indicating tissue damage that would eventually become cancerous — would respond well to Vitamin A and Beta-Carotene, found naturally in such tropical plants as red palm oil and sweet potatoes.

With Dr. Stitch's planned retirement, the ECU has dissolved. Advanced research continues in the centre's remaining six divisions: a medical biophysics unit; epidemiology, biometry and occupational oncology; advanced therapeutics; cancer endocrinology; and the Terry Fox Laboratory.

### **DR. ALLEN EAVES AND THE TERRY FOX LABORATORY**

UBC'S DIVISION OF CLINICAL HEMATOLOGY, which incorporates staff at the Terry Fox Laboratory and the Leukemia/Bone Marrow Transplant Program of B.C., has created the largest bench-to-bedside leukemia treatment and research program in

Canada. Researchers here have discovered a new approach to treating patients with advanced chronic and acute myeloid leukemia. At the beginning of 1991, 12 patients with chronic myeloid leukemia had undergone the procedure and most were doing well. The first patient treated is now three years post-transplant with no evidence of leukemia.

Dr. Allen Eaves, professor of Medicine, Pathology and Microbiology and head of our Division of Hematology, is director of the Terry Fox Laboratory. Core support is provided by the British Columbia Cancer Agency and the British Columbia Cancer Foundation. Research is funded by grants totaling over \$3 million, held by the 10 university senior scientists. The laboratory occupies 15,000 square feet in the Cancer Research Centre and has a staff of 100, with more than 40 students and postdoctoral fellows.

Leukemia — cancer of the blood — is the disease focus of the Terry Fox Laboratory. While chemotherapy is usually effective in curing or controlling the acute and chronic forms of lymphocytic leukemia, bone-marrow transplants are needed to cure myeloid leukemia, which primarily affects middle-aged people. However, only a third of patients will have a donor, and graft-versus-host disease is a major complication of transplants, increasing with age and generally disqualifying people over 50 from having transplants.

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LEUKEMIA.**

The Vancouver team's approach has been to get patients to be their own donors, where everyone has a donor and there is no graft-versus-host disease. It is based on an observation made by Dr. Eaves and his wife, Dr. Connie Eaves: cultured outside the body, leukemic cells die off more rapidly than normal cells. An autologous transplant begins with the removal of as much of the patient's own bone marrow as is possible. While the patient receives chemotherapy and radiation to kill all his remaining marrow cells, the removed marrow is purged in culture for 10 days. The leukemic cells die and surviving normal cells are then returned intravenously to the patient. Usually after one to two months, enough normal blood cells are being produced that the patient can be sent home.

The Vancouver results are considered to be extraordinary in the treatment of a disease that is usually lethal. The development of this treatment shows the importance of laboratory research in finding better ways of treating cancer. It also shows how the process of bringing research to the bedside is facilitated by having basic scientists working in close collaboration with physicians.

The lab's molecular geneticist, Dr. Keith Humphries, is an associate professor of Medicine at UBC. With his skills in growing marrow stem cells, Dr. Humphries worked with American genetic engineer Dr. French Anderson, famous now for conducting the first approved use of gene therapy in a patient. Recruited back to the Terry Fox Lab as a Medical Research Council of Canada Scholar, Dr. Humphries is leading the molecular biology component of the leukemia and bone marrow transplant research program. "We now have a hematology research group in the front rank, internationally," he says. "In fact, we in British Columbia have an excellent chance of making significant further contributions to improved treatments for leukemia — if not the cure."

*Dr. Allen Eaves is professor of Medicine, Pathology and Microbiology, head of UBC's Division of Hematology, and director of The Terry Fox Laboratory.*

**BRITISH COLUMBIA'S CHILDREN'S HOSPITAL** is not only the province's pre-eminent child health-care centre, with 242 inpatient beds and nearly 50 outpatient clinics serving acutely ill and injured children from more than 200 communities. It is also the locus for UBC's pediatric research and education, training physicians, nurses and other health-care professionals and is actively involved in world-calibre research to discover better ways to treat and prevent childhood diseases.

Children's has evolved into a Western Canadian resource that concentrates on tertiary, specialized pediatric care while fostering the development of quality pediatric services elsewhere in the province. This is the only hospital in B.C. equipped for such specialized procedures as pediatric organ transplants and heart and brain surgery and is the major referral centre for newborn babies who require extensive medical attention. Among its facilities is a five-room bone-marrow treatment and isolation complex.

Many of the university investigators who work at the hospital and at the UBC laboratories at the nearby Children's Variety Research Centre are also clinical specialists directly involved in treating children admitted to the hospital. Researchers are creating new comprehension of normal growth and development and health-care delivery as well as expanding the knowledge of childhood disease in such areas as understanding genetic predisposition to inherited disorders and clarifying the role of infection in childhood arthritis. Two of them, profiled here — Dr. Aubrey Tingle and Dr. David Scheifele — helped create the first formal centre for independent vaccine evaluation research in Canada.

**AUBREY J. TINGLE, DAVID SCHEIFELE AND  
THE CHILDREN'S VARIETY RESEARCH CENTRE**

AUBREY TINGLE HAD A RASH. He was an intern at the time and soon after he had the rash from rubella, an acute infectious viral disease, he developed arthritis in his hands for a week. This sequence of events prompted him to begin investigating the possibility that arthritis was caused by a virus. At the time, with neither the resources nor the sophistication to consider all possible viruses, he decided to choose a particular one — rubella — and follow its effects on a chronic disease like arthritis.

That was nearly two decades ago. Dr. Tingle's viral research led to the establishment in 1985 of the Children's Variety Research Centre, where world-calibre research has attracted scientists working at the forefront of medical knowledge. Joining UBC's Faculty of Medicine in 1974 as a professor of Pediatrics, Dr. Tingle later helped raise funds to begin UBC's research program at B.C. Children's Hospital, to buy the equipment and even the trailers to house it. He is now chair of the Research Advisory Committee of the hospital's research division. The research centre, on the Shaughnessy site, was funded by Children's, the Variety Club and UBC. It has become the laboratory base for much of the research activities within the hospital, generating interaction between clinicians and scientists, increased collaborative studies, and a rapid growth in publications and research funding.

**DR. TINGLE'S VIRAL  
RESEARCH LED TO THE  
ESTABLISHMENT IN  
1985 OF THE  
CHILDREN'S VARIETY  
RESEARCH CENTRE,  
WHERE WORLD-  
CALIBRE RESEARCH  
HAS ATTRACTED  
SCIENTISTS WORKING  
AT THE FOREFRONT  
OF MEDICAL  
KNOWLEDGE.**



One focus has been the rubella virus that inspired Dr. Tingle. A biochemist, Dr. Shirley Gillam, an associate professor of Pathology, has done the molecular biology of the virus, sequencing both it and the rubella vaccine and cloning each of the proteins in the virus. A virologist, Dr. Janet Chantler, an assistant professor of Pathology, has studied the persistence of the rubella virus, demonstrating that it is present in patients who develop arthritis after rubella. Meanwhile, Dr. Tingle, Dr. Chantler and Dr. Ross Petty, head of the Rheumatology Division in the Pediatrics Department, have learned in their research of juvenile rheumatoid arthritis that 35 per cent of children with the condition are carrying the rubella virus in their joints or bloodstream, suggesting that rubella is causing about one-third of the cases.

A major spin-off of the research program has been the Vaccine Evaluation Centre, the first formal facility in Canada for independently evaluating vaccines and helping health authorities select the best vaccines and strategies for use in immunization programs. "The vaccine centre arose from a conversation where David Scheifele and I jointly came up with the idea," Dr. Tingle recalls. He is now co-director with Dr. Scheifele, a fellow professor of Pediatrics.

Funded jointly by UBC and Children's Hospital, the centre opened in 1988 and quickly altered the relationship with vaccine manufacturers to one in which its researchers play the major role in planning and conducting clinical trials. It now conducts about 60 per cent of the evaluation research of children's vaccines in Canada. The director of the federal government's Bureau of Biologics describes the centre as "the right idea at the right time."

The centre's first and largest study was a surveillance of adverse reactions to a *Haemophilus b* conjugate vaccine. *Haemophilus* is characterized as the single worst germ in children, one that causes roughly three-quarters of the cases of childhood meningitis, the leading cause of acquired deafness and retardation. Collaborating with three local health units, the centre monitored more than 5,000 children for adverse events in the 30 days following immunization — the first major post-marketing study of a vaccine to be done in Canada. With such studies expected to be required for the future licensing of vaccines, the centre is well positioned to provide leadership in this area.

Collectively, the 15 researchers on the centre's advisory committee have skills unequalled by any other Canadian university group or manufacturer in this field of preventive medicine. Its team includes specialists in immunology, adult and pediatric infectious diseases, epidemiology, public-health policy and practice, clinical-trials methodology and statistics, bacteriology, virology and serology (the study of serums and their effects).

They are responding to advances in molecular biology that have stimulated vaccine development and basic vaccine research by universities, biotechnology firms and large corporations. Old vaccines are being improved; many new vaccines are being developed for infections that cannot yet be controlled. The number of infections preventable by vaccines promises to nearly double during the next decade. And a few dollars per dose can prevent suffering associated with major infections and avoid mounting costs of caring for the ill. As Dr. Tingle says, no other procedure in modern medicine is as cost-effective as a good vaccine. "We felt there was a need to have an organization that was independent of government and industry, one that can ask the question: 'What's in the best interests of child health?'"

About half of the evaluation centre's work has been on grant-funded, investigator-initiated questions related mainly to licensed vaccines; the other half

are evaluations of new vaccines for manufacturers. As Dr. Scheifele points out, the pace of new vaccines coming on the market is accelerating. "And the same technology that has allowed greater ease of invention has invited more inventors into the process. So we don't just get four or five new vaccines; for each of them, we get several competing variations. This means that the process of sorting out which of the competing viruses is superior becomes more complex. You need an independent group able to do studies on a scale where you can begin to compare, and do it with enough credibility that the manufacturer will buy into the process.

"This is why the centre is attracting such attention. We told the manufacturers that we would take the initiative, provide the quality assurance, analyze the data in a way that would stand up to peer review. That was the big gamble we took in 1988. We didn't know how long it would take for us to move into this new mode of being independent investigators. To our surprise, it happened within the first year."

*Dr. Tingle is a professor of Pediatrics and of Pathology and Dr. Scheifele a professor of Pediatrics in the Faculty of Medicine. They are co-directors of the Vaccine Evaluation Centre.*

## *UBC at University Hospital*

**UNIVERSITY HOSPITAL IS A RECENT UNION** of two independently run operations, the 568-bed UBC Health Sciences Centre Hospital on the UBC campus and the 643-bed Shaughnessy Hospital on the residential west side of Vancouver. The hospital's 900 practising physicians treat more than 10,000 patients a year, providing a full range of multidisciplinary treatment and diagnostic services covering the entire range of acute, psychiatric, intermediate and extended care. Medical students and residents train on both sites in most medical specialties; students in nursing, diagnostic, professional, social science and support-service programs gain educational and clinical experience here.

UBC schools of Nursing and Rehabilitation Medicine and some Faculty of Medicine offices are located on the university site.

The hospital is known internationally for its work in multiple sclerosis, medical genetics, Alzheimer's disease, spinal cord injury, back pain in astronauts, surgical robotics and schizophrenia. UBC researchers — including what is considered by some to be one of the strongest research teams on neurological diseases in the world — do significant work in the hospital's clinics and laboratories, typified below by four investigators pursuing the riddles of Huntington's disease, movement disorders, multiple sclerosis, and spinal cord injuries.

## *UBC at University Hospital—UBC Site*

### **DR. MICHAEL HAYDEN AND HUNTINGTON'S DISEASE**

UNLIKE OTHER GENETIC DISORDERS which become apparent soon after birth, Huntington's disease does not strike until middle age. Then it produces progressive deterioration of the brain, leading slowly and irrevocably to death within 10 to 15 years. There is no effective treatment or cure.

**THE HOSPITAL IS  
KNOWN  
INTERNATIONALLY FOR  
ITS WORK IN MULTIPLE  
SCLEROSIS, MEDICAL  
GENETICS,  
ALZHEIMER'S DISEASE,  
SPINAL CORD INJURY,  
BACK PAIN IN  
ASTRONAUTS,  
SURGICAL ROBOTICS  
AND SCHIZOPHRENIA.**

The disease is caused by a dominant gene. If a parent has Huntington's, each child has a 50 per cent chance of inheriting the gene and of developing the disease. Because the illness appears late in life, victims have had children, who may themselves have had children, before the family knows what seeds have been sown.

Until recently there was no way to tell if the children of Huntington's patients had inherited the defective gene. These people at risk lived in uncertainty — not knowing whether to marry or to have children, not knowing whether to plan for retirement or an extended illness and early death. Now, however, researchers have discovered that the Huntington's gene is on chromosome number four, close to an identifiable marker, which has two forms. By examining blood samples from affected and unaffected family members, researchers can tell which form of the marker is inherited along with the Huntington gene. They can then tell whether persons at risk have inherited the marker, and, with 95-per-cent accuracy, say what percentage of chance they have of getting the disease.

A first Huntington's marker was discovered in Boston in 1983; since then closer markers have been found — some of them by geneticists at UBC led by Dr. Michael Hayden, an associate professor of Medical Genetics.

**IN THE BASIC-  
SCIENCE ASPECT OF  
HIS WORK, DR.  
HAYDEN IS ONE OF  
SEVERAL UBC  
INVESTIGATORS  
FUNDED IN THE  
LARGEST MEDICAL  
RESEARCH GRANT  
EVER AWARDED  
UBC BY THE  
MEDICAL RESEARCH  
COUNCIL.**

Trained as an internist, Dr. Hayden was drawn to Huntington's from the humanistic perspective of a caring physician. "My involvement in Huntington's disease really started at the level of seeing the pain and suffering of families with this disorder and recognizing that nobody knew anything about it." In 1975 he began to see patients in South Africa and to study patterns of presentation, which led to the first published monograph about the genetics of this disorder. After doing a doctorate in population genetics and epidemiology and post-doctorate research in molecular genetics in Boston, Dr. Hayden came to UBC where he has been able to integrate basic and clinical research.

"I always believed and continue to believe that on the road to a cure there's lots of room for caring. As a primary researcher my goal is to clone the gene for Huntington's disease, but there's an equal need to provide something else for families right now and not to wait for some cure that may or may not come at some time in the future," he says.

In 1986, Dr. Hayden started a predictive testing project at UBC. In 1988, it became the only national program for Huntington's disease in the world, and UBC remains one of only four centres offering predictive testing. Because Dr. Hayden believes the service must be universal, the UBC group coordinates counsellors in 14 cities in Canada and has made testing available to people in other countries. So far, 350 people have been tested nationally and 25 internationally. People who enter the program meet with counsellors three times before hearing their results. Some decide that they don't want to know. For them, living with a 50-per-cent chance is preferable to knowing a virtual certainty.

The object of the predictive testing service is improved quality of life. It is not to decrease the frequency of occurrence of the gene in the population by counselling people not to have children. "It's not for me as a physician to judge that," says Dr. Hayden. "There are many people who developed Huntington's disease who led wonderful lives. Woodie Guthrie, for example. We would not have had *This Land is Your Land* if Woodie hadn't been born."

Dr. Hayden believes that the Huntington testing program at UBC is a model for dealing with the ethical, legal and social issues that will arise when predictive

tests for Alzheimer's, cancer and heart disease are available. "We see people being discriminated against because they have a family history. We need more appropriate legislation to protect individuals from the impact of such information because the truth is we are all affected. We're going to find a test for some disease that your grandparents had."

In the basic-science aspect of his work, Dr. Hayden is one of several UBC investigators funded in the largest medical research grant ever awarded UBC by the Medical Research Council. The MRC Group in Degenerative Disorders of the Motor Pathways is directed by UBC neuroscientist Dr. Donald Calne. Dr. Hayden is collaborating with neuroscientists and others on a unique two-pronged approach to studying Huntington's disease. Searching for markers that predate clinical symptoms, the group is correlating changes in DNA with changes in positron emission tomography (PET) brain scans. "We've already shown that changes occur metabolically before there is cell death in the brain. We're correlating the changes in DNA with the changes seen on PET scans. We've been able to show that certain regions of the brain have less uptake of glucose, even before the cells die or before a lot of cells have died. We're interested to see what drugs can be used to reverse that process — so we're looking at drugs even before we understand the pathogenesis of the disease."

For Michael Hayden, the challenge is the disease. As a medical geneticist, his goal is to clone the gene. As a basic scientist, he uses state-of-the-art technology to understand the disease. As a physician, his goal is to improve the quality of life for patients who have or may have this devastating disease.

*Dr. Hayden is chair of the Scientific Advisory Board of the Huntington's Disease Society of Canada, national scientific director of the Canadian Genetic Diseases Network and director of the Adult Genetics Clinic at University Hospital-UBC Site.*

#### **DONALD CALNE AND PARKINSON'S, AMYOTROPHIC LATERAL SCLEROSIS AND DYSTONIA**

UBC'S DONALD CALNE has never been afraid of asking questions. In his 25 years as a research neurologist, Dr. Calne was the first to introduce bromocriptine as a treatment for Parkinson's disease (for which it is now routine therapy) and with a colleague from the United States, was the first to recognize the existence of two categories of receptors for dopamine, a vital chemical agent that transmits information between nerve cells in the brain. When Oliver Sacks, of 'Awakenings' fame, was giving l-dopa to Parkinsonian patients in New York, Dr. Calne was giving it to similar patients in London, England. Hearing of patients in Guam with a disease that resembled Parkinson's, Dr. Calne arranged with the U.S. Navy to fly them to UBC. Knowing of a group of people in southern California who had taken a drug that caused some of them to develop parkinsonism, he solicited the cooperation of Immigration Canada in bringing unaffected members of the group to UBC for brain scans.

The Donald Calne story would show a man concerned for his patients, an innovative researcher and a superb organizer — a man able to assemble a first-rate research team and to create one of the strongest movement-disorder groups in the world.

Dr. Calne's UBC team comprises 11 full-time and eight part-time researchers, funded by a \$6.1 million MRC group grant and an additional \$2 million from public and private sources. They are focusing on four diseases — Parkinson's, Huntington's, dystonia, and Lou Gehrig's disease, which doctors call Amyotrophic Lateral Sclerosis, or ALS.

Dr. Calne's research involves Parkinson's, ALS and dystonia. These movement disorders are becoming more frequent as life expectation increases, and are being seen more often in elderly people.

Approximately 70,000 Canadians have Parkinson's — a progressive degenerative disorder with symptoms that may include tremor and muscular stiffness and rigidity.

Twenty-five thousand have ALS. The number is lower, Dr. Calne says, partly because ALS is an aggressive disease that usually kills within five years. It is characterized by muscular weakness and atrophy, often accompanied by spasticity.

"There are certain common features in the mechanism of ALS and PD," says Dr. Calne. "There are similar changes in the nerve cells — nerve cells concerned with controlling strength in the case of ALS, and nerve cells concerned with planning or organizing movement in the case of PD."

Current medical research indicates that an environmental factor — perhaps a toxin or an infection — may be the cause for both diseases. In contrast, Huntington's, which affects about 40,000 Canadians, has a clearly defined genetic origin.

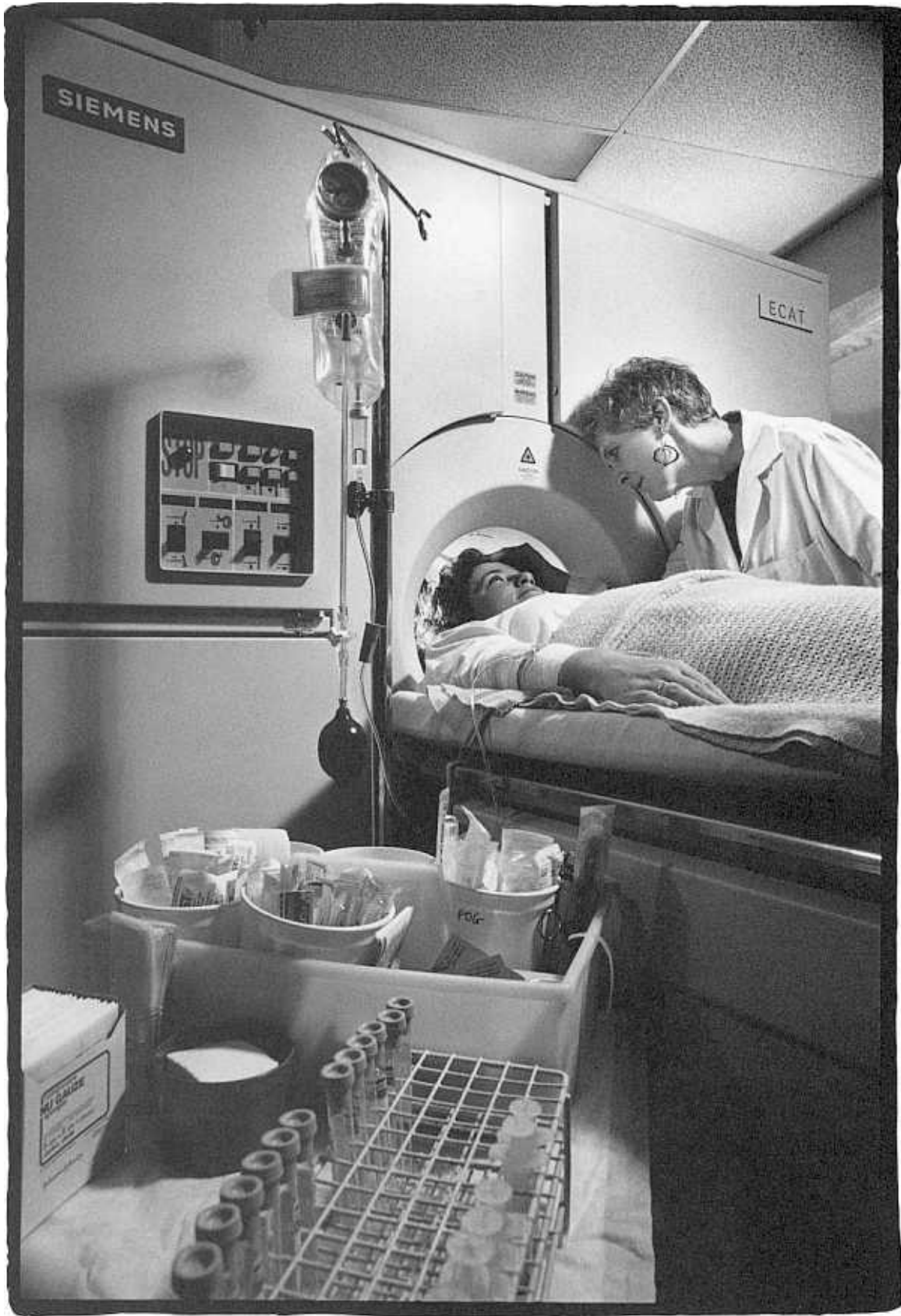
Dystonia, which affects approximately 8,500-9,000 Canadians, is a syndrome of sustained muscle contractions, frequently causing twisting, repetitive movements or abnormal postures. It may be confined to one body part — the eye, the neck or the jaw — or it may be more generalized. In 1984, UBC researchers pioneered the use of botulinum-A toxin, injected into neck muscles to reduce the force of contractions.

"We're interested in detecting these diseases even before people have symptoms," says Dr. Calne. "If we can identify them, we can begin to treat them early." The area of the brain involved in Parkinson's is the substantia nigra, which contains cells that produce dopamine. With the death of these cells and a consequent deficiency in dopamine, the transmission of messages between nerve cells is interrupted. Positron emission tomography scans can show changes in the brain before a person exhibits symptoms.

The traditional treatment of PD has been to replenish the deficient dopamine by giving drugs that are converted to dopamine or that mimic its action. Based on a theory that excessive drive of the nerve cells may contribute to their early death, the Calne team is testing a new drug — lamotrigine — which reduces the release of excitatory agents. Dr. Calne says lamotrigine might be useful in ALS, for which there has been no treatment so far.

In 1985, in the journal *Nature*, the Calne team reported its findings of PET scans in four Californians who had taken MPTP — a synthetic heroin, which had induced parkinsonism in others. Although these four were symptom-free, they had abnormal scans. This was the first direct evidence that dopaminergic impairment can exist without clinical deficits. As a result, the team hypothesized that Parkinson's disease may result from an environmental event which precedes the onset of symptoms by many years, and that normal aging erodes the compromised cells, resulting in the emergence of the disease.

Further evidence of an environmental link in Parkinson's comes from Dr. Calne's study of natives of Guam, where there is a very high incidence of a disease like PD. In 1986, the U.S. Navy began flying patients to UBC for PET scans. The disease is occurring less frequently now, which, says Dr. Calne, is a clue to its cause. "Something happened during the war — some major change in diet or a change in minerals in the water supply," he suggests. Dr. Calne's association with



*The Positron Emission  
Tomography (PET)  
Scanner, a state-of-  
the-art diagnostic tool,  
is being used at UBC  
to identify the early  
pre-clinical  
symptoms of  
Huntington's disease.*

Guam has produced both Guamanian government funding for the research at UBC and a personal award of gratitude.

With the rising incidence of all the movement-disorder diseases, the outcome of Dr. Calne's research will affect many Canadians. "I would hope," he says, "that a substantial advance in our understanding of mechanism, cause or treatment will occur within the next 10 years."

*Dr. Donald Calne is the Belzberg Family Professor of Medicine and head of the Division of Neurology at the University Hospital's UBC Site. He is director of the Medical Research Council Program in Degenerative Disorders of the Motor Pathways.*

#### **DONALD PATY AND MULTIPLE SCLEROSIS**

YOU COULD SAY that Donald Paty is a one-disease neurologist. "MS is my thing," he says. "When I started looking at it, it was obvious to me that it was one of the most fascinating diseases because it involved viruses, immunology, the nervous system, genetics and a whole lot of other things."

Not all physicians are willing to spend their lives caring for people who have a disease that cannot be cured. But some are. "In neurology, particularly," says Dr. Paty, "you have made peace with the inability to be a compulsive therapist."

Multiple sclerosis is a progressive, autoimmune disease in which the body attacks the myelin sheath around nerve fibres in spots scattered throughout the brain and spinal cord. As a result, messages transmitted to many different muscles become imprecise. The disease can take a chronic form, but most patients have spontaneous remissions and relapses. It is a young adults' disease, the mean age of onset being 31. No one knows why but MS is more common in northern latitudes. The rate of prevalence in the U.S. is 60/100,000; in Vancouver it is 130/100,000.

Dr. Paty attacks the disease both as a clinician and as a scientist. His approach has been to understand what is going on with the patient in order to formulate questions for his basic research. Determined to work with and learn from patients, he went in 1970 to Newcastle-on-Tyne where there was probably more MS than in any other place in the world. The British Medical Research Council had a research centre there, but, says Dr. Paty, they had no organized system to see patients and collect data from them. "I had to beg on the wards to be able to see patients."

At the University of Western Ontario in the 70s, he started an MS clinic. The concept of a prospective follow-up of patients caught on, and with the sponsorship of the Canadian MS Society, clinics were set up across the country. Those clinics now use a standardized approach to collecting data, designed by Dr. Paty and Dr. Donald Studney of the Department of Medicine. MS-COSTAR, a modified version of the public domain system, COSTAR, is used by six Canadian clinics and was selected by MS researchers in the U.S. after six years of exhaustive evaluation. Dr. Paty says that European countries are interested in COSTAR as well, because it will make them compatible with what is going on in Canada. UBC has made the software available to participating clinics for \$1.

At UBC since 1980, as head of the Division of Neurology in the Department of Medicine, Dr. Paty has directed MS research programs, basing them on a mutually beneficial relationship with patients. "Patients understand that we have a dual purpose in meeting. They can benefit from the expertise of someone interested in their disease, and we get data and material from them for our research programs." He sees patients at the Multiple Sclerosis Clinic at University Hospital-UBC Site. "One of our missions is to be available to the patients with MS in the province who



want to see us. Patients with chronic, incurable, unpredictable, neurological diseases know that there is no magic available to them, but they always respond very well to people taking an interest in their problem."

In 1988 in the journal *Neurology*, Dr. Paty and his team reported the results of Magnetic Resonance Imaging of 200 suspected MS patients, comparing the scans with other diagnostic tests. Their conclusion was that MRI was the most sensitive tool for diagnosing MS and that it would be useful in determining the efficacy of treatments.

Dr. Paty explains that typically in MS there are lesions — multiple areas of abnormality in the white matter of the nervous system. MRI gave researchers a way of seeing the extent of these lesions and following them over time. They were not surprised to find that symptoms did not correlate with lesions — that there could be 10 times more activity in the nervous system than was expressed in symptoms. But they were surprised by one observation: the abnormal areas went away and returned, and it could take years for a lesion to become permanent. "That is just a revolution in thinking about the disease," says Dr. Paty. "The good news about MS is that built into the nervous system is a control mechanism that can reverse the process."

With this in mind, Dr. Paty looked again to his patients to try to understand the relationship of the immune system to activity in the disease. It was obvious that the immune systems of MS people operated differently, but it was difficult to correlate immune system abnormalities with symptomatic attacks. However, with MRI scans in hand, one could relate abnormalities in the nervous system with synchronous changes in the immune system.

Using MS-COSTAR, UBC researchers have logged in 2,500 patients in the past nine years, which is the largest computerized MS database known. This collection of well-studied patients followed over a long period of time is a tool that can be used to predict prognoses for new patients. That is important in deciding whether to administer the powerful, toxic immuno-suppressant or anti-viral agents that are typically used in MS.

In the next decade, genetic studies in MS will become more important, and UBC is well positioned to participate. Dr. Paty's colleague, Dr. Adessa Sadovnick, professor of Genetics, has diligently collected family-related information on MS. As a result she has the best MS genetics database in the world. The next task is to do the molecular studies on those patients to try to understand why inherited factors are important.

Dr. Paty says research will show the genetic basis of MS to be unlike Huntington's where one gene is probably the culprit. In MS, he suggests, a combination of genes will prove to be a necessary but not sufficient prerequisite. The trigger may be a virus that comes at a time of susceptibility, probably around puberty, and causes the immune system to malfunction, producing symptoms anywhere from five to 20 years later.

"I think we will have ways of controlling the disease long before we have the answers to what is causing it," says Dr. Paty. "In another 10 or 15 years, we will be in a position to be much more specific about modulating the immune function when it is abnormal as in MS."

Posing the questions that research must answer will be clinician-scientists, like Dr. Paty, who have studied the disease in all its etiological complexities. "I'm

AT UBC SINCE 1980,  
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RELATIONSHIP WITH  
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proud to say that Canadian research has contributed enormously towards understanding what is going on with the patient."

*Dr. Paty is head of the Division of Neurology in the Department of Medicine.*

### *UBC at University Hospital-Shaughnessy Site*

#### **PETER WING AND SPINAL CORD RESEARCH**

SINCE 1985, A TEAM OF UBC RESEARCHERS has been designing experiments with some rather strange criteria. The equipment needed must fit into a shoebox. It must be light, require no power, gives off no gases and if it is blowtorched, it must not burn.

Getting an experiment ready to go into space is no easy matter, as researchers in the Orthopedics Department at University Hospital-Shaughnessy Site, have been learning. NASA's standards are exacting, but more difficult to bear has been waiting for the launch. Dr. Peter Wing and his two crews have experiments prepared for two International Microgravity Laboratory missions.

Dr. Wing and his cohorts have waited this long time to try to determine why astronauts get taller in space. Height increases of up to seven centimetres have been documented on previous flights, and it is well known that two-thirds of astronauts suffer back pain. What Dr. Wing wants to do with his experiments is confirm the amount of height change and try to establish how it happens. Does the spine change length or shape or both? Then he'd like to see if he can ascertain how that change produces pain.

Dr. Wing's involvement with the American space program grew out of his work in the Back Pain Clinic, which he started in 1979 with Woodward Foundation funding. The Back Pain Clinic continues to offer its assessment of individuals with chronic and intractable back pain. It is one component of a focus at the hospital on spinal cord problems.

University Hospital-Shaughnessy Site, is the provincial referral centre for all spinal cord injuries in B.C. In a province that has the highest number of such injuries in North America, the Spinal Cord Injury Unit is proud of the fact that it can have a person, injured anywhere in the province, on an operating table within four hours. The 22-bed unit treats 220 patients a year. Its multidisciplinary team of physicians, nurses, physiotherapists, occupational therapists and counsellors helps patients deal with their severe injuries. Since a large proportion of spinal cord injuries occur in young men, the unit draws on the expertise of Dr. George Szasz, a professor of Psychiatry, in the area of sexual function and fertility in the spinal-cord injured person.

The unit also engages in research on fracture patterns (Dr. J. F. Schweigel, associate professor of Orthopedics, and Dr. William Yu, clinical associate professor of Orthopedics); and on urinary infections in the spinal-cord-injured population (Dr. Marie Gribble, assistant professor of Medicine).

Dr. Wing isn't quite yet sure what outcome the IML-1 experiments might have for back-pain sufferers on earth. But he says the study is important to our understanding of how the spine responds to stress here on earth. UBC's involvement in the space program has produced spin-off benefits for patients. In zero-gravity training flights, the UBC investigators have performed experiments with the Transcranial Doppler, as a way of measuring blood flow using ultrasound. That technique is being tested here to monitor infants who are being flown on air ambulances.

**"ONE OF OUR  
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As well, the unit's doctors are testing one space-inspired treatment measure. When astronauts return to earth, they suffer orthostatic hypertension — they faint when they stand up. Since spinal cord patients are often dizzy when they first get up, the unit has been testing the astronauts' solution to the problem, which has been to drink a lot of water. With Dr. John Ledsoe, head of our Department of Physiology, the unit has been giving spinal cord patients a short, quick intravenous to balance their fluid load.

Reflecting on the lessons that space research can teach us about spinal cord injuries, Dr. Wing comments that the caution NASA practises is worth emulating: "If people approached driving a car with as much care as NASA does flying the shuttle, we'd have a much lower injury rate."

*Dr. Wing is head of the Department of Orthopedics at University Hospital—Shaughnessy site, and associate clinical professor in UBC's Department of Orthopedics.* ■

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**MANY FORMAL CLINICS AND UNITS HAVE BEEN CREATED BY UBC FACULTY. ON THE ONE HAND, THESE CLINICS ENHANCE TEACHING AND RESEARCH; ON THE OTHER, THEY PROVIDE AN IMPORTANT SERVICE TO THE COMMUNITY.**

## *XI. Clinics and Community Service*

**A FEW EXAMPLES** indicate the range of clinical services provided by the Faculty of Medicine:

- **THE DIVISION OF DERMATOLOGY OPERATES A PSORIASIS UNIT AND, AMONG OTHERS, OFFERS CLINICS SPECIALIZING IN PIGMENTED LESIONS, HUMAN PAPILLOMA VIRUS, ICHTHYOSIS (A CONDITION CHARACTERIZED BY DRY, SCALY SKIN), AND EPIDERMOLYSIS BULLOSA (A RARE, HEREDITARY SKIN DISEASE).**
- **THE DIVISION OF CARDIOLOGY OPERATES A HEART ARRHYTHMIA MANAGEMENT PROGRAM THAT HANDLES 1,000 PATIENTS A YEAR. THE DIVISION IS THE MOST ADVANCED IN THE COUNTRY IN THE TREATMENT OF ABNORMAL HEART RHYTHMS WITH ABLATION. (ELECTRICAL CATHETERS ARE USED TO CAUSE A LOCALIZED AREA OF INJURY THAT CURES THE ARRHYTHMIA.) THE DIVISION STARTED AND IS THE CENTRE OF A CARDIAC DRUG TRIALS NETWORK INVOLVING 13 B.C. HOSPITALS.**
- **THE DIVISION OF GERIATRIC MEDICINE OPERATES AN ALZHEIMER ASSESSMENT AND FOLLOW-UP CLINIC AT UNIVERSITY HOSPITAL, AN INCONTINENCE CLINIC AT VGH, AND GERIATRIC MEDICINE CONSULTATION SERVICES IN VARIOUS HOSPITALS.**
- **THE DIVISION OF NEPHROLOGY OPERATES A RENAL STONE CLINIC AT VGH AND THE COOPERATIVE OSTEOPOROSIS CLINIC WHICH IS INTER-HOSPITAL IN SCOPE.**

**THE ALLAN MCGAVIN SPORTS MEDICINE CLINIC,  
SOUTH CAMPUS, UBC**

IT'S THE FOREMOST CENTRE OF ITS KIND IN CANADA: the Allan McGavin Sports Medicine Clinic is unparalleled in this country in its blend of academic and service functions for both elite performance athletes and people in the community who lead active recreational lives. Its staff of specialists treats an average of 1,000 a week from all the western provinces as well as Yukon and the Northwest Territories.

The outreach clinic ministers to everyone from teenagers to the elderly, from Olympic athletes to lawn-bowlers. Named for a former UBC chancellor who contributed enormously to sport during his career, the clinic is operated by the Sports Medicine Division of the Faculty of Medicine's Department of Family Practice and the School of Physical Education and Recreation. Its co-directors, Drs. Doug Clement and Jack Taunton, are among four full-time and four part-time physicians providing primary care; three full-time and one part-time orthopedic surgeons; four full-time physiotherapists; and a rehabilitation consultant and an arthritis consultant.

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MEDICINE'S  
DEPARTMENT OF  
FAMILY PRACTICE AND  
THE SCHOOL OF  
PHYSICAL EDUCATION  
AND RECREATION.**

The co-directors are prominent in the world of Canadian sport. Recently made a member of the Order of Canada, Dr. Clement has for 10 years been the national coach of Athletics Canada (formerly the Canadian Track and Field Association). He sits on the accreditation committee of the Canadian Academy of Sports Medicine (CASM). Dr. Taunton was chief medical officer for the 1991 Pan American Games in Cuba and held the same position for an earlier Pan Am Games and two World Student Games as well as being a medical officer in the 1984 and '88 Olympic Games, primarily for the Canadian national men's and women's field hockey teams, of which he is team doctor. A marathon runner himself, he coaches two leading Canadian runners and an international runner. He is past president of B.C.'s Sports Medicine Council and now is working to develop a Sports Research Foundation for the council.

Among the part-time physicians in primary care is Dr. Gordon Matheson, team doctor for the Vancouver Canucks of the National Hockey League. He is also the founding editor of *The Clinical Journal of Sport Medicine*, published by the CASM, whose editorial board includes the clinic's co-directors. Dr. Ralph Davidson is the Canucks' team surgeon. Others affiliated with the clinic are doctors for several of Canada's national teams: Pat McConkey (downhill ski and men's basketball); Jim Macintyre (downhill ski); Rob Lloyd Smith (cross-country ski); Don McKenzie (canoe/kayaking); and Sue Hopkins (cycling). Physiotherapists involved with national teams include Ron Mattison (men's field hockey) and Clyde Smith (wrestling).

The focus of research undertaken by clinic physicians ranges from the very young to the very old. Dr. Don McKenzie is studying attitudes towards exercise and how they affect oncology and juvenile rheumatoid arthritis patients at Children's Hospital. Dr. Jack Taunton, working with the Department of Family Practice, the School of Physical Education and VGH, is coordinating an investigation into the effects of exercise on early elderly women. Dr. Taunton is also coordinator of a research project to determine the best management of stress fractures using an air-cast; and, collaborating with the School of Family and Nutritional Sciences, he is looking at the effects on metabolism and fat-store

redistribution of cyclic weight loss by such athletes as wrestlers, and at the effects of different frequencies of running exercise on adults newly diagnosed with diabetes. As well, he is conducting on-going research on the causes, effects, treatment and rehabilitation of specific sports-related medical problems, such as hamstring injuries. Dr. Clement studies the incidence, clinical presentation and course of treatment of femoral stress fractures in athletes. With a former graduate student now on the faculty of Lakehead University, he is also researching iron metabolism in athletes.

The Sports Medicine Division presents two symposiums on its specialty each year, and the staff teach several courses throughout the province as well as making presentations to hospitals and medical associations.

The clinic remains best known for what its administrator has described as its "one-stop-shopping" style of public service, its treatment of a spectrum of athletic and recreational injuries that range from those resulting from over-use to acute sports injuries that demand immediate attention.

**THE UBC MOVEMENT DISORDERS CLINIC, UNIVERSITY HOSPITAL-UBC SITE**  
PEOPLE FROM AS FAR AWAY AS AUSTRALIA AND INDIA have attended the UBC Movement Disorders Clinic. A child with generalized dystonia flies in from the east coast once every three or four months to receive injections of botulinum toxin. Patients who are taking part in a Swedish brain-cell transplant program have come for pre- and post-operative PET scans.

UBC has the strongest movement-disorder PET scanning group in the world, and the results of research conducted by that group have already benefited patients who have Parkinson's and dystonia.

The clinic was established in 1981 to conduct research and to provide treatment and counselling for people with dystonia and other neurological disorders of movement. It is one of several clinics funded by the Dystonia Medical Research Foundation.

Coordinator Susan Calne explains that everybody who comes to the clinic understands that it has a research program. Everyone becomes a passive subject in that charts are maintained on their progress, but no one is obliged to take part in projects and fewer than a fifth do so. "We provide a superb service in this clinic," she says. Patients are seen by Dr. Donald Calne, or one of five post-doctorate fellows. They also see a nurse, who explains and monitors their drug regimen. For those who need them, an occupational therapist, speech language pathologist, physical therapist and social worker are available. Dystonia patients, who are usually younger than those who have Parkinson's and have to hold down jobs, receive help coping with the related physical and emotional impact of their disease.

It is Mrs. Calne's job to recruit patients for research projects, such as the phase-one and comparative drug studies that the clinic regularly conducts. She finds that there are patients who like to take part in studies, partly because they know they will receive good care (a nurse is available to them 24 hours a day) and partly because they want to make a contribution to knowledge. "We live in a society where intelligent patients are their own advocates in their own disease. They are well read and well informed. They are genuinely interested in increasing knowledge."

Normal subjects who have volunteered for PET scans are often patients' relatives, who want to aid scientific research. Even clinic Director Donald Calne has had one. "It's a risk I was prepared to take to provide information."

In a year, the clinic sees 400 patients with Parkinson's and dystonia.

**TROPICAL DISEASES CLINIC AND INFECTIOUS DISEASES OUTPATIENT CLINIC, VGH, UNIVERSITY HOSPITAL AND UBC SITES**

MALARIA, LEISHMANIASIS, GIARDIASIS AND ECHINOCOCCOSIS may not be that common in the average general practitioner's waiting room in B.C., but they are frequent souvenirs of foreign travel. Western Canadians who have acquired these parasitic diseases can take them to the Tropical Diseases Clinic, which is an initiative of UBC's Division of Infectious Diseases, operated at Vancouver General Hospital. It is the only clinic of its type west of Toronto, serving all of B.C. and accepting referrals from CUSO and other government agencies. It maintains an exotic anti-parasitic drug depot, with medications not available by prescription and probably not known to general practitioners. Doctors here are on the forefront, knowing what drugs are under investigation and having access to them before they have been released by regulatory agencies. They see a lot of malaria, and types of life-threatening malarias that are resistant to drugs. They have the expertise to treat malaria in a pregnant woman when the drug therapy might harm the fetus.

The division's Infectious Diseases clinics see approximately 1,200 new outpatients in a year and consult to physicians in remote cities in B.C. and in Alberta and Washington State. People with serious infections — in the heart valve and prostate gland, in bone and bone marrow and in the central nervous system — may be treated with thrice-daily intravenous injections, given in collaboration with VGH's Medical Day Care Unit.

**MEDICAL GENETICS SERVICES, UNIVERSITY HOSPITAL-SHAUGHNESSY SITE**

THE CLINICAL PROGRAM IN MEDICAL GENETICS begun in 1978 at Grace Hospital now serves approximately 6,000 B.C. families a year from a central office at University Hospital-Shaughnessy Site. Dr. Barbara McGillivray of our Department of Medical Genetics is clinical director of the service, while Dr. Judith Hall, now head of our Department of Pediatrics, was the director for several years.

The clinical services offered by UBC genetic physicians include assessment, diagnosis and counselling. In Vancouver and on frequent outreach visits in Victoria and the Thompson/Okanagan region, the medical staff advise people who are considered to be at very high risk — people with family histories of Huntington's disease, muscular dystrophy, congenital structural abnormalities (such as Noonan's syndrome and neural tube defects) and chromosomal abnormalities (such as Turner's syndrome). Women who have had a previous child with a condition such as Down's syndrome or pregnant women who have been exposed to occupational chemicals, medicines or drugs are also counselled.

Counselling may point people in the direction of support groups; it may help them to explore the ramifications of having an abnormal child; but it does not question a couple's right to conceive. "Most people," says Dr. Hall, "think a geneticist's job is to say you shouldn't have children because you are at risk. None of us feels that way."

Through the UBC service, discoveries in gene-mapping can help people. Dr. Hall points out that a new disease is mapped every week. "I think what's dramatic about medical genetics is the rapidity with which things are discovered on a basic-science level and become immediately something you can use to take care of families," says Dr. Hall.

Geneticists at UBC are contributing to the explosion of information about genetic disease. Dr. McGillivray's research with investigators at the Whitehead

Institute for Biomedical Research at the Massachusetts Institute of Technology has demonstrated that a single gene may determine whether a human embryo will grow into a male or female. The discovery has allowed Dr. McGillivray to reassure patients: "I can tell a man that although he has two X chromosomes, he still has the crucial gene that makes him a male," she says.

Dr. Jan Friedman, acting head of the University Hospital Department and our Department of Medical Genetics, has developed a database that provides doctors with information about the effects of drugs on unborn babies. The Teratogen Information System (TERIS) is available on-line or on disc and is subscribed to by 15 centres in Europe and 25 in North America. Information is usually sought on behalf of women who drank alcohol or used medications before they knew they were pregnant.

UBC medical geneticists are envied for their ability to access the B.C. Health Surveillance Registry, which was set up 40 years ago by farsighted officials in the Division of Vital Statistics. One of the best population-based registries in the world, the registry lists the genetic disorders and handicapping disabilities of over 170,000 British Columbians. Using data from the registry, Dr. Patricia Baird has refuted suggestions that environmental factors may be causing an increase in the incidence of Down's syndrome. She has demonstrated that genetic inheritance is a very important determinant of health or illness. And she and UBC industrial hygienist Kay Teschke have shown that certain birth defects, in particular heart defects, may be more common among children whose fathers are firefighters and were exposed to inhaled toxins. Dr. Baird, who was head of our Department of Medical Genetics and remains a faculty member, has chaired the Royal Commission on New Reproductive Technologies and is a vice-president of the Canadian Institute of Advanced Research. ♣

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**SIR FRANCIS CRICK ONCE WROTE THAT THE LEADING EDGE OF RESEARCH IS ALWAYS IN A FOG. BUT THE TRICK ABOUT BEING IN A SCIENTIFIC FOG, HE EXPLAINED, IS TO BE IN THE RIGHT FOG WITH THE RIGHT COMPANIONS.**

## *XII. Basic Research in the Health Sciences*

**CRICK SAYS THAT HE AND DR. JAMES WATSON** did a number of things right in constructing their double helix model of the DNA molecule. One was that they picked the right problem and stuck to it. The other was that they worked together. "In solving scientific problems of this type it is almost impossible to avoid falling into error," he writes. "Intellectual collaboration helps jolt one out of false assumptions."

More and more such collaborative association characterizes basic science research in the biomedical field at UBC. We at UBC are doing everything we can

to foster campus and campus-hospital collaborations, to bring together individuals whose research interests coincide, and to provide common facilities that can be used by investigators in many disciplines.

Collaborations in biomedical research cross departments and faculties. A neuroscientist in Psychiatry in the Faculty of Medicine works with a biopsychologist in the Faculty of Arts studying the relationship of the brain and behavior. An oral biologist in the Faculty of Dentistry interested in dental implants uses the materials expertise of electrical engineers in the Faculty of Science. An animal scientist in the Faculty of Agricultural Sciences meets with an endocrinologist in the Faculty of Medicine to study osteoporosis. A Faculty of Science botanist whose expertise is in medicinal chemicals in plants publishes papers with a medical microbiologist in the Faculty of Medicine. A professor of Pharmaceutics in the Faculty of Pharmaceutical Sciences leads a national research program that includes an obstetrician/gynecologist and a pediatrician in the Faculty of Medicine.

This is not to say that there have not been outstanding achievements by individuals on our faculty.

Dr. Harold Copp, the first head of Physiology, has been honored nationally and internationally as the discoverer of the hormone calcitonin, which regulates the blood level of calcium and suppresses bone loss. Dr. Copp is one of 28 Canadians who have received the Gairdner Award for outstanding achievement in Canadian medical science. He was also the first gold medal winner in the Science and Engineering Awards established by the Science Council of British Columbia in 1980.

Dr. Copp's fellow physiologist, Dr. John Brown, received the B.C. gold medal in 1983, and many other awards, recognizing his two important discoveries — GIP, or gastric inhibitory polypeptide, and motilin, which is a polypeptide that stimulates gastric motor activity.

Other UBC scientists working in the biomedical field have been given the Science and Engineering gold medal:

- **1982: DR. JULIA LEVY, DEPARTMENT OF MICROBIOLOGY, FOR THE DEVELOPMENT OF A SENSITIVE, RAPID AND INEXPENSIVE TEST FOR THE EARLY DETECTION OF LUNG CANCER.**
- **1985: DR. ROBERT NOBLE, THE FIRST DIRECTOR OF UBC'S CANCER RESEARCH CENTRE, WHO IN THE 1950S DISCOVERED THAT EXTRACTS OF THE LEAVES OF THE JAMAICAN PERIWINKLE CONTAINED VINCA ALKALOIDS, WHICH COULD BE USED IN THE TREATMENT OF CANCERS.**
- **1988: DR. DONALD CALNE, DEPARTMENT OF MEDICINE, FOR HIS RESEARCH AND TREATMENT RELATING TO DYSTONIA.**
- **1990: DR. DAVID DOLPHIN, DEPARTMENT OF CHEMISTRY, FOR HIS RESEARCH INTO INNOVATIVE, CANCER-COMBATTING DRUGS.**

There has as yet been no Nobel Prize given a UBC scientist, but our association with one Nobel Prize winner serves to make a point about the ramifications of scientific interactions. From 1952 to 1960, Dr. H. Gobind Khorana worked on our campus. Here he discovered a method for synthesizing small fragments of DNA called oligonucleotides. He also laid the foundation for work he would complete at the University of Wisconsin — the deciphering of the genetic code, for which he shared a Nobel Prize in 1968.

While Dr. Khorana was at UBC, a young chemist came to work in his lab. There he became interested in biology and began to do DNA research, which would

eventually take him to the Medical Research Council in Cambridge, England. In 1977 he and others helped Dr. Frederick Sanger work out the complete sequence of the 5,386 nucleotides in the DNA of one small virus. Dr. Michael Smith, professor of Biochemistry, brought the methodology he learned in Sanger's lab back to UBC and is applying it now in the research he directs through our Biotechnology Laboratory, a joint venture of five UBC faculties that is supported by provincial Excellence in Education funding.

The possibility of establishing interdisciplinary and clinical connections brought five scientists en masse from Dalhousie University to UBC in 1988. The five, who are engaged in fundamental studies of the visual cortex, are now members of our Department of Ophthalmology. "Why did we come?" says Dr. Max Cynader. "The answers would be the opportunity for clinical interactions, the opportunity for computational interactions, and the opportunity for basic-science interactions. UBC is a tremendous store of talent and academic expertise." The Cynader team's eight research projects draw on UBC experts in molecular biology, electrical engineering, neuroscience, computer science and psychology.

For instance, Dr. Frank Tufaro, assistant professor of Microbiology, has shown the team how to use viruses to transfer genes into neurocells. To help them visualize particular populations of neurons, they have linked with Honorary Assistant Professor Branko Palcic, who has developed high-tech imaging systems at the B.C. Cancer Agency. In order to understand the principles of computation in the visual cortex, the group shares ideas with computer scientists who are trying to build a vision system. Ideas are the fare at their regular computer-vision lunch meetings. "We see something in the brain that turns out to be incredibly necessary to get a vision system to work and we tell them they really ought to try engineering this thing," says Dr. Cynader. "Then they say they want to build something — say, a variable depth-of-focus controller — and is there such a thing in the brain? And when I think about it I realize it is in the brain but nobody has ever named it that. There's a terrific and very exciting interplay between us — the biological scientists — and the people who are building things."

Although there are no hard-and-fast distinctions, biomedical researchers seem to fall into two categories — those who set out to cure a disease and those who want to solve a biological puzzle. Basic science researchers tend to be of the latter type even though they can foresee eventual health-care outcomes for the research that goes on in their laboratories.

Direct delivery of drugs to specific sites in the body is the outcome of research conducted by Dr. Pieter Cullis, professor of Biochemistry. He studies the physical properties of phospholipids, the major components of cell membranes, which can be formed into sealed closed sacks — liposomes. Dr. Cullis has found that drugs loaded into liposomes survive longer in the body and are less toxic. His current challenge is to target liposomes to specific tissues in the body.

Dr. Christian Fibiger's puzzle is measuring the release of neurochemicals in very small, discrete regions of the brain. As a researcher, Dr. Fibiger has Medical Research Council funding with two psychologists to do basic-science studies. As a neuroscientist and acting head of the Division of Neurosciences in the Department of Psychiatry, he works with colleagues whose approach has been to focus on one or other neurological disease. For instance, Drs. Patrick and Edith McGeer have

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BIOLOGICAL  
PUZZLE.**



achieved international renown for their work on Alzheimer's. Within the division there is room for both approaches to doing science. "I don't think scientists have ever been or should ever be put in a position of having to justify their research in terms of a disease. I think in many instances before we can ask sophisticated questions about disease processes, we have far to go in just understanding the basic mechanisms."

Understanding basic mechanisms was exactly what Dr. John Brown was doing when he discovered the polypeptides motilin and GIP. Peptides are important regulatory agents, the best known being insulin. "Not very many people have discovered peptides," he explains. "And not very many have sequenced their molecular chains. First of all you have to identify that there could be something there. You have to get up a strategy to find it. Then you find it, purify it and sequence it." He continues to do that sort of basic research, with the ultimate aim of helping to create analogues that can be used therapeutically. "We take our work up to the identification of the peptides, working out the physiology," says Dr. Brown. "Then we start to work with the synthetic chemists outside to come up with analogues." In a matter of five or 10 years, Dr. Brown thinks chemically synthesized peptides will be available for treatment of inflammatory bowel disease, idiopathic paralytic ileus (a decrease in or absence of contractions in the intestines), maturity-onset diabetes, obesity and cardiovascular disease.

The latter is a new area of research for Dr. Brown and his four colleagues in the Department of Physiology who are funded as a Medical Research Council Group. "We and other people have identified that the heart, brain, lung and nerves have these peptides. We don't know what they do so it's a new venture — a completely new area."

## *Basic Science Research Establishments on Campus*

### *The Biotechnology Laboratory*

**LOCATED IN THREE PLACES ON CAMPUS**, the Biotechnology Laboratory is a research organization set up to promote interaction between the basic and applied sciences. It operates under the deans of five faculties — Science, Medicine, Applied Science, Forestry and Agricultural Sciences — with more than 100 faculty, staff, postdoctoral fellows and graduate students. The nine faculty members have teaching responsibilities in the departments where they hold academic appointments.

Dr. Michael Smith, who directs the laboratory, hired its faculty. "One of the successes of the Biotechnology Laboratory," he says, "was to recruit a number of young Canadians who were the sort of people who would have normally been offered and accepted very good jobs at American universities." They in turn were attracted by the opportunity to establish collaborations with scientists in other disciplines.

Although not all the research at the Biotechnology Laboratory pertains to the health sciences, much of it does:

**DR. B. BRETT FINLAY'S RESEARCH IS AIMED AT UNDERSTANDING HOW BACTERIAL PATHOGENS ENTER A HOST CELL AND HOW THEY SURVIVE AND MULTIPLY. VIRULENT SALMONELLA, WHICH CAUSES SUCH HEALTH PROBLEMS AS FOOD POISONING, IS A FOCUS OF THIS RESEARCH, DONE IN COLLABORATION WITH A COLLEAGUE AT THE BRITISH COLUMBIA CANCER AGENCY. OTHER COLLABORATIVE PROJECTS WITH UBC RESEARCHERS INVOLVE MENINGITIS PATHOGENS AND GIARDIA, WHICH CAUSES AN**

INFLAMMATORY INTESTINAL CONDITION. DR. FINLAY IS WORKING WITH A COLLEAGUE AT THE WELLCOME RESEARCH LABORATORIES ON THE USE OF SALMONELLA MUTANTS AS ATTENUATED VACCINES.

- DR. TERRANCE P. SNUTCH IS WORKING ON THE CENTRAL NERVOUS SYSTEM, LOOKING AT THE GENES THAT ENCODE FOR CALCIUM CHANNELS AND NEURAL RECEPTORS. HE IS BUILDING BRIDGES WITH ZOOLOGY AND WITH NEUROSCIENCES, THE LATTER IN A PROJECT THAT MAY HAVE IMPLICATIONS IN THE REGULATION OF DOPAMINE RECEPTORS WHICH PLAY A ROLE IN PARKINSON'S DISEASE.
- DR. WILFRED A. JEFFERIES HAS APPOINTMENTS IN MICROBIOLOGY AND MEDICAL GENETICS. HE IS WORKING ON HOW THE IMMUNE SYSTEM RESPONDS TO VIRAL INFECTIONS. BECAUSE IT IS HARD TO DEVELOP ANTI-VIRAL AGENTS THAT ARE NOT TOXIC TO NORMAL HUMAN CELLS, THE ROLE OF THE IMMUNE SYSTEM IS IMPORTANT. DR. JEFFERIES' WORK HAS RELEVANCE TO CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND RUBELLA VIRUS INFECTIONS. HE COLLABORATES WITH UBC FACULTY MEMBERS AT ST. PAUL'S HOSPITAL AND CHILDREN'S HOSPITAL, AND AT THE BIOMEDICAL RESEARCH CENTRE.
- DR. MICHAEL SMITH, WHO IS A PROFESSOR OF BIOCHEMISTRY, IS INVOLVED IN FUNDAMENTAL GENETIC ENGINEERING. USING SYNTHESIZED BITS OF DNA, HIS LAB HAS DEVELOPED A METHOD FOR ISOLATING AND IDENTIFYING GENES RESPONSIBLE FOR INHERITED DEFECTS. ALSO USING SYNTHETIC DNA, HIS LAB HAS DEVELOPED A METHOD OF CAUSING SPECIFIC MUTATIONS. THESE TWO EXPERIMENTAL TECHNIQUES ARE USED EXTENSIVELY BY PEOPLE STUDYING HUMAN DISEASE.

The Biotechnology Laboratory has several state-of-the-art facilities that it makes available on a per-fee basis to researchers on and off campus: a Laser-Scanning Confocal Microscope, a Pilot Plant Facility for the large-scale production of cells or cell products, and an Oligonucleotide Synthesis Facility, which can provide various types of fragments of DNA.

### *Triumf*

**IT WAS A DAUNTING PROPOSAL:** to create the largest cyclotron in existence and one of only three such advanced nuclear science research facilities in the world. Eight years would pass before the cyclotron delivered its first high-energy pi-meson beam in 1975. But in the decade and a half since, the TRIUMF Project at the University of British Columbia has become Canada's national laboratory for subatomic physics research and the site of applied research programs that have generated important new biomedical research tools.

TRIUMF — Tri-University Meson Facility — takes its name from the trio of universities that first collaborated on its creation in 1967 and continue to operate it as a joint venture: Victoria, Simon Fraser and UBC. Later they were joined by the University of Alberta. The cyclotron, still the biggest, accelerates negatively charged hydrogen ions to 75 per cent the speed of light; intense beams of protons are then directed out of the cyclotron. At these energies, short-lived particles called pi-mesons, or pions, can be created so efficiently that TRIUMF is often described as a meson factory. These mesons explore the structure of matter, seek out nature's basic building blocks and measure the fundamental forces between them.

The medical community quickly realized TRIUMF's potential; since 1961, scientists had been considering the potential of pi-meson radiation in the treatment of deep-seated tumors. Today, the cyclotron is being used for various biomedical purposes at UBC that would have been unthinkable only a decade or two ago. ▀

RESEARCH OF RELEVANCE TO HEALTH GOES ON IN NINE OF OUR FACULTIES. IT INCLUDES CLINICAL RESEARCH IN HOSPITAL SETTINGS AND BASIC SCIENCE RESEARCH IN LABORATORIES. IT IS AS FUNDAMENTAL AS THE PURSUIT OF POLYPEPTIDES AND AS PRACTICAL AS THE DEVELOPMENT OF HEARING DEVICES. IT TOUCHES ON THE FOOD WE EAT, THE AIR WE BREATHE, THE HOMES WE INHABIT. IT SEEKS TO PROMOTE HEALTH AND TO RATIONALIZE HEALTH POLICY. IT IS TRULY ALL-ENCOMPASSING.

### *XIII. Health Science Research in Non-medical Faculties*

AS YOU MIGHT IMAGINE, the bulk of our health sciences research is conducted by investigators in the faculties of Medicine, Dentistry and Pharmaceutical Sciences and the School of Nursing. Elsewhere in this report we describe their major research endeavors. Here we present some highlights of health sciences research in the faculties of Arts, Agricultural Sciences, Applied Science, Commerce and Business Administration, Education and Science.

**REPRESENTATIVE OF SCIENTISTS IN NON-MEDICAL FACULTIES** is Dr. Robert Hancock. Dr. Hancock is a basic scientist — a microbiologist in the Faculty of Science. Not the type you'd expect to find at the bedside. But for many years his research has been related to a bacterium that causes infections common in people with cystic fibrosis. Now, he is formally linked to the disease — as chair of the Medical and Science Advisory Committee of the Canadian Cystic Fibrosis Foundation. "Cystic fibrosis is one of those things that hooks you," he says. "It's a tragic disease. Children now can grow into adults. But it's like they contain a time-bomb. They know they are going to die young."

Today, because of Canadian research, the prospects of cystic fibrosis patients are improving. With better antibiotics, better nutrition and better physiotherapy, cystic fibrosis patients already live longer. In the past 10 years, life expectancy has gone up by seven years. In Canada, where the CF Foundation has put a great deal of money into research, the life expectancy is higher than anywhere else in the world. A major breakthrough has been the discovery by researchers in Toronto of the CF gene, creating the possibility of gene therapy as a cure.

Meanwhile, Dr. Hancock is trying to defeat a bacterium that is a major cause of death in CF patients. Healthy people aren't bothered by *Pseudomonas aeruginosa*, which is so common that any shovelful of earth will contain it. However, in those who are ill or weak, it causes serious lung infections. It is a constant threat to cystic fibrosis patients, whose respiratory system is a focus of their disease. And it is the second major cause of death in North America from nosocomial — or hospital-derived — infections. What makes it difficult to deal with is that it is resistant to the disinfectants used in hospitals and to antibiotics.

Dr. Hancock explains that bacteria that once succumbed quite readily to inexpensive antibiotics, such as tetracycline and penicillin, have suddenly become

resistant. "These are cheap drugs," says Dr. Hancock. "Now we are moving to the next line of compounds which will cost tens of dollars a course. Knowing bacteria as I do, they will eventually overcome those antibiotics and we'll move on to others that cost hundreds of dollars. Suddenly, diseases that are epidemic in our society will become much more frightening."

The focus of Dr. Hancock's research is the effort to overcome the resistance of gram-negative bacteria, such as *Pseudomonas*, to antibiotics. He is one of only three or four people in the world who are expert in the way gram-negative bacteria take up antibiotics through their outer surfaces.

Microorganisms are classified gram-negative or -positive in a staining technique named for the scientist who developed it. Gram-negative bacteria have a protective outer coating that slows the rate at which antibiotics can get in. Some bacteria, such as *Escherichia coli*, have thousands of channels through their outer membranes. *Pseudomonas* has far fewer channels. Because the antibiotics are entering slowly, the bacteria build up a secondary defence mechanism that allows them to digest the drug. They also seem to have what amounts to a program memory: once they have developed a resistance to one drug, they readily resist another.

Dr. Hancock has filed a patent application on one possible way of getting around the resistance of *Pseudomonas*. His patent involves a molecule known as polymixin B nonapeptide. If PMBN is available, *Pseudomonas* will use it to build its outer coating. Because PMBN is a large molecule, it produces gaps through which antibiotics can enter. Dr. Hancock predicts that PMBN will be in clinical trials within five years.

Meanwhile, he stresses the careful use of antibiotics to maintain their effectiveness. "If we start off with one bacteria in a person's body, we can have 10 to the 8th the next day. In that pool of bacteria, we will have a lot of mutants — those that can overcome an antibiotic." Resistance can spread rapidly in a population of bacteria, with the result that if one person becomes resistant to a drug, everyone does.

"Bacteria evolve extremely rapidly. Human beings don't change that much over time because we take 40 years per generation. Bacteria take less than 40 minutes.

"I have an enormous respect for bacteria."

## *Faculty of Agricultural Sciences*

**IN THIS FACULTY'S ANIMAL SCIENCE DEPARTMENT**, researchers studying chickens may help solve two human health problems. Dr. Robert Blair studies Sudden Death Syndrome, which kills about eight million broiler chickens a year in Canada. Because the chickens exhibit respiratory distress before they suddenly die, Dr. Blair suggests that the syndrome has parallels with crib death in sleeping babies. Dr. Leslie Hart's study of the effect of reproductive hormones on the strength of bone and egg shell in laying hens may provide information that will assist in the treatment of osteoporosis in women.

Focused on keeping people healthy, UBC food scientists tackle such matters as devising a method of quickly detecting paralytic shellfish poisoning in seafood; developing food-preservation technology; modifying the antigenic and

immunological properties of infant formula; and informing the public about safe food-preserving and handling techniques.

Fundamental changes in international trade relations, coupled with advances in food processing, have given a new urgency to food marketing and food quality. UBC will take a leadership role in this area with the establishment of a Food Research Centre, the first of its kind in Canada.

## *Faculty of Applied Science*

**BIOMEDICAL ENGINEERING** is one of the hidden activities in the health sciences. The term covers the entire intersection of engineering and the health sciences. The technological devices used in medicine are biomedical engineering devices.

Dr. Charles Laszlo, a professor of Electrical Engineering, is director of our Clinical Engineering Program, which was the first post-graduate program in the field in Canada. Graduates practise in hospitals, applying engineering principles to patient-care and health-care technology. Biomedical engineers work at the B.C. Cancer Agency, VGH (where 20 technicians are affiliated with UBC), British Columbia's Children's Hospital and the G.F. Strong Rehabilitation Centre.

In Canada, UBC is the only place where devices for the hard-of-hearing and the deaf are being developed. For instance, Dr. Laszlo has built a small vibrator worn on the wrist which signals a hard-of-hearing person that a telephone is ringing or a fire alarm has sounded.

Solving other kinds of problems, Dr. Laszlo is working with Dr. Andrew McNab at Children's Hospital to develop ways of eliminating the detrimental effect of noise on ailing children being transported long distances by road and by air. With the Sexual Medicine Unit at University Hospital-Shaughnessy Site, he is developing a portable unit that will cool the gonads of wheelchair-bound males allowing them to father children.

A driving simulator, developed jointly by biomedical engineers at UBC and G. F. Strong, has been sold to hospitals affiliated with the University of Toronto. This unique device indicates if a patient who has suffered neurological damage has recovered sufficiently to drive again.

A Biomedical Engineering Program at the masters and doctorate level, which involves the departments of Electrical, Mechanical and Chemical Engineering, has been approved by the UBC Senate. The objective is to train graduate engineers capable of designing and developing new medical devices and related technology.

**IN THE DEPARTMENT OF ELECTRICAL ENGINEERING**, a number of faculty members contribute significantly to aiding the disabled or to devising signal-based methods of diagnosing various conditions:

- **EMERITUS PROFESSOR DR. MICHAEL BEDDOES DEVELOPED A TALKING STENOGRAPH MACHINE USED BY BLIND PEOPLE AND ALSO BY BRAIN-DAMAGED CHILDREN. HE HAS CONTRIBUTED TO THE DEVELOPMENT OF THE PHONETIC BOSWELL KEYBOARD, WHICH IS HELPFUL IN TEACHING DYSLEXICS.**
- **DR. MABO ITO HAS WORKED WITH DR. MURRAY MORRISON, PROFESSOR OF SURGERY, ON THE USE OF SIGNAL PROCESSING TO IDENTIFY LARYNGEAL PATHOLOGY, AND WITH ELECTRICAL ENGINEERS AT VGH ON A**

**MICROPROCESSOR-BASED SYSTEM FOR MONITORING THE PERFORMANCE OF ANESTHESIOLOGICAL VENTILATORS.**

- **ADJUNCT PROFESSOR DR. JAMES MCEWEN, NOW IN THE ELECTRICAL ENGINEERING DEPARTMENT AT VGH, DID HIS PHD THESIS ON COMPUTER-ASSISTED EEG ANALYSIS OF HUMAN CONSCIOUSNESS. HE HAS DEVELOPED A ROBOT USED IN KNEE SURGERY TO HOLD THE LIMB STEADY.**
- **DR. PETER LAWRENCE DIRECTS SOME OF HIS RESEARCH TOWARDS THE USE OF Telerobotics to enhance the safety of operators of heavy equipment.**
- **DR. RABOB WARD IS COLLABORATING WITH DR. BRANCO PALCIC AT THE CANCER RESEARCH CENTRE ON AUTOMATED DIAGNOSIS OF X-RAY IMAGES FOR CANCER SCREENING AND DETECTION.**
- **DR. ROBIN TURNER, WHO IS ATTACHED TO THE BIOTECHNOLOGY LABORATORY ON CAMPUS, SEEKS TO UNDERSTAND THE NATURE AND CAUSES OF DRIFT IN ELECTROCHEMICAL BIOSENSORS. HIS EXPERIENCE IN THIS FIELD COMES FROM THE DEVELOPMENT OF NEW MEMBRANE SYSTEMS AND INSTRUMENTATION FOR IMPLANTABLE BIOMEDICAL GLUCOSE SENSORS.**
- **DR. GARY BIRCH, ADJUNCT PROFESSOR, IS DIRECTOR OF RESEARCH AND DEVELOPMENT FOR THE NEIL SQUIRE FOUNDATION. THE LONG-TERM GOAL OF HIS RESEARCH INVOLVES THE USE OF BRAIN-WAVE SIGNALS TO CONTROL EXTERNAL TECHNICAL AIDS.**

**IN THE DEPARTMENT OF MECHANICAL ENGINEERING, Dr. V. J. Modi is working on evaluating heart valves. In the Department of Chemical Engineering, Dr. Joel Bert, a chemical engineer, has close research links with our Pulmonary Research Laboratory at St. Paul's Hospital. His research looks at fluid and protein distribution in the body. Dr. Bert, together with Dr. John Grace and the B.C. Cancer Agency, is developing methods for ascertaining exposures to different chemical and physical hazards in the workplace and a unique coding scheme which can also be used in other health fields.**

**Dr. Douglas P. Romilly is actively involved in biomedical-related research directed towards several areas including the analysis and optimization of pressure profiles for pneumatic tourniquet cuffs, development of tongue force measurement systems for the diagnosis and treatment of dysphagia (swallowing disorders), and the development of a powered orthosis for patients with upper limb dysfunction.**

## *Faculty of Arts*

**THE SCHOOL OF SOCIAL WORK takes in an undergraduate class of 85 and has 94 graduate students in its MSW program. The school now participates in an interdisciplinary PhD, involving Psychology, Anthropology and Sociology, and Economics.**

**Among the school's more than 50 field placement agencies are many focusing on mental health, and most of the faculty have a link in their teaching in that area. Students spend two full days a week in one of these agencies. "Our students are working with people classified as mental-health patients," says former Acting Director Elaine Stolar. "While others tend to separate out the mental and**

*Researchers at the Terry Fox Laboratory use the latest techniques in the fight against myeloid leukemia. The staff of 100 includes more than 40 students and post-doctoral fellows.*



emotional from the physical, we approach the complaint from a holistic — interdisciplinary — point of view.” Master’s students introduce innovative programs in their field placement agencies, such as an effective 10-week group program for native Indian women attending a drug and alcohol clinic in Vancouver. The school has recently begun an on-campus service providing therapy for individuals, couples and children living in student housing or in residence.

Of the 16 faculty members in the School of Social Work, six are involved in teaching health-centred courses or doing research in that area. Professor Stolar has collaborated with Dr. Michael MacEntee, Faculty of Dentistry, and Dr. Frederick Glick, Departments of Statistics, and Health Care and Epidemiology, on a survey of 521 elderly people in Vancouver, identifying factors that influence oral health in old age. The study found that most of the subjects had been to a dentist since the age of 65, and that the cost of treatment was not a major concern to them. However, those on low incomes went to the dentist only for relief of pain. Professor Stolar has done projects with mastectomy patients and their self-image attitudes, as has Dr. Nancy Waxler-Morrison, who has an appointment in Anthropology and Sociology as well as in Social Work. Dr. Sharon Manson Willms is a faculty associate with UBC’s Centre for Human Settlements and the principal investigator of a team conducting a national study of the housing needs of Canadians infected with the HIV virus. The study was funded with more than \$98,000 from Health and Welfare Canada.

Other health-related studies include those of Dr. Kathryn McCannell on sex abuse and violence; Dr. Mary Russell on family violence; and Dr. Paule McNichol on multi-cultural approaches to health care.

**SIX OUT OF THE 10 LEADING CAUSES** of death in North America — including heart disease and cancer — are related to nutrition. Healthy eating practices, reasonable body weight, and sound exercise obviously play a primary role in the prevention of and recovery from disease. Just as obviously, well-trained dietitians and nutritionists perform a vital service in educating the public and medical professionals alike. Not only do the graduates of our School of Family and Nutritional Sciences work with the public in community settings, but also most of the 500 Registered Dietitian Nutritionists (RDNs) in B.C. — the majority of them UBC graduates — are involved in direct delivery of dietary therapy to patients in health-care facilities. Meanwhile, researchers within the school are adding invaluable data to the world’s knowledge of dietary links to health in such areas as the measurement of cholesterol production and the effects of nutritional intake on athletic performance.

Dietitians in particular may be involved in routine nutritional screening, counselling and often follow-up of all new patients in an acute-care or long-term health-care facility, as well as of those who have a high level of nutritional risk or are restricted to special diets. Some dietitians are administrators in charge of food production at hospitals. Others are in private practice. Nutritionists generally work in such facilities as community public-health units. “At the community level,” says Dr. Susan Barr, director of the Dietetics Program, “the contribution to health care may be more indirect, but certainly the education of mothers, children and others to foster positive eating habits will, in the long run, make a difference in health.”

The BSc in Dietetics is a pre-professional program which, followed by a one-year hospital-based internship, qualifies graduates to become a member of the

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Canadian Dietetic Association or the B.C. Dietitians' and Nutritionists' Association, a prerequisite to professional employment. In the first two years, as well as studying nutrition, food chemistry, psychology and commerce, students take many of the same courses in biology, chemistry, math, organic chemistry and microbiology as pre-med and pharmaceutical students. In third year, the emphasis on science continues with biochemistry, physiology, nutrition and a nutrition lab. Most applied courses are taken in fourth year.

The Human Nutrition Program, delivered in conjunction with the Faculty of Science, also has a broad science base in its first two years, similar to those taken by students in the life sciences. The final two years focus on nutrition courses, covering cellular and organismal features of nutrition. Optional subjects range from computer science to zoology. The program, introduced in recent years, is intended for students interested in basic nutritional sciences who are preparing for further academic studies and research. As Dr. Melvin Lee, the program's recently retired coordinator, points out, "Many of the students use it as a route to dental and medical studies and others go into research and graduate programs."

The school's faculty and students are involved in research in both dietetics and human nutrition. Dr. Susan Barr's major interest is the relationship between nutrition and physical activity. Working with medical collaborators, she is

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studying dietary patterns of athletes and how they change with different levels of activity, particularly in endurance sports, and the longer-term effects of reduced nutritional intake by adolescents who are active in such pursuits as gymnastics and ballet. Dr. Peter Jones, an assistant professor of Nutrition, has developed a procedure that promises to revolutionize the way cholesterol production in the human body is measured: non-radioactive stable isotopes can be used safely to measure cholesterol synthesis in place of the time-consuming and inaccurate method of fecal examination. Dr. Linda McCargar, also an assistant professor of Nutrition, is researching weight cycling (or "yo-yo dieting") and the hypothesis that constant dieting followed by weight gain may

make it harder to shed pounds and easier to regain them. Graduate students are investigating a variety of areas, including the out-patient use of low-protein diets for advanced Parkinson's-disease patients, and the effects of a nutrition-education program for kindergarten children.

**PROSPECTIVE MEDICAL AND NURSING STUDENTS** form a significant part of the enrolment in some undergraduate courses in the Department of Anthropology and Sociology. In these courses they become aware not only of ethnic cultures but also of different values and ways of interacting among less obvious groups in our society — such as the physically disabled or hard of hearing. Understanding that these cultural values exist is particularly important for health-care givers.

A number of PhD students supervised by Dr. Elvi Whittaker have done or are working on theses in the area of medical anthropology or sociology. These involve studies of women who survive breast cancer, of women who have AIDS, of gerontology as a construct of people who are not themselves aged, and of people who recovered from inflammatory bowel disease. Dr. Whittaker, who completed a long-term study of nursing education, is now doing theoretical work at the edges of psychiatry — looking at what we do to ourselves when we reify concepts such as the self.

Dr. Nancy Waxler-Morrison, who is an associate professor of Sociology and Social Work, has done studies of women with breast cancer showing that the survival rate is better among unmarried women who have a good support network. She is a co-author with Dr. Joan Anderson, in the School of Nursing, and Elizabeth Richardson, a social worker with the Ministry of Social Services and Housing, of a handbook for health professionals who treat people from groups that have recently immigrated to Western Canada. Attitudes to childbirth, mental illness, dental care, hospitalization and death are examined. Recently in Sri Lanka Dr. Waxler-Morrison has been studying people who use traditional doctors and those who use western-trained doctors.

Recognizing that there are few studies of what it is like to be handicapped and that there is a population of variously handicapped students on campus, Dr. Bill McKellin is working with our disabilities centre to define projects for his students who are taking a standard quantitative methods course. His own research recently has looked at choices made by parents of children with severe to profound hearing loss. He is interested in how parents choose an educational program — either a signing program or an oral program — for their children. “The way parents understand hearing impairment changes as their child goes to school,” he says. “The notion of what deafness is is shaped by what institution is chosen.”

Others in the department conduct studies of mental health among Indian groups in Washington State or of the availability of western medicine in Papua New Guinea.

**THE UBC PSYCHOLOGY DEPARTMENT** is a major contributor to our research effort in the health sciences. Approximately half the research done in the department — involving 19 faculty members — is aimed at the solution of health-related problems. Research is supported by the Medical Research Council of Canada, the B.C. Health Care Research Foundation, the B.C. Alcohol and Drug Commission, the National Health Research and Development Program, the MacArthur Foundation, Ciba-Geigy Pharmaceuticals, the B.C. and Yukon Heart and Stroke Foundation, the University Hospital Foundation, and the B.C. Alzheimer's Society. In addition, faculty members hold Natural Sciences and Engineering Research Council grants that have major health-science components.

Several faculty conduct research on memory deficits associated with neurologic disorders.

**DR. JOHN PINEL: AMNESIA CAUSED BY THIAMINE DEFICIENCY IN ANIMAL MODELS, WHICH IS RELATED TO BRAIN DAMAGE IN CHRONIC ALCOHOLICS. • DR. PETER GRAF: MEMORY DEFICITS OF ALZHEIMER PATIENTS. • DR. ROMUALD LAKOWSKI: COLOR VISION OF DIABETIC PATIENTS. • DR. STANLEY RACHMAN: THE ETIOLOGY AND BEHAVIORAL MECHANISMS OF PHOBIAS.**

In the area of psychoactive drugs, Dr. Anthony Phillips and Dr. Charles Blaha study the mechanisms of action of antischizophrenic drugs, primarily dopamine antagonists, in rodents. Dr. Boris Gorzalka has been looking at the effects on human and animal sexual motivation of various hormones and serotonergic agents. (Serotonin acts as a potent vasoconstrictor and as a neurotransmitter.)

Systems of diagnosis developed in the department include Dr. Robert Hare's Psychopathy Checklist (a rating scale for the assessment of psychopathy in male forensic populations); Dr. Stanley Coren's and Dr. Arthur Ralph Hakstian's inventories for quickly, inexpensively and accurately screening adults for visual acuity and color blindness; and Dr. Kenneth Craig's Neonatal Facial Coding

System for objectively describing newborns' reactions to potentially painful events.

In evaluating treatment protocols, Dr. Charlotte Johnston studies the effectiveness of drug treatments for attention-deficit disorders; Dr. Wolfgang Linden evaluates the effectiveness of treatment programs for hypertension and postmyocardial infarction; and Dr. Lynn Alden studies the effectiveness of the treatment of severe shyness.

Several faculty members study the adverse effects of chronic illness on psychosocial adaptation, and the services in the community — or lack thereof — to deal with them. Dr. Anita DeLongis focuses on the psychosocial problems faced by people suffering from arthritis and the traumatic loss of loved ones.

Dr. Peter Suedfeld does research that shows that Restricted Environmental Stimulation can be used therapeutically to cure smoking, reduce high blood pressure and assist in sleep disturbances.

## *Faculty of Commerce and Business Administration*

**IN THE POLICY ANALYSIS DIVISION**, Dr. Peter N. Nemetz is a faculty associate of our new Centre for Health Services and Policy Research. In addition, he is a senior visiting scientist in the Department of Health Sciences Research at the Mayo Clinic. His research activities fall into three general areas:

- **THE ROLE OF THE AUTOPSY IN PROVIDING ESSENTIAL INFORMATION FOR HEALTH POLICY AND MEDICAL DECISION-MAKING: WRITING IN THE AMERICAN JOURNAL OF PATHOLOGY, DR. NEMETZ POINTS OUT THAT THE AUTOPSY IS A VALUABLE INSTRUMENT FOR ACHIEVING COST-EFFECTIVE HEALTH CARE AND THE EFFICIENT ALLOCATION OF RESOURCES. AUTOPSIES PROVIDE ACCURATE INFORMATION ON THE CAUSE OF DEATH AND THUS FACILITATE THE PROCESS OF GENERATING AND TESTING HYPOTHESES CONCERNING THE PREVALENCE OF DISEASES. HE NOTES THAT THE NUMBER OF AUTOPSIES PERFORMED IN THE U.S. HAS DROPPED FROM 50 PER CENT OF ALL DEATHS IMMEDIATELY AFTER THE SECOND WORLD WAR TO 14.7 PER CENT IN 1980.**
- **PHARMACOEPIDEMIOLOGY: IN THIS AREA, THE PRINCIPLES OF EPIDEMIOLOGICAL ANALYSIS ARE APPLIED TO THE STUDY OF THE POSITIVE AND ADVERSE EFFECTS OF PHARMACEUTICALS. THIS HAS BECOME AN INCREASINGLY IMPORTANT TOPIC, ESPECIALLY IN THE UNITED STATES, BECAUSE OF THE CONCERN OVER POSSIBLE LITIGATION ARISING FROM ADVERSE DRUG EVENTS.**
- **THE OLDEST OLD: THE FASTEST-GROWING SUBSET OF THE POPULATION ARE THOSE OVER 85. LITTLE IS KNOWN ABOUT WHAT CAUSES DEATH IN THIS GROUP AND WHAT CONDITIONS CO-EXIST AT THE TIME OF DEATH. DR. NEMETZ IS STUDYING THE OLDEST OLD TO UNDERSTAND THE NATURE OF THEIR MEDICAL NEEDS AND THE COSTS OF SERVICES THEY REQUIRE.**

**IN THE DIVISION OF MANAGEMENT SCIENCE**, Dr. Martin Puterman is founder and director of the Biostatistical Consulting Service at British Columbia's Children's Hospital, and president of the Biostatistics Section of the Canadian Statistical Society. Biostatistics is the application of statistical methods to the design of clinical and laboratory studies and the analysis of the resulting data. Dr. Puterman's statistical investigations have been in a wide variety of areas: infectious

diseases, immunology, obstetrics, neonatology, nutrition, rheumatology, virology and cardiology. In *Pediatric Cardiology*, for instance, he reported normal ranges for variability in echocardiographic images, allowing cardiologists to determine non-invasively when chemotherapy leads to deterioration of the heart. Currently he is involved in clinical trials investigating the use of intravenous gammaglobulin as a treatment for childhood seizures and the treatment of urinary tract infections in patients with spinal cord injuries.

## *Faculty of Education*

**SEVERAL DEPARTMENTS** — Counselling Psychology, Mathematics and Science Education, and Educational Psychology and Special Education — as well as the School of Physical Education and Recreation are active in health-related research. Through the teachers we prepare for the public school system, we have a profound effect on the health and lifestyles of young people.

**HEALTH EDUCATION** in the Department of Mathematics and Science Education began in 1978 with funding from the Canadian Cancer Society to develop a cancer education program for the secondary schools of Canada. In 1981, the program introduced cancer education as part of the cross-Canada curriculum in such subjects as social studies and senior biology. The department has since received grants to develop programs in drug education for students from grades four to nine. Out of these activities, a graduate program has developed. Masters students are creating education models related to smoking, alcohol, AIDS and the teacher's role as an attachment figure for abused children. Work in AIDS education research continues at the doctoral level. Dr. Kip Anastasiou heads the health education group in the department.

**HEARING LOSS AMONG NATIVE INDIAN CHILDREN** in public and high schools in central B.C. is the focus of research done by Dr. Perry Leslie, of the Department of Educational Psychology and Special Education. His research partner is Dr. Douglas Willms, of the Department of Social and Educational Studies. The two suspect that among the Carrier-Sekani Indians some form of hearing impairment may affect 30 per cent of students from kindergarten to Grade 12. The cause is usually middle-ear infections brought on by colds caused by extreme temperature changes. The hearing loss, which can cause a student to miss a great deal of what is said in the classroom, comes and goes on a regular basis, confusing teachers who think a child with an active infection has become a behavior problem. The research is funded by the Social Sciences and Humanities Research Council.

Other Special Education faculty have research projects related to the mother-child relationship when one or both are hearing-impaired, and to the effect on hearing-impaired children of attending a school for the deaf or being in a classroom with hearing children.

**THE DEPARTMENT OF EDUCATIONAL PSYCHOLOGY AND SPECIAL EDUCATION** provides post-graduate, specialist training for teachers who will work with hearing-impaired and visually-impaired children. UBC has supplied teachers for

the deaf for two-thirds of the school districts in the province, but there is still a need for more such specialists.

**AN EXAMPLE OF HEALTH-SCIENCES RESEARCH** combined with community service is the Alcohol Recovery Project, directed by Dr. John Friesen, of the Department of Counselling Psychology. Developed over the past four years, the 15-week treatment is being offered to 150 families who have one or more children age four or older, an alcohol-dependent father and a non-alcohol-dependent mother. From an education-research point of view, Dr. Friesen and the 16 researchers involved are exploring the effectiveness of a treatment called Experiential Systemic Therapy. The data gathered from questionnaires and 2,000 videotaped therapy sessions will be used to improve treatment in a variety of government and private counselling agencies. Funded by the Ministry of Labor and Consumer Services, the treatment is offered in Surrey and Duncan. The Department of Counselling Psychology, which prepares school counsellors, now offers a doctoral program.

**THE SCHOOL OF PHYSICAL EDUCATION AND RECREATION** is a school within the Faculty of Education. Researchers there, such as Dr. Kenneth Coutts, are involved in the study of human activity. Dr. Coutts, who has connections with our Disability Resource Centre and Sports Medicine Clinic, is now doing research on wheelchair locomotion and propulsion. Having previously studied wheelchair athletes and the upper limits of their ability to accelerate a wheelchair, Dr. Coutts is now concerned with the demands made on the ordinary person who must propel a wheelchair in the real world. With Dr. Donald McKenzie, coordinator of research for the Division of Sports Medicine, and Dr. Paul Rogers, professor of Pediatrics, Dr. Coutts is cooperating in studies of fitness levels of children with spina bifida. In children undergoing treatment for solid-tumor cancers, they are looking at the post-treatment effect of chemotherapy on the heart and on endurance.

Dr. Angelo Belcastro, president of the B.C. Sports Medicine Council, has an academic appointment in the School of Physical Education and Recreation. His basic interest in diabetes and its effect on muscle has led to two paths of research. For the past 15 years, he has collaborated with the University of Alberta team that recently succeeded in transplanting islet cells into a diabetic. Dr. Belcastro's contribution has been in studying islet cell function in animals. The second path involves muscle wasting in diseases such as diabetes, dystrophy and myopathies. He is studying the processes that control protein breakdown in muscle — in whole organisms, in isolated cells and at the sub-cellular level.

**HEALTH PROMOTION AND WELLNESS** play key roles in the Health Sciences at UBC. Initiatives include:

- **RESEARCH WITH THE VANCOUVER SCHOOL BOARD ON NUTRITION AND THE DAILY LUNCH PROGRAM.**
  - **RESEARCH INVOLVING EXERCISE AND PHYSICAL ACTIVITY AS IT RELATES TO THE REDUCTION OF OBESITY AND OSTEOPORITIS IN ELDERLY WOMEN.**
- THE BUCHANAN FITNESS CENTRE WHERE HUNDREDS OF STUDENTS, FACULTY AND MEMBERS OF THE COMMUNITY HAVE THEIR FITNESS EVALUATED AND ARE COUNSELLED EVERY YEAR.**

**HEALTH-SCIENCES RESEARCH** is conducted in five departments Botany, Chemistry, Microbiology, Zoology, and Statistics.

**VINBLASTINE AND VINCRISTINE** — chemicals from the Madagascar periwinkle, used to prevent the proliferation of malignant cells — were discovered in Canada in the 1950s with some of the work being done at UBC. But today Dr. Neil Towers of the Department of Botany is one of the few people in Canada interested in the biological applications of chemicals found in plants. For their antibiotic potential in the treatment of skin ailments, he is studying light-activated chemicals in marigolds and members of the parsley family, and for their antibiotic potential against pathogenic yeasts (such as *Candida albicans*), he's looking at two local weeds — ambrosia and rattlesnake tail. While the *in vitro* activity of St. John's Wort against the HIV virus has been demonstrated by others, Dr. Towers has shown that this activity is enhanced by light. Researchers in Dr. Towers' lab are trying to induce cultured cells of the Pacific yew tree to produce Taxol, a drug now being tested on ovarian-cancer patients in 23 Canadian medical centres.

**SETTING THE PACE** for the Department of Chemistry's contribution to biomedical research, Dr. David Dolphin, a professor in the department and former acting dean of Science, was the 1990 health sciences winner of a B.C. Science and Engineering gold medal. Dr. Dolphin is an expert in porphyrins, naturally occurring products that react strongly when exposed to light. In cancer therapy, injected porphyrin-based drugs accumulate in tissues where exposure to low-power laser light causes them to convert oxygen into a toxic substance that destroys cancerous tissues without damaging healthy tissue. Tests of Photofrin, a porphyrin-based drug, are being conducted at Quadra Logic Technologies, a Vancouver biotechnology company in which Dr. Dolphin holds an official position. Other light-sensitive drugs developed by Dr. Dolphin can be used to cleanse donated blood of potentially harmful viruses, such as HIV.

The main topic of Dr. Leslie Burtnick's research is the regulation of the assembly and disassembly of actin, a protein that in muscles brings about contraction and relaxation. In non-muscle systems, actin filaments act like girders in a building, giving cells shape. When cells die or rupture, the filaments spill out into the blood stream and are normally cleared away by scavengers. In conditions where there is an excessive breaking up of cells, as in acute respiratory syndrome, the system might not be able to cope with the overload of circulation-clogging filaments. Funded now by the Natural Sciences and Engineering Research Council, Dr. Burtnick has had Heart Foundation and B.C. Health Care Foundation support.

Inorganic chemist Dr. Chris Orvig has coined the term metallodrugs to describe the compounds of metals he designs for use in diagnosis, involving nuclear medicine, and in treatment. He is also interested in the chelation of biologically active metal ions, an example of which is the potential involvement of aluminum in Alzheimer's disease. Dr. Orvig has pharmaceutical company funding, as well as grants from the National Cancer Institute in the U.S. and the Natural Sciences and Engineering Research Council in Canada. His campus collaborations are with the Faculty of Pharmaceutical Sciences.

**THE DEAN OF SCIENCE**, who is a professor in the Department of Microbiology, personally exemplifies his faculty's contributions to health sciences research at UBC. Dr. Barry McBride is an oral microbiologist who began his career in the Faculty of Dentistry where he became head of the Department of Oral Biology. In 1986, he moved over to the Faculty of Science as head of Microbiology. Dean since 1990, he retains his appointments in Oral Biology and Microbiology, where his research involves understanding the disease-causing ability of two anaerobic micro-organisms — *Porphyromonas gingivalis* and *Treponema*. Both are oral pathogens. The former causes disease in the mouth, but given the right circumstances can spread, causing lung and brain abscesses. *Treponema*, a spirochete, can invade oral tissues, producing a host of damaging enzymes. His research, conducted in part as a member of the Canadian Bacterial Diseases Network, involves understanding how these organisms adhere to cell surfaces and how it is that they cause disease when other oral organisms do not.

**STATISTICAL METHODOLOGY** is concerned with both the efficient use of experimental resources and the appropriate analysis of data. Some medical research groups on campus have recognized their need for statistics expertise to improve their research programs. At present, interactions between medical researchers and statisticians and biostatisticians occur informally.

Having taken sabbatical leave at the Harvard School of Public Health, Dr. John Petkau, head of the Department of Statistics, began to establish interactions with medical researchers at UBC to develop his research interest in designs for clinical experiments, research that has expanded to include others in the department (Dr. Nancy Heckman and a graduate student) and has evolved into collaborative activity with UBC neuroscientists studying multiple sclerosis. The department's Statistical Consulting and Research Laboratory has also been involved. Two faculty members — Dr. Frederick Glick and Dr. Michael Schulzer — have joint appointments in the Faculty of Medicine.

**RESEARCH IN THE DEPARTMENT OF ZOOLOGY** falls into four broad categories: cell and developmental biology; community and population biology; evolutionary biology; and comparative physiology and biochemistry. The department harbors several researchers whose projects have implications for human health, and it has interdisciplinary research and teaching connections with the Cancer Research Centre.

Working with fruit flies, Dr. Thomas Grigliatti is looking for genes that package DNA into chromosomes and chromatin (the material within the cell nucleus from which chromosomes are formed). These genes are important in condensing chromosomes so they can go through normal cell division. "Whatever we find for regulating chromosome structure in *Drosophila* is probably going to be at work in humans," he says, adding that differences in chromosome packaging might explain Fragile X syndrome, which produces mental retardation in humans. Dr. Grigliatti is a member of the National Network of Centres of Excellence studying Biotechnology for Insect Pest Management.

In the Neural Regeneration Network, Dr. John Steeves is contributing to spinal cord research directed out of the University of Manitoba.

The research projects of Dr. Peter Hochachka clearly illustrate the interaction of zoology and medicine. Dr. Hochachka is studying animals naturally able to survive the stress of hypoxia — a deficiency of oxygen — and he has tested humans

well-adapted to living and working at high altitudes. Now, he says, the scientific meetings he attends include people working in related problem areas in medicine: cerebral metabolism in stroke; hypoxia or ischemia (reduced blood supply) of the heart; acute renal failure; and liver ischemia.

Since 1976, Dr. Hochachka has been going on two-month expeditions to the Antarctic to monitor the biochemistry and physiology of voluntarily diving seals, which routinely breath-hold for 45 minutes. His colleague in this venture is an American clinician, whose object has been to find a model system that protects mammals from lack of oxygen in order to help save lung-injured patients.

Studying Andean Indians, brought to Vancouver for the purpose, Dr. Hochachka and his colleagues solved a metabolic mystery known as the lactate paradox. When humans work or exercise to capacity, tissues lack oxygen and lactate is generated in the muscles. Fifty years ago, scientists noticed that Andean natives made less rather than more lactate at any work level. Now, the B.C. team has demonstrated that, having a unique distribution of enzymes, Andeans don't make lactate because they can't. Pointing out that an equivalent block occurs in the hummingbird, Dr. Hochachka says, "My guess is that we've stumbled on a true genetic level adaptation."

A current project with direct human-health connections involves the testing of another group of Andeans with high-viscosity blood, which can affect the delivery of oxygen to the brain. Through PET scans at TRIUMF and MR spectroscopy in Alberta, the researchers are trying to discover if there are regions of the brain differentially protected or sensitive to limitations of oxygen. This research relates to ischemic stroke and other kinds of cerebrovascular accidents. ▀

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**THE DISCOVERY OF INSULIN 70 YEARS AGO IN AN OUT-OF-THE-WAY LABORATORY AT THE UNIVERSITY OF TORONTO REMAINS THE MOST FAMOUS EVENT IN CANADIAN MEDICAL RESEARCH. IT MAKES AN APPEALING STORY — A DETERMINED DOCTOR AND A STUDENT ASSISTANT WORKING FOR THE MOST PART ALONE, NOT ENTIRELY SURE OF THEIR HYPOTHESIS, MAKING MISTAKES, GETTING DISCOURAGED, AND EVENTUALLY OBTAINING THE LIFE-SAVING EXTRACT.**

## *XIV. Major National Research Endeavors — UBC Links*

**IN THE ISOLATION OF ITS HEROES**, the Banting and Best drama is not likely to be re-enacted today. Synergy — the process of working together to enhance effectiveness — is the watchword of modern science, and in Canada synergy has



been facilitated by national programs that link university and corporate scientists.

UBC health-sciences investigators have been chosen by international juries to participate in these programs and, in several cases, to lead the entire national effort. Their involvement is both an acknowledgement of the superiority of research at this university and a stimulus to further discoveries.

Here we discuss the university's participation in National Networks of Centres of Excellence; the Canadian Institute for Advanced Research; and the Canadian HIV Trials Network.

## *National Networks of Centres of Excellence*

**IN MAY, 1988, THE FEDERAL GOVERNMENT** announced a competition to establish cross-country, inter-disciplinary networks of scientists engaged in related research projects. The program challenged researchers to devise projects that would boost Canada's performance in science and technology and create collaborations among university researchers and industry. By the closing date of the competition, applications involving 4,000 researchers had been submitted. These were judged by an international peer-review committee. The result was the creation of 14 original — and eventually 15 — Networks of Centres of Excellence with funding support of \$240 million. The government of B.C. later added \$20 million for network researchers in the province.

These networks and research projects represent the very best in Canadian research, and it is a tribute to the breadth of excellent research at UBC that the university was chosen to participate in 12 networks. Six of these are in biotechnology or are dedicated to research that has implications for human health. In recognition of UBC's leadership in health sciences research, three networks are based here, with UBC faculty members as scientific directors, coordinating research nodes across the country. In each case, national offices have been established on campus. Their presence has meant an infusion of funds, which has had an enormous impact on UBC's scientific capabilities. A networks building, funded by the provincial government, has been constructed, expensive equipment has been purchased, cross-country computer links have been established and jobs have been created for research associates and assistants, post-doctoral fellows and administrators.

The three networks headquartered at UBC are focusing on Bacterial Diseases, the Genetic Basis of Human Disease and Protein Engineering.

UBC biomedical investigators are members of networks headquartered elsewhere. They are focusing on Respiratory Health, Neural Regeneration and Functional Recovery, and Biotechnology for Insect Pest Management. While the research of the latter network is not directly relevant to disease, its objective — the development of new and environmentally acceptable methods of pest control — could have health benefits in improved crop production and reduced damage to the environment. Dr. Thomas Grigliatti, professor of Zoology at UBC, leads a team developing ways to transfer genetically engineered material into insects making use of jumping genes — genes that spread rapidly through a population yet remain in one species only.

All these networks will shrink barriers to scientific interchange and

enhance both problem-solving and the transfer of technology to the private sector. Their success will be in the creation of patents and inventions that can be developed by industry.

### *Protein Engineering Network of Centres of Excellence*

PENCE — THE PROTEIN ENGINEERING NETWORK of Centres of Excellence —links eight UBC researchers with colleagues in two other universities, four research laboratories and five companies. The network's substantial budget of \$20 million over four years will facilitate meetings among those whose complementary projects are directed at a single objective.

"The whole idea of the network is to foster new and collaborative research," says Dr. Michael Smith, the network's scientific director. "The projects we made the basis for our proposal were like that — new projects which involved distinct collaborations, where different people did complementary things directed at a single objective."

Protein Engineering uses a variety of techniques to understand the functioning of proteins and to improve them by making changes in their amino-acid building-block structure. Improved proteins can be used in the food industry, in industrial products, in the development of disease-resistant crops and in the treatment of cancer and infectious diseases.

Of the network's five current projects, one that is most relevant to human health is being conducted at UBC. Drs. Brayer, Clark-Lewis and Ziltener are studying cellular growth factors to gain a better understanding of how these proteins control the development of the immune system. They hope to produce modified proteins which might enhance the body's ability to repel infections. They are focusing on a factor called interleukin-3, which stimulates bone-marrow cells to differentiate into red blood cells or lymphocytes — immune cells.

The work of Drs. Kilburn, Withers and Warren involves cellulases — a group of enzymes which break down cellulose. Genetic engineering techniques can be used to extract parts of those enzymes which might be useful in medicine — either as diagnostic agents or as tools to purify proteins.

### *Canadian Bacterial Diseases Network*

THE CANADIAN BACTERIAL DISEASES NETWORK comprises 50 people in eight universities, 11 companies and two government agencies. In the area of human health, researchers are investigating the causes of whooping cough, gonorrhoea, pelvic inflammatory disease, toxic shock syndrome, dental diseases, lung infections in cystic fibrosis and hospital infections. The CBDN will receive \$18.2 million from the federal government over the next four years.

"The network allows us to interact with drug companies on terms that are reasonable for us. It provides links across the country, and within the university, it provides great collaboration. By forming a consortium, you expand the possibilities that your own research will come to something," says Dr. Robert Hancock, the network's scientific director.

Dr. Hancock's research involves overcoming the resistance of bacteria to antibiotics — a phenomenon that has reduced the effectiveness of wonder drugs

#### PROTEIN ENGINEERING NETWORK OF CENTRES OF EXCELLENCE

SCIENTIFIC DIRECTOR:  
DR. MICHAEL SMITH,  
PROFESSOR OF BIOCHEMISTRY  
FACULTY OF MEDICINE

THE UBC CENTRE:  
DR. DOUGLAS KILBURN,  
PROFESSOR OF MICROBIOLOGY  
FACULTY OF SCIENCE

DR. GRANT MAUK,  
PROFESSOR OF BIOCHEMISTRY  
FACULTY OF MEDICINE

DR. GARY BRAYER,  
ASSOCIATE PROFESSOR OF BIOCHEMISTRY  
FACULTY OF MEDICINE

DR. R. A. J. WARREN,  
PROFESSOR OF MICROBIOLOGY  
FACULTY OF SCIENCE

DR. STEVE WITHERS,  
PROFESSOR OF CHEMISTRY  
FACULTY OF SCIENCE

DR. IAN CLARK-LEWIS,  
ASSISTANT PROFESSOR OF BIOCHEMISTRY  
BIOMEDICAL RESEARCH CENTRE

DR. HERMAN ZILTENER,  
ASSISTANT PROFESSOR OF PATHOLOGY  
BIOMEDICAL RESEARCH CENTRE

such as penicillin and tetracycline. Dr. Hancock is one of only three or four people in the world who are expert in the way gram-negative bacteria take up antibiotics through their outer surfaces. Gram-negative bacteria — such as *Pseudomonas aeruginosa*, which is a major cause of death in children with cystic fibrosis — have a protective outer coating that slows the rate at which antibiotics can get in. Because the antibiotics are entering slowly, the bacteria build up a secondary defence mechanism that allows them to digest the drug. Several people in the network are looking at ways of attacking this defence mechanism.

While Dr. Iwama's work relates to animal science, the investigations of the other node members have implications for human health.

Dr. Anthony Chow is one of a few Canadians working on gram-positive bacteria. His project in the network relates to the pathogenesis of toxic shock produced by gram-positive organisms in the genital tract.

Dr. Barry McBride, who was chair of the Department of Oral Biology in the Faculty of Dentistry, is also a member of the Department of Microbiology doing basic-science studies of two oral pathogens. The focus of his research on *Porphyromonas gingivalis* and *Treponema* is understanding how these micro-organisms adhere to cell surfaces and grow.

**CANADIAN BACTERIAL  
DISEASES NETWORK**

**SCIENTIFIC DIRECTOR:**  
DR. ROBERT HANCOCK,  
PROFESSOR OF MICROBIOLOGY  
FACULTY OF SCIENCE

**VANCOUVER COORDINATOR:**  
DR. ANTHONY CHOW,  
PROFESSOR OF MEDICINE  
FACULTY OF MEDICINE

**UBC CENTRE:**  
DR. DONALD BROOKS,  
PROF. OF PATHOLOGY AND CHEMISTRY  
FACULTIES OF MEDICINE AND SCIENCE

DR. BRETT FINLAY,  
ASSISTANT PROFESSOR  
BIOTECHNOLOGY LABORATORY

DR. BARRY MCBRIDE,  
PROFESSOR OF MICROBIOLOGY  
DEAN OF SCIENCE

DR. GEORGE IWAMA,  
ASST. PROFESSOR OF ANIMAL SCIENCE  
FACULTY OF AGRICULTURAL SCIENCES

DR. DAVID SPEERT,  
PROFESSOR OF PEDIATRICS  
FACULTY OF MEDICINE

Dr. Donald Brooks, the first Canadian to have put experiments on a space shuttle, is an expert in methods of biophysically separating one liquid from another. His experiments are aimed at using the zero gravity of space to purify pharmaceuticals faster. He is also interested in the binding properties of bacteria. Whether bacteria bind to cell surfaces or do not has implications in their ability to cause disease.

Dr. Brett Finlay works in the general area of intracellular pathogens, with a particular interest in those bacteria that cause salmonellosis, a disease that costs society billions of dollars a year in terms of lost productivity. His research is also important to diarrheal disease in our society and shigellosis, an acute bacterial infection of the bowel common in third-world countries. Dr. Finlay has shown that *Salmonella* must interact with epithelial cell surfaces and induce the synthesis of several new surface proteins before it can enter host cells. If the cell surfaces are chemically altered, these proteins are not induced and the bacteria do not enter. He has applied for a patent on his method of inhibiting the uptake of intracellular pathogens into human cells.

A pediatrician, Dr. David Speert is a scientist whose experience in clinical care of children is invaluable to the node. His project involves phagocytes — cells that are able to surround, engulf and digest micro-organisms. He is studying the mechanisms bacteria use to enter phagocytic cells and outwit their defenses, with the idea of making phagocytes more effective in killing bacteria.

*Canadian Genetic Diseases Network*

THIS NETWORK COMPRISES 22 scientists from eight universities and hospitals, working with five pharmaceutical and biotechnology companies. Among the areas of study are the defective genes that cause muscular dystrophy, cystic fibrosis and Huntington's disease, and the genes that create an increased susceptibility to diabetes, heart disease or cancer. The goal of the network is to determine the biological function of each of the relevant genes and to discover how mutations in

each cause disease. This innovative research will lead to a new industry in Canada related to the diagnosis, prevention and treatment of genetic disease, resulting in fewer affected persons and reduced health-care costs for Canadians.

"What we're doing is breaking down institutional barriers and departmental barriers," says Scientific Director Dr. Michael Hayden. "We really feel as though we have colleagues across this country — as if they're in the lab next door."

A key aspect of the network has been the development of facilities that provide technological and analytical services for all the investigators so that they can concentrate on their research. Four of these core facilities are on the UBC campus.

Dr. Gregory Lee directs the operation of a hybridoma facility at University Hospital-UBC Site. The facility is now producing monoclonal antibodies for some of the proteins that are coded by the genes being studied in the network. These monoclonal antibodies are important in understanding the cellular and subcellular organization of the proteins, allowing researchers to study why disturbed cells are not effective. The facility has produced antibodies against many human proteins, tumor markers and surface antigens.

Dr. Paul Goodfellow directs a somatic cell hybrid facility at UBC, which is able to determine where a particular gene is in the human gene complex.

At the Biomedical Research Centre, Dr. Jamey Marth is running a gene targeting facility and Dr. Frank Jirik directs the transgenic facility. Both are high-technology additions to the province's research capabilities in terms of understanding the mechanisms underlying genetic diseases and in developing therapies. Researchers in these facilities will create animal models of human genetic diseases. By knocking out specific genes, they will be able to produce individuals with abnormalities similar to abnormalities in humans and to study their development.

Dr. Ruedi Aebersold directs a protein analysis facility at the Biomedical Research Centre. The facility consists of an analytical laboratory able to do ultra-high sensitivity protein sequencing. Protein patterns can be digitized and stored in computer memory, so that changes in patterns in pathological states can be studied.

#### CANADIAN GENETIC DISEASES NETWORK

SCIENTIFIC DIRECTOR:  
DR. MICHAEL HAYDEN,  
PROFESSOR OF MEDICAL GENETICS  
FACULTY OF MEDICINE

THE UBC CENTRE:  
DR. PAUL GOODFELLOW,  
ASST. PROFESSOR OF MEDICAL GENETICS  
FACULTY OF MEDICINE

DR. GREGORY LEE,  
ASST. PROFESSOR OBSTETRICS &  
GYNECOLOGY  
FACULTY OF MEDICINE

DR. JAMEY MARTH,  
ASST. PROFESSOR OF MEDICAL GENETICS  
FACULTY OF MEDICINE

BIOMEDICAL RESEARCH CENTRE:  
DR. RUEDI AEBERSOLD,  
ASST. PROFESSOR OF BIOCHEMISTRY  
FACULTY OF MEDICINE

DR. FRANK JIRIK,  
ASST. PROFESSOR OF MEDICINE  
FACULTY OF MEDICINE

#### *Respiratory Health Network of Centres of Excellence*

THE RESPIRATORY HEALTH NETWORK of Centres of Excellence is headquartered at McGill University. The network has taken on five projects involving diseases that cause airways obstruction. These include asthma, cystic fibrosis, chronic bronchitis and emphysema, and occupational and environmental lung diseases.

The Pulmonary Research Laboratory at St. Paul's Hospital in Vancouver, directed by Dr. James Hogg, is functioning as the administrative centre for UBC's contribution, which involves four of the five major projects. Dr. Hogg is the principal investigator for two projects. His study, with Dr. Peter Paré, of the structure and function of the lung is aimed at identifying the earliest pathological abnormalities that occur in the lungs exposed to cigarette smoke, atmospheric pollution or specific allergens in order to develop a fuller understanding of the mechanism of disease production — and, from that, a strategy for therapeutic intervention. Using dissected specimens from lung-cancer or other lung-pathology operations, the investigators make detailed measurements of airways' and lung

airspace's structural abnormalities, which are then correlated with lung-function abnormalities determined before the operations. Because these assessments require an enormous number of quantitative measurements on microscopic section, the group is using an image-analysis system developed by Infrascan Corporation of Richmond, B.C. A spin-off will be the manufacturing by Infrascan of an automatic image digitizer that will retail at half the cost of current models and will have applications in fields such as physics, geology and cell biology where quantification of structure is important.

Dr. Hogg's second network project involves establishing a molecular biology laboratory within the UBC pulmonary research group at St. Paul's Hospital to investigate the role of viral infections in the pathogenesis of chronic obstructive lung disease. There is considerable evidence that respiratory tract viral infections in early life, even prior to the age of two, are associated with airways obstruction in adulthood. Dr. Hogg's ultimate goal is to test the hypothesis that the 20 per cent of heavy smokers who develop airways obstruction do so because they have active or chronic latent viral infections.

Dr. Moira Chan-Yeung is responsible for the UBC contribution to two projects: Environmental Home Air and Asthma. UBC investigators Salari, Schellenberg and Chan-Yeung are on the team seeking new pharmacological therapies for asthma, a health problem that affects about 10 per cent of Canadians. Their study of the role of a biologically active compound known as Platelet Activating Factor is basic to the team's goal of developing new drugs to reverse the airway inflammation in asthma. Drs. Chan-Yeung and Salari are measuring the role of PAF in western red cedar asthma.

Dr. Chan-Yeung is a co-principal investigator of and Dr. Sverre Vedal is a member of the group seeking to identify the determinants of ill health in indoor environments. The UBC investigators are assessing the respiratory health of 2,000 elementary school children in 12 schools in the coastal pulp mill town of Port Alberni, and testing the hypothesis that wheezing syndromes and airway hyperresponsiveness are related to the type and amount of aero-allergen in the home environment. Among the team's objectives is the testing of an ultra-violet air sterilizer as a means of reducing allergen load in homes.

Pharmacologist Dr. Sidney Katz is a member of the cystic fibrosis team. It is estimated that 13,000 Canadian children have this disease, which leads inevitably to premature death. Although the basic defect in CF is understood, current therapies are directed against the manifestations of the disease in the lungs and intestines. The network is trying to develop therapeutic agents to treat the underlying cellular abnormality in cystic fibrosis.

Dr. George Davidson, professor of Pediatrics, and Dr. David Walker, assistant professor of Pathology, are network consultants.

### *Neural Regeneration and Functional Recovery Network of Excellence*

MAJOR ADVANCES HAVE BEEN MADE recently in uncovering the unsuspected ability of the nervous system to re-grow after injury. The goal of this network, headquartered at McGill University, is to promote regeneration in the nervous system and recovery of function in people who have suffered strokes, spinal cord

#### RESPIRATORY HEALTH NETWORK OF CENTRES OF EXCELLENCE

THE UBC CENTRE:  
DR. JAMES HOGG,  
PROFESSOR OF PATHOLOGY  
FACULTY OF MEDICINE

DR. SIDNEY KATZ,  
PROFESSOR OF PHARMACOLOGY  
AND TOXICOLOGY  
FACULTY OF PHARMACEUTICAL SCIENCES

DR. MOIRA CHAN-YEUNG,  
PROFESSOR OF MEDICINE  
FACULTY OF MEDICINE

DR. STEPHEN LAM,  
ASSOCIATE PROFESSOR OF MEDICINE  
FACULTY OF MEDICINE

DR. PETER PARÉ,  
PROFESSOR OF MEDICINE  
FACULTY OF MEDICINE

DR. HASSAN SALARI,  
ASSISTANT PROFESSOR OF MEDICINE  
FACULTY OF MEDICINE

DR. ROBERT SCHELLENBERG,  
ASSOCIATE PROFESSOR OF MEDICINE  
FACULTY OF MEDICINE

DR. SVERRER VEDAL,  
ASSOCIATE PROFESSOR OF MEDICINE  
FACULTY OF MEDICINE

injury or retinal damage or who have Alzheimer's disease, dyslexia or amblyopia. The strength of the network in molecular biology and microelectronics could lead to the discovery of new drugs and the development of new devices to assist in the recovery of neural function after injury.

The UBC centre, coordinated by Dr. Cynader, is studying visual function after early deprivation or damage. Using animal models, the group will seek new methods to re-create connections within the visual centres in the brain.

As part of the University of Toronto node, Dr. Snutch will be working with transgenic mice to investigate the role of neurotransmitter receptors and ion channels in re-establishing the functioning of nerves during recovery from damage.

Dr. Steeves is a member of the spinal cord node which is based at the University of Manitoba. His research interests are in the development and regeneration of the central nervous system, in central nervous system control of locomotion in vertebrates, and in the effects of environmental toxins on the development of the central nervous system. He has recently established that the transected spinal cord of an embryonic chick will functionally repair all damage if the injury occurs early enough in the developmental period. This exciting finding — an example of true regeneration of damaged axons — will lead to the examination of how regeneration occurs and what inhibits it. A new Chair in Spinal Cord Regeneration will aid in this research.

Dr. Cynader's group is part of a second network — the Institute for Robotics and Intelligent Systems (IRIS). The objective of this UBC node, led by Dr. Alan Mackworth, professor of Computer Science, is to build machines that can see. With their knowledge of biological and human visual systems, Dr. Cynader and his team will be able to contribute to the improved organization of robotic systems.

#### NEURAL REGENERATION AND FUNCTIONAL RECOVERY NETWORK

THE UBC CENTRE:  
DR. MAX CYNADER,  
PROFESSOR OF OPHTHALMOLOGY  
FACULTY OF MEDICINE

DR. ROBERT M. DOUGLAS,  
ASSOCIATE PROFESSOR OF OPHTHALMOLOGY  
FACULTY OF MEDICINE

DR. JOANNE A. MATSUBARA,  
ASSOCIATE PROFESSOR OF OPHTHALMOLOGY  
FACULTY OF MEDICINE

DR. NICHOLAS SWINDALE,  
ASSISTANT PROFESSOR OF OPHTHALMOLOGY  
FACULTY OF MEDICINE

UBC MEMBERS AT TORONTO NODE:  
DR. TERRANCE SNUTCH,  
ASSISTANT PROFESSOR OF PSYCHIATRY  
BIOTECHNOLOGY LABORATORY

DR. KENNETH BAIMBRIDGE,  
ASSOCIATE PROFESSOR OF PHYSIOLOGY  
FACULTY OF MEDICINE

UBC MEMBERS AT MANITOBA NODE:  
DR. JOHN STEEVES,  
PROFESSOR OF ZOOLOGY  
FACULTY OF SCIENCE

## *The Canadian Institute for Advanced Research*

**A PRIVATE, NON-PROFIT ORGANIZATION,** The Canadian Institute for Advanced Research is a Canada-wide research enterprise with international scope. Launched in 1982, the institute has put together five networking programs with members in Canadian universities and research-based institutions, and now including individuals in other countries. The institute funds salaries of program members, who remain in their home institutions. It also funds the costs of interaction — workshops, working visitations, the exchange of graduate students and electronic communications. There are three categories of appointment to the institute: fellows are outstanding scientists or scholars, who are appointed for five years and receive full salary support; associates are chosen according to similar criteria as fellows but do not receive salary support; scholars are young researchers whose salaries are paid for terms of three to five years. Of the five institute programs in which UBC participates, two are in the health-sciences field — the Program in Evolutionary Biology and the Program in Population Health.

### *Program in Evolutionary Biology*

EVOLUTIONARY BIOLOGISTS trace genealogical relationships and deduce mechanisms by which evolutionary change occurs. With advances in molecular biology, scientists will be able to understand the beginnings of life, the process of mutation and selection, the evolutionary structure and functions of proteins, and ultimately the human genome — the complete set of genes in our chromosomes.

The three evolutionary biology program laboratories at UBC study the evolution of unicellular organisms by using molecular techniques to work out the exact structure of selected genes. Dr. Cavalier-Smith is studying the evolution of protozoa and other single-celled living organisms whose cells have nuclei. He is determining the DNA sequence of certain genes in numerous living organisms in order to work out a detailed evolutionary tree of all the major branches of life and to understand the evolution of human genes and those of our unicellular ancestors. He is also studying the molecular basis of cell structure in *Giardia*, which is not only a major cause of human disease but also a living relic of a stage in evolution passed through by our own ancestors over a thousand million years ago.

Dr. Dennis is studying gene structure in archaebacteria, a kingdom of unusual bacteria related to eukaryotes, which are cells with nuclei, capable of forming complex multicellular organisms including plants and animals. The purpose of Dr. Dennis's research is to reconstruct a history of evolution by gathering together informative pieces of DNA nucleotide sequence information from contemporary organisms.

Dr. Redfield's study is related to one of the biggest unsolved problems in biology: why human beings and most other organisms large enough to see reproduce sexually — that is, by combining two sets of chromosomes, one from each parent. Studies in her laboratory involve *Haemophilus influenzae* — a bacterium that takes up chromosome fragments from its environment and inserts them into its own chromosomes. How and why that happens may explain the origin of sexual reproduction in our earliest unicellular ancestors.

#### PROGRAM IN EVOLUTIONARY BIOLOGY

**UBC INVESTIGATORS:**  
DR. THOMAS CAVALIER-SMITH, FELLOW  
PROFESSOR OF BOTANY  
FACULTY OF SCIENCE

DR. PATRICK P. DENNIS, FELLOW  
PROFESSOR OF BIOCHEMISTRY  
FACULTY OF MEDICINE

DR. ROSEMARY REDFIELD, SCHOLAR  
ASSISTANT PROFESSOR OF BIOCHEMISTRY  
FACULTY OF MEDICINE

#### PROGRAM IN POPULATION HEALTH

**UBC INVESTIGATORS:**  
DR. ROBERT G. EVANS,  
MANUFACTURERS' LIFE FELLOW  
PROFESSOR OF ECONOMICS  
FACULTY OF ARTS

DR. PATRICIA BAIRD,  
ASSOCIATE, CIAR VICE-PRESIDENT  
PROFESSOR OF MEDICAL GENETICS  
FACULTY OF MEDICINE

DR. MORRIS L. BARER,  
ASSOCIATE PROFESSOR OF HEALTH CARE  
AND EPIDEMIOLOGY  
FACULTY OF MEDICINE

DR. CLYDE HERTZMAN, SCHOLAR  
PROFESSOR OF HEALTH CARE  
AND EPIDEMIOLOGY  
FACULTY OF MEDICINE

### *Program in Population Health*

MEDICAL ADVANCES HAVE ENABLED THE PREVENTION AND CURE of some diseases and have eased symptoms in many chronic illnesses, but it is clear that health in populations and individuals is not entirely a factor of medical care. The determinants of health are broad. Genetic inheritance, housing, pollution, family structure, work environment and psychological makeup interact in a complex way to determine how healthy people are.

Dr. Evans is the director of this program which brings together 14 Canadian and three international members. Their expertise in genetics, medicine, epidemiology, sociology, political science, economics and statistics will be dedicated to understanding the complex factors that determine health and to developing a more illuminating intellectual framework for thinking about the relationships between organism and environment, health and disease, and the role of health care.

With CIAR fellow Dr. Gregory Stoddart of McMaster University, Dr. Evans has written a working paper that is the basis for the book the program will produce

for policy-makers. *Producing Health, Consuming Health Care* develops a conceptual framework for the examination of evidence and hypotheses about a broad range of determinants of health and the relationships among these determinants. The authors argue, in eloquent prose, that the understanding of the determinants of population health and the discussion and formulation of health policy have been seriously impeded by the perpetuation of an incomplete, obsolete and misleading framework. A more adequate framework would accommodate distinctions among disease (as defined and treated by the health-care system), health and function (as perceived and experienced by individuals), and well-being (a still broader concept to which health is an important, but not the only, contributor). The framework would recognize and foster identification of the economic trade-offs involved in the allocation of scarce resources to health care instead of to other activities (for example, the stimulation of economic performance) which may contribute to health and well-being.

Dr. Evans is a faculty member of our Centre for Health Services and Policy Research and a member of the British Columbia Royal Commission on Health Care and Costs.

## *The Canadian HIV Trials Network*

**THIS NATIONAL NETWORK OF EIGHT CENTRES** across the country is based at UBC and St. Paul's, one of the university's teaching hospitals. B.C. has always had the highest cumulative incidence of AIDS in Canada, and St. Paul's Hospital has had the highest caseload of AIDS of any single hospital in the country.

The network is funded by a three-year National Health and Welfare grant of \$10.2 million to UBC. Its mission is to allow Canada to rapidly set up trials of new HIV/AIDS therapies and to provide patients the broadest possible access to these trials.

At the time of its official opening in January, 1991, the centre was conducting a two-year trial comparing the use of dideoxyinosine (ddI) and AZT in 430 patients. AZT is the approved drug treatment for HIV disease, but it is thought that patients develop a resistance to it. Dideoxyinosine, the next generation of anti-viral agents, is being used on patients who cannot tolerate AZT or who are failing on it. The investigators are trying to determine whether it is better to switch earlier or later from AZT to ddI.

Linked by computer to centres elsewhere in Canada and receiving up-to-the-minute data on hundreds of patients, the UBC investigators are able to monitor trials of new drugs and respond quickly to reported side-effects and complications. ▀

### THE CANADIAN HIV TRIALS NETWORK

PRINCIPAL INVESTIGATORS:  
DR. MARTIN SCHECTER,  
ASSOC. PROF. OF HEALTH CARE  
AND EPIDEMIOLOGY  
FACULTY OF MEDICINE

DR. JOHN RUEDY,  
PROFESSOR OF MEDICINE  
HEAD OF DEPARTMENT OF MEDICINE,  
ST. PAUL'S HOSPITAL

DR. JULIO MONTANER,  
ASSISTANT PROFESSOR OF MEDICINE  
FACULTY OF MEDICINE



ESTABLISHED IN 1969, THE MEDICAL RESEARCH COUNCIL OF CANADA IS THE MAJOR FEDERAL AGENCY FUNDING MEDICAL RESEARCH IN THE COUNTRY. IT SUPPORTS RESEARCH AND RESEARCH TRAINING IN HEALTH SCIENCES IN UNIVERSITIES AND THEIR AFFILIATED HOSPITALS AND INSTITUTES. IN 1989-90, UBC RECEIVED \$16,328,000 IN MEDICAL RESEARCH COUNCIL FUNDING, THE FOURTH-HIGHEST AMOUNT AMONG 31 INSTITUTIONS.

## *XV. Major Medical Research Council Funding*

**IN OPERATING GRANTS TO INDIVIDUALS**, in spite of its smaller size, UBC placed third in the country, receiving more than \$10 million, and it ranks among the top three or four in funding of career investigators, MRC scientists and scholars.

### **MRC REGULATORY PEPTIDE GROUP**

**LEADER:**  
DR. JOHN C. BROWN,  
PROFESSOR OF PHYSIOLOGY  
FACULTY OF MEDICINE

**THE GROUP:**  
DR. ALISON M. J. BUCHAN,  
ASSOCIATE PROFESSOR OF PHYSIOLOGY  
FACULTY OF MEDICINE

DR. YIN NAM KWOK,  
ASSISTANT PROFESSOR OF PHYSIOLOGY  
FACULTY OF MEDICINE

DR. CHRISTOPHER H. S. MCINTOSH,  
PROFESSOR OF PHYSIOLOGY  
FACULTY OF MEDICINE

DR. RAYMOND A. PEDERSON,  
PROFESSOR OF PHYSIOLOGY  
FACULTY OF MEDICINE

As well as funding individual investigators, the MRC supports collaborative research programs through Program and Group Grants.

An MRC Group is considered a centre of excellence for research and training in the health-science field. A grant supports teams of four or more accomplished investigators for collaborative work over a period of years in especially important and potentially productive areas. The MRC funds only 13 groups in the country, one of which is the five-member Regulatory Peptide Group in UBC's Department of Physiology.

Program Grants go to multidisciplinary research activities involving three or more investigators. There are 28 in the country, of which UBC has four — three in the field of neuroscience, and one that brings together pharmaceutical sciences and medicine.

### *MRC Regulatory Peptide Group*

THE REGULATORY PEPTIDE GROUP WAS FORMED IN 1986 with a six-year commitment from the MRC to pay for salaries, supplies and expenses. In 1990-91 that amounted to more than \$800,000.

Peptides are important regulatory agents, insulin being the best example. Unravelling the role of peptides in controlling functions of the stomach, intestines and pancreas in health and disease is the goal of this project. Once Dr. Brown and his colleagues have isolated and characterized a peptide, they will work with pharmaceutical companies to create analogues that can be used to treat diseases such as inflammatory bowel disease, Type 2 diabetes and conditions such as obesity. Until a few years ago, the use of peptides as drugs was prohibitive because it was difficult and expensive to synthesize a peptide molecule's chain of amino acids. Recent advances in chemical synthesis have allowed chemists to create analogues with a shorter chain of amino acids but still able to perform the biological activity.

## *MRC Program in Degenerative Disorders of the Motor Pathways*

THE PROGRAM IN DEGENERATIVE DISORDERS of the Motor Pathways has the largest medical research grant ever given UBC — \$6.1 million over five years. The grant recognizes the international reputations of many of the team members and the excellence of the UBC PET program, initiated in the late 70s by Dr. Brian Pate when he was associate director of TRIUMF.

This complex grant involves 11 full-time faculty members with eight part-time faculty researchers in six separate projects, and includes data analysis at the University of Wisconsin and collaboration with a former UBC faculty member now at the University of Alberta. The team has an administrative location provided by University Hospital-UBC Site. The laboratories in the University Hospital are linked to TRIUMF by pneumatic tube which can deliver samples in 90 seconds.

Directed by Dr. Donald Calne, head of Neurology at University Hospital's UBC site, the multidisciplinary team is focusing on three neurodegenerative disorders: Parkinson's disease, Huntington's disease and amyotrophic lateral sclerosis — Lou Gehrig's disease. Researchers are examining the process of selective nerve cell death in the motor pathways of patients with these diseases.

The Parkinson's disease project will look for pre-clinical markers; analyze the rate of progress of the disease; explore the relationship between Parkinson's and normal aging and between Parkinson's and ALS; and explore treatments to retard the pathogenesis of Parkinson's.

The ALS group is doing studies of motor neurons in culture, studies of preclinical and clinical ALS, and conducting therapeutic trials of antioxidant and antiexcitant drugs.

The Huntington's group is following the preclinical and clinical course of the disease in patients with DNA markers associated with the Huntington's gene; testing new treatments to retard the progression of the disease; and investigating a more sensitive indicator of the disease.

Other projects involve pharmacological experiments, the development of radiopharmaceuticals for use in the program's experiments, and post-mortem and tissue culture studies to corroborate the data obtained in the PET studies and to test factors contributing to degeneration.

## *MRC Program: the Kinetics, Effects and Toxicology of Drugs During Pregnancy, the Newborn Period and Childhood*

THIS PROGRAM GRANT, which took effect in October, 1990, will give these five investigators \$2.7 million over five years. Working together and individually, they were previously funded by the MRC, the B.C. Health Care Foundation, the Canadian Heart and Stroke Foundation, the Kidney Foundation of Canada and by drug companies to do basic science studies.

### **MRC PROGRAM IN DEGENERATIVE DISORDERS OF THE MOTOR PATHWAYS**

**DIRECTOR:**  
DR. DONALD B. CALNE,  
PROFESSOR OF MEDICINE  
DIVISION OF NEUROLOGY

**THE A TEAM:**  
DR. MICHAEL J. ADAM,  
RESEARCH SCIENTIST  
TRIUMF

DR. ANDREW EISEN,  
ACTING HEAD, DEPT. OF MEDICINE  
PROFESSOR, DIVISION OF NEUROLOGY

DR. SEUNG KIM,  
PROFESSOR OF MEDICINE  
DIVISION OF NEUROLOGY

DR. CHARLES KRIEGER,  
ASSOCIATE PROFESSOR OF MEDICINE  
DIVISION OF NEUROLOGY

DR. EDITH MCGEER,  
PROFESSOR EMERITA OF PSYCHIATRY  
FACULTY OF MEDICINE

DR. BRIAN PATE,  
PROFESSOR OF MEDICINE  
FACULTY OF MEDICINE

DR. TOM RUTH,  
DIRECTOR OF THE PET PROGRAM  
TRIUMF

DR. MICHAEL SCHULZER,  
PROFESSOR OF STATISTICS AND MEDICINE  
FACULTIES OF SCIENCE AND MEDICINE

DR. BARRY SNOW,  
ASSOCIATE PROFESSOR OF NEUROLOGY  
FACULTY OF MEDICINE

DR. JOSEPH TSUI,  
ASSISTANT PROFESSOR OF MEDICINE  
DIVISION OF NEUROLOGY

### **MRC PROGRAM: THE KINETICS, EFFECTS AND TOXICOLOGY OF DRUGS DURING PREGNANCY, THE NEWBORN PERIOD AND CHILDHOOD**

**COORDINATOR:**  
DR. JAMES E. AXELSON,  
PROFESSOR OF PHARMACEUTICS  
AND BIOPHARMACEUTICS  
FACULTY OF PHARMACEUTICAL SCIENCES

DR. DANIEL RURAK,  
ASSOCIATE PROFESSOR OF OBSTETRICS  
AND GYNECOLOGY  
FACULTY OF MEDICINE

DR. FRANK ABBOTT,  
PROFESSOR OF PHARMACEUTICAL CHEMISTRY  
FACULTY OF PHARMACEUTICAL SCIENCES

DR. KEVIN FARRELL,  
ASSOCIATE PROFESSOR OF PEDIATRICS  
FACULTY OF MEDICINE

DR. WAYNE RIGGS,  
ASSISTANT PROFESSOR OF CLINICAL PHARMACY  
FACULTY OF PHARMACEUTICAL SCIENCES

Despite a greater awareness of the potential hazards, drugs are widely used during pregnancy. Almost a quarter of pregnant women take preparations that contain antihistamines. Others are prescribed drugs for heart disease, epilepsy, hypertensive disorders and complications of pregnancy. Increasingly, fetal disorders are treated by administering drugs to the mother. Premature infants and young children with medical problems also receive extensive drug treatments. The objective of this MRC program is to expand research into the effects and toxicology of drugs in pregnancy, in newborns and in the young child.

*MRC Program: The Neurobiology of Central Dopamine Systems in Normal and Pathological Behavior*

WITH \$2 MILLION MRC BACKING, this team is investigating the function of two major groups of neurons in the brain — acetylcholine-containing cells in the basal forebrain and dopamine-containing cells in the mesencephalon (the mid-brain).

Using new laboratory techniques, the group is measuring the release of acetylcholine and dopamine in discrete regions of the living brain. The research could provide important knowledge about Alzheimer's disease, Parkinson's disease, schizophrenia, and severe depression.

**MRC PROGRAM:  
THE NEUROBIOLOGY  
OF CENTRAL DOPAMINE SYSTEMS  
IN NORMAL AND  
PATHOLOGICAL BEHAVIOR**

**COORDINATOR:**  
DR. CHRISTIAN FIBIGER,  
ACTING HEAD, DEPARTMENT OF PSYCHIATRY  
FACULTY OF MEDICINE

DR. ANTHONY PHILLIPS,  
PROFESSOR, DEPARTMENT OF PSYCHOLOGY  
FACULTY OF ARTS

DR. CHARLES BLAHA,  
SESSIONAL LECTURER, DEPT. OF PSYCHOLOGY  
FACULTY OF ARTS

**MRC PROGRAM:  
NEURAL MECHANISMS UNDERLYING  
AMBLYOPIA AND STRABISMUS**

**COORDINATOR:**  
DR. MAX CYNADER,  
PROFESSOR OF OPHTHALMOLOGY,  
PSYCHIATRY AND PSYCHOLOGY  
FACULTIES OF MEDICINE AND ARTS

DR. CHRISTOPHER SHAW,  
PROFESSOR OF OPHTHALMOLOGY  
FACULTY OF MEDICINE

*MRC Program: Neural Mechanisms Underlying Amblyopia and Strabismus*

DR. CYNADER AND DR. SHAW share this four-year, \$1.2-million grant with two colleagues, one at the University of Montreal and one at Dalhousie University.

Strabismus is the medical term for crossed eyes. Amblyopia, a Greek word meaning "dull eye," is a condition in which there is reduced vision in an eye that appears structurally normal when examined with an ophthalmoscope. The group's research is aimed at understanding how it is that an eye developing in a sub-optimal environment fails to make proper connections to the brain. ♥

THE UNIVERSITY AND AFFILIATED RESEARCH INSTITUTIONS GENERATE MORE THAN 60 PER CENT OF ALL PUBLIC AND PRIVATE RESEARCH ACTIVITY IN THE PROVINCE. DURING THE LAST TWO DECADES, SUCH RESEARCH HAS CREATED 87 SPIN-OFF COMPANIES EMPLOYING MORE THAN 4,600 PEOPLE AND PRODUCING REVENUES IN EXCESS OF \$824 MILLION A YEAR. UBC HAS DEVELOPED THE MOST ACTIVE TECHNOLOGY TRANSFER PROGRAMS OF ANY UNIVERSITY IN CANADA.

## *XVI. Biomedical Spin-off Companies*

INCREASINGLY, THE TECHNOLOGY BEING TRANSFERRED results from research originating in our biomedical laboratories — from DNA-Probe “fingerprinting” technology to the commercialization of photosensitive drugs that are activated by light.

These spin-off companies owe their origin, directly or indirectly, to research or expertise that began at UBC. They may be formed either by faculty, staff or students who use their acquired know-how to produce goods and services for the marketplace, or through the direct commercial licensing of a technology. Our policies pertaining to the creation of spin-off commercial companies have been the models for other universities and should guide future health-science research in B.C. In addition to a new agreement signed with each of the teaching hospitals, we have recently signed a research agreement with Children’s Hospital that will be helpful in this process.

By sharing our discovered knowledge in the biomedical field, UBC contributes to solving problems in the real world, creates income for the university, and stimulates local, regional and national economies. Canada, with its relatively small industrial base, must rely on universities like ours to supply much of its technological innovations and entrepreneurs for a global marketplace. Aggressive competition demands that research and development be intensified to shorten the gap between discovery and application. As Dr. Geraldine Kenney-Wallace wrote as chair of the Science Council of Canada, “We need to integrate people, ideas, opportunities, markets and capital in new and effective ways. The most urgently needed linkages are those between the research community within the universities and the private sector. A new sense of strategic partnership must become a reality.”

At UBC, we have long recognized the benefits of such a partnership. Commercialization of our publicly funded research was originally overseen by the Office of Research Administration, which handled patent disclosures, applications and licences. In 1981, UBC began patenting inventions on behalf of our researchers; two years later we opened the Office of University-Industry Liaison, which by '85 was operating on a five-year major grant from the federal and provincial governments. Technology transfer through the creation of spin-off companies became focused in 1986. The first survey of its kind identified companies that existed because of research conducted on campus, including those formed by individuals using technical expertise gained while studying or teaching here; through licensing patents or know-how from UBC; or as second- or third-generation enterprises from original university spin-offs.

In 1991, the university formed UBC Research Enterprises (UBC/RE) as a spin-off from the Industry Liaison Office to oversee prototype development, market assessment and the formation of companies based on campus research. The goal is to attract financing and support from private industry, investors and government agencies for a more coordinated approach to commercializing technology. While the Industry Liaison Office continues to handle the majority of technology transfers, UBC/RE offers market assessments, industrial contacts, financing and preparation of business plans for prototype development.

Royalties from UBC's spin-off companies have grown from \$5,000 a year in 1983 to nearly \$750,000 in 1990. For each dollar received from licensed companies, half goes to the inventor, a sixth to the inventor's faculty or department, and the remainder to the university.

The financial spin-offs from these companies multiply dramatically. In the last decade alone, nine B.C. biomedical companies, which had their origins in research at UBC, created 144 jobs and now have multi-million-dollar annual revenues. The most prominent is Quadra Logic Technologies Inc. of Vancouver, which was founded on the research of two UBC scientists, Dr. Julia Levy and Dr. David Dolphin, in Photodynamic Technology (PDT). The technology, licensed from UBC, uses light-activated drugs for the diagnosis and treatment of such diseases as cancer, viral inactivation in blood, atherosclerosis, and sexually-transmitted diseases. Quadra Logic, which employs 60 people, maintains a close working relationship with the departments of Microbiology and Chemistry and much of its research occurs at the university in collaboration with scientists in these areas.

Other UBC biomedical spin-off companies include:

- **FMG INTEGRATED BIOTECHNICAL LABS LTD. OF RICHMOND, B.C., WHOSE PRINCIPAL INTEREST IS IN DEVELOPING NEW PRODUCTS AND PROCESSES FOR THE AQUACULTURE INDUSTRY WORLDWIDE AND IN THE HUMAN AND ANIMAL HEALTH-CARE INDUSTRIES.**
- **HELIX BIOTECH CORPORATION OF RICHMOND, WHICH IS ENGAGED IN THE RESEARCH, DEVELOPMENT AND MANUFACTURE OF HIGH-QUALITY DIAGNOSTIC COMPONENTS AND SYSTEMS FOR USE IN THE CLINICAL, VETERINARY AND AQUACULTURE INDUSTRIES; IT OWNS THE CANADIAN AND PATENT RIGHTS TO DNA-PROBE TECHNOLOGY (FINGERPRINTING).**
- **INTRINSIC RESEARCH AND DEVELOPMENT, INC. OF RICHMOND, WHICH IS INVOLVED IN THE RESEARCH AND DEVELOPMENT OF PHARMACEUTICALS USED IN CANCER TREATMENT.**
- **LIPEX BIOMEMBRANES, INC. OF VANCOUVER, WHICH PRINCIPALLY PRODUCES AN EXTRUDER FOR RAPID AND REPRODUCIBLE PREPARATION OF A SYSTEM TO FORM LIPIDS (FATTY ACIDS) INTO SMALL BUBBLES FOR THE DELIVERY OF DRUGS TO SPECIFIC CELLS IN THE BODY.**

**RUTLAND BIOTECH LIMITED OF BURNABY, B.C., A RESEARCH, MARKETING AND SALES COMPANY WITH A GROWING BASE OF ADVANCED TECHNOLOGY IN PERSONAL AND PROFESSIONAL HEALTH-CARE PRODUCTS INCLUDING ORAL HEALTH, SKIN-CARE LUBRICANTS AND CLEANSERS.**

- **SHAPE TECHNOLOGIES INC. OF NORTH VANCOUVER, MARKETER AND DISTRIBUTOR OF A COMPUTER AIDED DESIGN/COMPUTER AIDED MANUFACTURE SOFTWARE PACKAGE FOR THE DESIGN AND MANUFACTURE OF ARTIFICIAL LIMBS FOR AMPUTEES; AND ALSO CONDUCTS CONTRACT SOFTWARE DEVELOPMENT FOR CAD/CAM APPLIED TO MEDICINE.**

**VORUM RESEARCH CORPORATION OF VANCOUVER, WHICH IS INVOLVED IN SOFTWARE DEVELOPMENT AND SYSTEMS INTEGRATION FOR MEDICAL CAD/CAM APPLICATIONS IN GENERATING ANATOMICAL SHAPES. ■**

DR. WILLIAM C. GIBSON, PROFESSOR EMERITUS AND FORMER HEAD OF THE DIVISION OF THE HISTORY OF MEDICINE AND SCIENCE, LIKES TO RECALL A PARTICULAR MEETING HE HAD OVER BRANDIED MILK WITH P. A. WOODWARD, THE BENEFACTOR OF THE WOODWARD BIOMEDICAL LIBRARY.

## XVII. *Support Services on Campus*

### *Woodward Medical Library*

WHEN DR. GIBSON TOLD THE DEPARTMENT-STORE MAGNATE about the possibility of acquiring an important collection of rare medical books, Mr. Woodward said excitedly, "I don't want to build a book cemetery. I want the milestones of science — the first time any new discovery was published. I want the students to see these, and to appreciate that UBC has them. I want them displayed in glass cases, day and night."

"And," Dr. Gibson says, "so evolved our method of teaching the history of medicine and related sciences by displays of the great books."

Thanks to the Mr. and Mrs. P. A. Woodward Foundation and matching federal grants, the university now has the second-largest library in the UBC system, which houses many milestones of medical science amid the largest health-sciences collection in Western Canada: more than 340,000 volumes in the health and life sciences, biology, botany, dentistry, medicine, nursing, nutrition, pharmaceutical sciences, zoology and related subjects. The library is also the hub of the Health Sciences Library Network, which was designed to meet the specific needs of the health scientists in the UBC teaching hospitals. As a result, the Woodward collection is conveniently accessible to every physician in the province.

The collection had its origins in 1915, when Nobel Prize winner Sir Charles Sherrington gave Dr. Frank Wesbrook, the university's founding president, a surprise gift of the copper-plate first edition of Bidloo's classic *Anatomia*, published in 1685. The number of medical volumes slowly increased; by 1951, when the first full-time Biomedical Librarian was appointed, there were 8,000 in the Main Library's Medical Reading Room. With the enrolment of the inaugural class in the Faculty of Medicine, a Biomedical Branch Library opened at Vancouver General Hospital.

The Biomedical Library itself opened in 1964. A dozen years later it doubled in size through a second gift from the same donors, while the Instructional Resources Centre opened next door. Another Woodward Foundation grant funded the first on-line informational retrieval system; by 1978, the old card catalogue system was a thing of the past.

Douglas McInnes, recently retired head of the Woodward, was a central figure in planning a network of provincial medical libraries to serve health practitioners throughout B.C. The Health Sciences Network was launched in 1982: sharing their resources and providing next-day delivery of about 50,000 volumes a year to library users are the Woodward Library, the Biomedical Branch at VGH, St. Paul's Hospital's Library and the Eric Hamber Library at Shaughnessy Hospital.

The Woodward, close to full working capacity, seats 950 in its 60,000 square feet. Its annual circulation is well over 200,000 loans; its staff answers nearly 50,000 reference questions and makes 3,000-plus computer searches for patrons each year.

The Charles Woodward Memorial Room, dedicated to B.C.'s pioneer physicians, holds an outstanding collection of more than 6,000 volumes on the history of medicine and the natural sciences. The holdings — named for Dr. William C. Gibson — rank second in importance in Canada, attracting scholars from around the world. Among treasures in the climate-controlled library is a 1628 first edition of William Harvey's *De motu cordis*, describing his discovery of blood circulation; and the autographed letters of such significant scientific and medical figures as Charles Darwin and Florence Nightingale.

The Nightingale letters were essentially shanghai'd by the library on their way to California. As Dr. Gibson remembers, a book dealer from Boston was trying to circumvent an American airline strike by flying across Canada to Vancouver and then wending his way south. In Vancouver, he called the only person he knew in town, Woodward librarian Basil Stuart-Stubbs, who suggested he stay overnight at the Faculty Club. Helping the dealer with his suitcases, the librarian remarked on their weight. "Oh," said the Bostonian, "they're filled with Florence Nightingale letters I hope to sell in California." Mr. Stuart-Stubbs immediately called Dr. Gibson at home, asking if he had any Scotch in stock. He had, and librarian and dealer came to visit, luggage in hand. "Suffice it to say," Dr. Gibson recalls, "that by 3 a.m. we had acquired all the contents of the suitcases.... We told him not to bother, in the future, going to California but to bring his wares directly to UBC."

The adjacent Sherrington Room is used for seminars and small meetings. Hearing of the university's plans to create this area, Sir Charles' son, Carr Sherrington, sent the Woodward library all his father's honorary degrees, his portrait, Nobel Prize citation, Order of Merit medal from the Crown, Royal Society regalia, and even his dining-room chairs.

The Memorial Room area has a small collection of artifacts, including historical infant feeders and surgical instruments, and displays three extraordinary contemporary tapestries. One, woven in the People's Republic in China, depicts the Canadian surgeon Dr. Norman Bethune operating during the Eighth Route Army campaign in China. The other are post-war French works: *Masters of Science*, done by the young Gobelin tapissier Roland, and *Masters of the Spirit*.

Again, Dr. Gibson has a good story to tell about acquiring *Masters of the Spirit*. On a visit in France to the art patron who had commissioned *Masters of Science*, he noticed a tapestry portraying great philosophers and writers. The patron said one of his oldest tapissiers had been half-way through its creation when he suffered a cerebral haemorrhage; because the right half was badly done, the patron didn't want to sell it for fear its creator's work would be mocked. "I explained that I was a neurologist with scientific interest in this amazing result," Dr. Gibson says. "Finally he agreed that in those circumstances we could buy it.... Many physicians and psychologists have come to see it since."

## *Student Health Service*

**THE COMPLEXITIES OF CONTEMPORARY STUDENT LIFE** — from stress to drug abuse to sexually-related diseases — have made compelling new demands on the university's Student Health Service. For UBC's 27,000 students, particularly the 4,500 who are single and living in residence, the staff at the Health Service may be

the only medical people they ever know during their time at university. This makes it all the more vital that the service offers psychiatric consulting to handle students' stress and other emotional upheavals and runs an annual Drug and Alcohol Awareness Week and a safer-sex education program.

Located in the acute-care unit of the University Hospital on campus, the service fields 38,000 clinical visits a year. Dr. Donald J. Farquhar has succeeded Dr. C.A. Brumwell as medical director, heading a full- and part-time staff that ranges from physicians with special training in sports medicine to a psychologist and a dermatologist. Collectively, they offer doctor's office care, including medical and psychiatric services, travel advice, immunizations and allergy injections, and referrals to consultative services in many specialty areas throughout the hospital. Affiliated with the clinic is the Ambulatory Care Pharmacy in the hospital lobby; the Department of Radiology's x-ray, ultrasound and imaging services; and specialists in physiotherapy, nuclear medicine, nutritional counselling and diagnostic cardiology, neurology and respiratory areas.

During the academic year, a health education and wellness promotion program features workshops, health fairs, talks in residence, and a monthly newsletter for students. Special programs include the drug and alcohol awareness project, mounted yearly since 1987, for which Outreach Nurse Margaret Johnston recently won an award from the Insurance Corporation of B.C. She has also coordinated the safer-sex education project, which brings experts together with students to focus on AIDS and other sexually related diseases; last year's three-day event included a board game called Sexploration to prompt learning and discussion about sex, drugs and alcohol.

From the beginning — since the university's inception in 1912 — we have made a commitment to the health of our student population. Dr. Harold White, medical director of the Vancouver School Board, became UBC's founding medical examiner, assessing all first-time students as well as women participating in major athletics programs. With the university's move to Point Grey in 1925, Dr. H.W. Hill, head of the Bacteriology Department, became medical health officer; two years later Mrs. C.A. Lucas was appointed our first public health nurse. In 1938, we began offering consultative psychiatric services to students. And by 1951, the Health Service had its first full-time medical director, Dr. A.K. Young.

At that time, the service offered care to university staff and faculty as well as students. It operated out of the Wesbrook Building, which housed a 26-bed infirmary in the University Health Service Hospital. Although surgical and obstetrical cases were referred to city hospitals, the campus hospital ministered to a variety of ailments, including communicable diseases, handled in special isolation facilities. A live-in resident cared for emergency cases overnight and weekends. In 1959 a full-time resident from the Department of Psychiatry came on staff and, six years later, a full-time physiotherapist. By then, there were three full-time physicians, two sessional and two part-time doctors, and two psychiatric residents as well as full-time and part-time consultant psychiatrists.

When the Health Service Hospital closed in 1980, the service moved from the Wesbrook Building into its present quarters in the University Hospital-UBC Site. Today, the staff includes seven full-time-equivalent general practitioners, 5.5 full-time-equivalent psychiatrists and two psychiatric residents, as well as four nurses

**LOCATED IN THE  
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and an outreach nurse, and an administrative assistant. Consultants and specialists include three orthopedic surgeons, two plastic surgeons, a dermatologist working with two residents, and a psychologist.

## *Disability Resource Centre and Rick Hansen National Fellow*

**THE DREAM GOES WELL BEYOND THE BORDERS OF UBC.** The Disability Resource Centre — the first of its kind in the world — opened in early 1991 with an initial mandate of evaluating how this university handles physical and functional accessibility, employment equity, curriculum, research and many other issues related to disabled men and women in the campus community. But, led by two people who themselves have disabilities, the centre sees itself a prototype with the goal of making post-secondary education across Canada more accessible to students, faculty, staff and visitors.

From the start, all phases of the centre — from feasibility studies to planning and actual operation, have been guided by persons with disabilities. The new director is Ruth Warick, a former director in the Saskatchewan Public Service. Hard of hearing since birth, she is a founding member of the Canadian Hard of Hearing Association and the National Forum of the Deaf and Hard of Hearing. She is collaborating with Rick Hansen, the disabled Canadian athlete whose Man in Motion World Tour electrified this nation over two years. He is now the first incumbent of the federally and provincially funded Rick Hansen National Fellow, which was founded to ensure the continuance of his ideals and values and to provide administrative funding to advocate nationally and internationally for positive social change relating to disability.

**AS ITS DIRECTOR POINTS  
OUT, THE CENTRE'S MISSION  
IS TO ENSURE THAT ALL  
PEOPLE WITH DISABILITIES  
BE GIVEN EQUAL  
OPPORTUNITY TO BENEFIT  
FROM, AND PARTICIPATE  
FULLY IN, ALL THAT POST-  
SECONDARY INSTITUTIONS  
HAVE TO OFFER.**

"UBC is probably as good as most universities right now," Rick Hansen says, "but from where we could be, there's a long way to go. Once UBC is brought up to speed, then we can begin to work on a plan to move outside this campus and start interacting with other universities and colleges."

Ruth Warick is hiring six coordinators to oversee areas of barrier-free access, advocacy, employment, information, service and research as they affect people with mobility, visual, hearing, learning and mental disabilities. The centre will set up databases of national and international contacts to pinpoint information on disability issues and has already distributed information packages about its unique role to 170 Canadian academic institutions, seeking their cooperation.

As its director points out, the centre's mission is to ensure that all people with disabilities be given equal opportunity to benefit from, and participate fully in, all that post-secondary institutions have to offer. It will encourage the university to channel important leadership resources back into the community in terms of education, awareness and research in the field of disability.

**THE CENTRE AND THE NATIONAL FELLOW** have similar yet distinct mandates and were funded separately. The B.C. and federal governments, corporate and individual donors have created a \$6.4 million endowment fund to finance the centre and permanently house it in the new Student Services Building in 1992. Earlier, the

two senior levels of government had provided \$4 million to endow the fellowship.

Among Rick Hansen's priorities is to see the integration of disabled athletes at such multi-sports competitions as the Commonwealth and Olympic Games; he heads an international committee on that issue. He is chair of Independence '92, an international congress on disability scheduled for Vancouver in April, 1992, an event expected to attract nearly 8,000 participants from around the globe. He also chairs the Planning Committee for the International Conference on Post-Secondary Education being planned for 1994-95.

As chair of the Advisory Committee to the Disability Resource Centre, Rick Hansen says, "Our greatest human-resource potential exists in universities and colleges across Canada. We need to develop a process that will instill a greater sense of responsibility and commitment to the issues of disability. The impact of this centre over the next decade, as it relates to the independence, self-esteem and dignity of people with disabilities will be profound."

## *First Nations Health Care Professions Program*

**FOR MANY YEARS, UBC HAS BEEN GRADUATING** First Nations students in law, education and other professions. But until recently there has been virtually no one of Native Indian ancestry involved in any of the health-science disciplines; of 35 First Nations doctors in Canada, not one originates from B.C. Now, however, the university has launched an active First Nations Health Care Professions Program and at least 17 students are enrolled in relevant departments.

There are four students in Social Work and Nursing, six in Science (five pre-meds and one pre-dentistry), and one in third-year medicine who will be the first Native to graduate from UBC's Faculty of Medicine. In addition, there are two graduate students who are setting precedents: one candidate is completing a Master's in Health Administration and the other has just started the PhD program in Counselling Psychology.

Angie Todd-Dennis, a member of the Carrier Nation, is coordinator of the program which began in 1988. She earned her Bachelor of Education in UBC's Native Indian Teacher Education Program; a former mayoralty candidate in Vancouver, she received the Professional Native Women's Association Gold Feather Award for her work in the Native community and as founding president of the association.

The pilot project, fully funded under the President's Office, falls under the umbrella of UBC's First Nations House of Learning, which has been offering counsel and support for all Native students on campus while forging links with First Nations people in the community. The coordinator works with an advisory committee composed of community representatives, university faculty and interested health professionals. An admissions review committee is exploring reasons why Native students are under-represented in the Faculty of Medicine. A curriculum committee recommendation has led to the launch of a credit course in biology that will focus on First Nations health and science issues.

Mentors are a vital part of this program. Dr. Bruce Crawford of the Department of Anatomy volunteers his time as campus mentor to medical and pre-med students. The Faculty of Science's Associate Dean, David Holm, offers academic advice to potential First Nations science students and is the faculty

advisor to the newly formed Canadian chapter of the American Indian Science and Engineering Society. A B.C.-wide mentor program is expanding with more health-care professionals encouraging First Nations youth to enrol in the health sciences.

Angie Todd-Dennis travels throughout the province to talk to leaders of Native communities and make presentations and conduct workshops in schools and colleges with significant First Nations enrolments.

One result is the Summer Science project, an annual residential program that brings teenagers to the university for five-day sessions to pursue studies in such areas as science in the natural world. Another is Scientists in the Schools, a Ministry of Advanced Education program that uses UBC scientists and others to promote general science and technology awareness in British Columbia high schools, including First Nations communities.

The coordinator has also collaborated with the Vancouver Native Health Society to present a two-day event, Native Health Awareness Days, to educate and sensitize health-care students to Native issues and to present Native youth with First Nations health professionals as role models. Among those speaking was Dr. Thom Alcoze of Laurentian University, who inspires students with his description of the role of Native medicine:

"The ability of the earth to heal is only now starting to be recognized. This is where Native medicine begins, integrating that knowledge about the earth into a consistent integrated whole. Our whole existence as Native people, our economy, politics, social customs, language and values, depend upon how nature, or the earth, functions. Our strength is our bond with the earth. Reclaim it!"

## *Occupational Health and Safety*

**INCREASINGLY CONCERNED ABOUT THE HEALTH AND SAFETY** of the campus community, the university formed a special department to oversee these vital areas in 1985. The challenges facing the Department of Occupational Health and Safety range over several fields, from biohazardous materials, chemicals and radiation to occupational hygiene and diving, first aid and hearing conservation.

Under the direction of Dr. M. Wayne Greene, the department provides programs, services, assistance and guidance to the university community on all these aspects, based on regulations by outside agencies that govern the working environment and the use of hazardous materials. It works closely with standing university committees that make recommendations on health and safety issues:

- **THE UNIVERSITY HEALTH AND SAFETY COMMITTEE, WITH 18 MEMBERS FROM ACROSS THE CAMPUS, RECOMMENDS SAFETY POLICY IN COMPLIANCE WITH INDUSTRIAL HEALTH AND SAFETY REGULATIONS. THE COMMITTEE PUBLISHES A NEWSLETTER ON SAFETY TOPICS AND SPONSORS AN ANNUAL HEALTH AND SAFETY WEEK ON CAMPUS.**
- **FACULTY ADVISORY COMMITTEES FOCUS ON FOUR SPECIALIZED AREAS: RADIOISOTOPES AND RADIATION HAZARDS; BIOSAFETY; CHEMICAL SAFETY; AND UNDERWATER DIVING.**
- **87 SMALLER DEPARTMENT/AREA/BUILDING SAFETY COMMITTEES MONITOR EACH LOCAL UNIT'S SAFETY PROGRAM, CONDUCT INSPECTIONS, INVESTIGATE ACCIDENTS AND MAKE RECOMMENDATIONS ON SAFETY ISSUES TO THEIR HEADS OR DIRECTORS.**

The department's Biosafety Office evaluates potential risks in research projects involving biohazardous materials, trains technicians and principal investigators in biosafety, and certifies laboratory equipment as well as consulting on the design of laboratories and selecting equipment.

The Chemical Safety Program promotes the safe handling and storage of chemicals and offers information and guidance on regulations and the accepted practices for proper chemical use through such measures as a laboratory chemical safety course delivered at least twice a year. A Chemical Waste Processing Facility collects and disposes of UBC's chemical and biohazardous waste in accordance with local and federal regulations.

A safety program for university personnel involved in occupational diving — in such departments as Oceanography, Botany, Zoology and Occupational Health and Safety — evaluates divers medically, assesses their fitness, checks them out in open water, reviews their rescue capabilities, orients them to available emergency equipment and UBC procedures, and gives them a comprehensive written exam.

The Occupational Hygiene Program recognizes, evaluates and controls those workplace environmental factors such as chemical or noise exposure that can affect faculty, staff or students. Among its activities: asbestos control; training in a variety of areas, from back injury prevention to respiratory protection; indoor air quality control; and an annual performance survey of laboratory fume hoods.

The Radiation Protection Program helps ensure the safe and knowledgeable use of radiation sources in research, teaching and the university environment, licensing research areas on and off the campus; monitoring personnel for radioactive-iodine contamination; and training staff, laborers, fire fighters and summer students.

The department is committed to providing everyone on campus with access to First Aid facilities. Among the highlights of this program: training of hundreds of faculty and staff as Survival First Aid attendants; ensuring of nurses and industrial First Aid attendants in Student Health Services, the Chemistry Department and Plant Operations; and publishing of a quarterly newsletter, *Vital Signs*, to keep the university community current.

Using the department's own hearing booth and audiometer, the Hearing Conservation Program tests UBC workers and University Hospital maintenance employees and offers advice on hearing-protection equipment.

**THE DEPARTMENT'S  
BIOSAFETY OFFICE  
EVALUATES POTENTIAL RISKS  
IN RESEARCH PROJECTS  
INVOLVING BIOHAZARDOUS  
MATERIALS, TRAINS  
TECHNICIANS AND  
PRINCIPAL INVESTIGATORS  
IN BIOSAFETY, AND CERTIFIES  
LABORATORY EQUIPMENT AS  
WELL AS CONSULTING ON  
THE DESIGN OF  
LABORATORIES AND  
SELECTING EQUIPMENT.**

## *Biomedical Communications*

**IT WAS A REMARKABLE FIRST** for the Biomedical Communications Department: In 1986, the department transmitted a heart operation and knee surgery by satellite from the UBC Medical Centre to 250 physicians in Jinan, China. The two-hour transmission, which cost \$6,000, demonstrated anew that UBC has one of the most sophisticated health-care communications systems in the world.

The department has sent video images of x-rays, CAT-scans and ultrasound

images via telephone to such distant centres as Toronto, with the quality better than the original because contrast and brightness could be controlled. It has produced videotapes for cancer patients, an award-winning series on epilepsy and a five-part series on blind children. And its video communications system in the Northwest Territories promises to bring better health care to more than 50 remote communities.

As a media production facility within the Faculty of Medicine, Biomedical Communications has units on site in each of UBC's teaching hospitals, and a professional staff provides medical and graphic art, and photographic, audiovisual and television services.

The Art Division provides a range of graphic services to meet the teaching, publication and presentation needs of the health-sciences community, from desktop publishing to medical illustrations of new surgical techniques for use as teaching slides, journal and text publications, TV and film. Computer-generated 35-mm bioslides can be created from virtually any graphics software package on state-of-the-art imaging equipment.

The department's professional photography staff do clinical and surgical documentation and such educational and administrative-related work as audiovisual productions and annual reports. The AV division's staff in each teaching hospital provides technical equipment and expertise for audio-visual presentations and viewing; duplicates video, film and slides; and repairs equipment. A television production division creates media programs (video, slide or audio) for research and in-service purposes and patient-education programs for the teaching hospitals and UBC Health Sciences. And a biomedical media library collection, *Healthmedia*, includes more than 800 existing programs on various health-related topics.

The Special Projects Division produces health-care videos — from documentary and public information to training and professional development programs — for such clients as pharmaceutical companies, the Canadian National Institute for the Blind and the B.C. Ministry of Health. Among its programs that have won top prizes in international video festivals are *Cancer: Its Treatment and Cure* and *One in a Hundred*, about childhood epilepsy.

Director Ian Cameron says Biomedical Communications' strength is in delivering information to health professionals in a hurry through two-way audio and visual links among teaching hospitals. Recently, a color video fax has been transmitting high-resolution signals between nurse-practitioners in the far north and hospitals in Yellowknife, NWT, and Vancouver. The images are so clear that nurses can transmit live images of patients for dermatology exams or send x-rays for immediate analysis. "Patients are often sent to Yellowknife by medivac flight and that can cost between \$5,000 and \$25,000 a trip," the director says. "With the color video fax system, the diagnosis can be done remotely, saving thousands of dollars. Officials in the Northwest Territories view its potential as a major breakthrough in health-care communications." ■

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# XVIII. Fund Raising in the Health Sciences

**THE WORLD OF OPPORTUNITY CAMPAIGN** to raise funds for UBC began in 1988 and will continue in an active phase until the end of 1992. By then we expect to have reached a campaign goal of \$250-million in private donations and matching provincial government funds. In the realm of the health sciences, we have raised funds for academic chairs and scholarships in many disciplines and for building projects. Some of these endeavors are fully funded and we plan to have the rest funded before the campaign ends. We will then continue our annual fund-raising activities, in such important areas as the health sciences, in collaboration with the UBC faculties. The private, corporate and institutional gifts described below have been matched by the Province of B.C. University Matching Program.

## *The Faculty of Medicine*

Neuroscience has had a long and distinguished history at UBC and continues to be a focus of research, bringing in \$7 million a year in research grants. The Faculty of Medicine will develop a Brain Research Centre on campus, building on strengths at the University Hospital-UBC Site and in the faculties of Pharmaceutical Sciences, Science, Arts and Dentistry. Four chairs in neuroscience will enhance the centre's research activity.

**JACK BELL**

### **CHAIR IN SCHIZOPHRENIA**

In 1987, UBC researchers found the first chromosomal abnormality in schizophrenic patients, a finding that launched investigations elsewhere in the world into the genetic components of the disease. Now, funds contributed

by Jack Bell, Robin Endres and the B.C. Friends of Schizophrenics will endow this Chair to expand research and teaching programs in the diagnosis and treatment of schizophrenia.

**LOUISE A. BROWN**

### **NEUROSCIENCES RESEARCH CHAIR**

**MARIANNE KOERNER**

### **CHAIR IN BRAIN DISEASES**

The establishment of these two Chairs will allow the university to strengthen, consolidate and expand its internationally recognized program in brain research. The Louise A. Brown Chair has been endowed by an anonymous donor. The Marianne Koerner Chair has been endowed by Walter Koerner.

### **ALCAN CHAIR**

#### **IN NEUROSCIENCES**

This Chair, funded by Alcan Aluminum, will be a major force in helping to establish the Brain Research Centre with its mission of understanding a host of diseases affecting the nervous system and developing better ways to manage these illnesses.

### **CHAIR IN CARDIOLOGY**

Cardiovascular diseases still account for more than half the deaths in Canada despite recent improvements in treatment and prevention. The Chair has been endowed by gifts from the B.C. and Yukon Heart Foundation, the Pacific Open Heart Foundation and members of UBC's Division of Cardiology.

### **SAUDER FAMILY CHAIR**

#### **IN PEDIATRIC INFECTIOUS DISEASES**

This Chair will ensure the continuing success of UBC's work to diagnose, treat and prevent serious infections in children. It will also permit the appoint-

ment of a senior scientist to provide leadership to the University's Vaccine Evaluation Centre. The William Sauder family in partnership with International Forest Products Ltd. has fully endowed the Chair.

**C.N. WOODWARD  
CHAIR IN SURGERY**

This Chair will foster more active participation of surgeons in new and innovative research and enable them to continue to improve patient care. Potential specific areas of research include: transplantation surgery; trauma; cancer; cardiovascular disease; burns; plastic and reconstructive surgery; pediatric surgery; neurosurgery; and urology. The Chair is fully endowed by gifts from the Woodward family and the Vancouver Foundation.

**E.W. HAMBER  
CHAIR IN MEDICINE**

Created for the head of the Department of Medicine and previously funded by annual donations from the Hamber Foundation, the Chair has been converted into an endowment.

**DR. JEAN TEMPLETON HUGILL  
CHAIR IN ANESTHESIA**

High-risk patients in teaching hospitals require sophisticated techniques for the careful monitoring of vital signs, the administration of anesthetics, and the management of pain. This Chair will provide a focus for anesthesiology research and will facilitate the development of exemplary programs of teaching and research. It has been fully endowed by gifts from an anonymous donor.

**MARY PACK - ARTHRITIS SOCIETY  
CHAIR IN RHEUMATOLOGY**

This Chair will allow the Rheumatic Disease Unit at UBC and the Division of Rheumatology in the Faculty of Medicine to hire a clinical scientist who will foster increased understanding of the scientific

basis for clinical management of the rheumatologic diseases. The Chair has been funded by the Arthritis Society.

**HAROLD ROBINSON -  
ARTHRITIS SOCIETY CHAIR IN  
ARTHRITIC DISEASES**

A 1987 report, commissioned by the Arthritis Society, concluded that there was not enough rheumatological research in Canada by scientists in professional fields allied to medicine. This Chair will allow us to hire a clinical scientist to conduct research within the School of Rehabilitation Medicine and to promote collaborative research with other scientists and clinicians. The Chair has been funded by the Arthritis Society.

**RHEUMATOLOGY  
RESEARCH ENDOWMENT**

Historically there have been close ties between UBC and the Arthritis Society, which operates an Arthritis Centre whose professional staff members have clinical appointments in the Faculty of Medicine. The centre has provided rotations for hundreds of students in medicine and the allied health sciences. Staff at the centre have cooperated with clinical scientists in the Rheumatic Disease Unit at UBC in fostering interdisciplinary research. This Endowment, created with a gift from the Arthritis Society, will support activities associated with the Harold Robinson Chair.

**PROFESSORSHIPS IN OCCUPATIONAL  
AND ENVIRONMENTAL HEALTH**

These two Professorships will enable the Department of Health Care and Epidemiology to expand its teaching and research, strengthening the epidemiological component of health studies for graduate students.

**CHAIR IN AIDS**

Together, UBC and St. Paul's Hospital have created a leading national and international research program in AIDS.

This Chair at UBC, likely the first in Canada, will allow the recruitment of a leading scientist to further our AIDS treatment, research and teaching.

CHAIR IN AUDIOLOGY  
AND SPEECH SCIENCES

The Chair will have two mandates: to implement research and training in adult language disorders and to strengthen the reputation of the School of Audiology and Speech Sciences for scholarship in communication disorders.

S.M. DRANCE CHAIR  
IN OPHTHALMOLOGY

Members of the UBC Department of Ophthalmology proposed this Chair to honor the achievements of Dr. Stephen Drance, who was head of the department during the critical stages of its development. Because of Dr. Drance's long-standing interest in research, it is planned that the Chair will bridge the gap between basic and clinical sciences.

*The Faculty of Dentistry*

DR. S. WAH LEUNG ENDOWMENT

In honor of its first dean, the Faculty of Dentistry has established this Endowment to support the educational and research programs begun by Dr. Leung, with emphasis on caring for the special needs of students, encouraging new and innovative approaches to teaching and research, and promoting measures to improve dental health throughout the world.

CHAIR IN GERIATRIC DENTISTRY

The Chair in Geriatric Dentistry is a major clinical and research effort to understand the effect of aging on oral tissues, improve diagnostic and treatment procedures for oral cancer and other oral lesions and develop new materials for dental restoration. This Chair is an essential step in achieving these goals.

*The Faculty of  
Pharmaceutical Sciences*

CHAIR IN PHARMACY  
ADMINISTRATION

In recent years, the Faculty of Pharmaceutical Sciences has begun to shift its resources to give greater emphasis to instruction and research in pharmacy administration. This Chair will permit the recruitment of a new faculty member and the initiation of a graduate program in this area of pharmaceutical education.

THE SHOPPERS DRUG MART  
PROFESSORSHIPS IN  
CLINICAL PHARMACY

These two Professorships provide the Faculty of Pharmaceutical Sciences the opportunity to expand clinical research in the treatment and prevention of childhood diseases. The persons named to the Professorships will interact between the Faculty of Pharmaceutical Sciences and the Department of Pediatrics in the Faculty of Medicine. The Professorships have been funded by Imasco to enhance the education of B.C.'s community pharmacists.

*The School of Nursing*

ELIZABETH KENNY MCCANN

CHAIR OR PROFESSORSHIP IN  
NURSING PRACTICE AND RESEARCH

Established in recognition of a former faculty member and acting director of the School of Nursing, this chair or Professorship will influence all of the school's programs. In particular, it will enhance the school's developing program of research and the scope and quality of the doctoral program.

*The Faculty of Education*

DOROTHY LAM CHAIR  
IN SPECIAL EDUCATION

Children with special needs, whether in special schools or mainstreamed in regu-



lar classes, have the right to be educated to the best of their abilities and in the least restrictive environment possible. The Chair will initiate and coordinate research programs in the Faculty of Education and in other relevant departments, with a view to addressing the effects of mainstreaming on the intellectual and social development of all school-aged children. The Chair has been endowed by gifts from David Lam and the Faculty of Education.

CHRIS SPENCER FOUNDATION  
PROFESSORSHIP IN DYSLEXIA

Recognizing the need for more comprehensive study in the changing field of dyslexia, the university has approved this Professorship. The incumbent will develop liaisons with the Faculty of Medicine and the School of Rehabilitation Medicine to coordinate research activities and will work within the school system to develop programs that will effectively meet the needs of dyslexic children. The Professorship has been funded by the Chris Spencer Foundation.

*The Faculty of  
Agricultural Sciences*

FOOD QUALITY  
AND MANAGEMENT CENTRE

This centre will be created to focus research, technology transfer and professional education programs in areas critical to enhancing the quality, safety and marketability of food products both domestically and internationally. The following two Chairs will be part of the centre.

CHAIR IN FOOD PROTECTION

The incumbent for this Chair will undertake research and teaching programs on food microbiology, toxicology and nutritional value as these pertain to food processing, manufacturing, wholesaling, retailing and serving.

CHAIR IN FOOD MARKETING

Research and teaching programs in the management aspects of food processing, wholesaling and retailing will be the mandate of this Chair. The incumbent will coordinate training and management courses for food-industry executives and managers.

*The Office of the Coordinator  
of Health Sciences*

CENTRE FOR HEALTH SERVICES  
AND POLICY RESEARCH

This centre, described in detail elsewhere in this report, is seeking a \$3-million endowment.

*The Faculty of Graduate  
Studies*

PROFESSORSHIP

IN HEALTH PROMOTION

This Professorship is being established to examine non-medical factors that affect health. Its purposes are to determine how environmental, lifestyle, social and economic factors combine with biomedical factors in causing illness, and to develop methods for promoting health through education and behavior modification.

WORKERS' COMPENSATION

BOARD APPLIED RESEARCH AND  
EDUCATION ENDOWMENT FUND

The Workers' Compensation Board has funded this endowment to create three Chairs in the Faculty of Graduate Studies. The balance of the annual income from the Fund will provide the operating capital for programs and research in occupational safety and health. The first project will be a masters program in Occupational Hygiene.

## *The Faculty of Science*

### SAUDER FAMILY CHAIR

#### IN VIRAL DISEASES OF CHILDREN

Endowed by gifts from the Sauder family in partnership with International Forest Products Ltd., this Chair will allow UBC to make progress in its search for treatments for the debilitating viral diseases that affect children.

### CHAIR IN

#### SPINAL CORD PHYSIOLOGY

Since UBC is ideally positioned to become an international centre for the repair of brain and spinal cord injuries, this Chair will attract an outstanding neuroscientist to pursue research in spinal cord regeneration.

### GOBIND KHORANA CHAIR

#### IN BIOLOGICAL CHEMISTRY

Named for Nobel Prize winner Dr. Gobind Khorana, who did his early research on the genetic code at UBC and at the B.C. Research Council, this Chair will foster interdisciplinary research in biochemistry, chemistry, biotechnology and biomedicine.

## *The Centre for Applied Ethics*

The Centre for Applied Ethics, funded by an endowment from the Bentall Foundation, Western Pulp Limited Partnership and George O'Leary, will comprise three academic Chairs and an endowment to support research and special projects. Funding is being sought for a Chair in Biomedical Ethics, but the following two Chairs are fully funded.

### PATRICIA F. RODGERS

#### CHAIR IN APPLIED ETHICS

Issues of applied ethics are rapidly gaining international attention, with increasing concerns expressed in the medical-science areas of biotechnology and genetic engineering. This Chair has been funded by Robert C. Rodgers in memory of his wife.

### MAURICE YOUNG

#### CHAIR IN APPLIED ETHICS

Dr. Michael McDonald, a member of the board of directors of the Canadian Centre for Ethics and Corporate Policy established in Toronto by leading members of the business community, is the holder of this Chair, which is the gift of W. Maurice Young.

## *Other Campaign Results*

### DISABILITY RESOURCE CENTRE

#### AND THE RICK HANSEN

#### NATIONAL FELLOW ENDOWMENT

The B.C. and federal governments and corporate and individual donors have created an endowment fund to finance the Disability Resource Centre and permanently house it in the new Student Services Building in 1992. The two levels of government have also endowed the Rick Hansen Fellowship, providing funds to pay the salary of the incumbent and administrative funds so that he can advocate nationally and internationally for positive social changes relating to disability. ■

## XIX. *New Frontiers in the 90s*

IN THIS REPORT I HAVE PLACED BEFORE YOU THE PANORAMA OF OUR HEALTH-SCIENCES RESEARCH AND TEACHING. THE HEALTH SCIENCES AT UBC — IN WHICH I INCLUDE BIOMEDICAL RESEARCH ON THE ONE HAND AND HEALTH CARING ON THE OTHER — RANGE WIDELY OVER 10 FACULTIES AND FIVE SCHOOLS. THEY INVOLVE SEVEN TEACHING HOSPITALS WITH WHICH WE HAVE REWARDING AFFILIATIONS. THEY KNOW NO ACADEMIC BOUNDARY, BEING THE CONCERN OF MANY DISCIPLINES AND DEPARTMENTS. THEY ARE FOSTERED BY MULTI-DISCIPLINARY COLLABORATIONS WHICH EXIST ON OUR CAMPUS AS FORMAL NETWORKS, CENTRES AND INSTITUTES AND IN THE INFORMAL ASSOCIATIONS OF COLLEAGUES WITH SIMILAR INTERESTS. BUT MOST IMPORTANT, THEY SPRING FROM FACULTY MEMBERS WHOSE DESIRE TO DIMINISH THE UNKNOWN IS THE SOURCE OF INVESTIGATION THAT PROPELS OUR TEACHING PROGRAMS, OUR RESEARCH, OUR SERVICE TO THE COMMUNITY AND OUR CONTRIBUTION TO HUMAN WELL-BEING. THE TEACHING AND RESEARCH RANGES FROM BASIC, FUNDAMENTAL SCIENCE TO APPLIED SCIENCE, AND EACH INFORMS THE OTHER IN A CONTINUOUS SPECTRUM. THE TEACHING AND RESEARCH ALSO RANGES FROM BIOLOGICAL SCIENCE TO SOCIAL SCIENCE AND, AGAIN, THERE IS NO BOUNDARY AS EACH INFORMS THE OTHER.

WHEN WE CONSIDER WHAT HAS BEEN ACCOM-

PLISHED IN A VERY FEW DECADES IN OUR FACULTIES OF MEDICINE, DENTISTRY AND PHARMACEUTICAL SCIENCES, COMPLEMENTED BY THE ACTIVITIES IN OTHER FACULTIES LIKE GRADUATE STUDIES AND SCIENCE; WHEN WE CONTEMPLATE THE LONG-STANDING ACHIEVEMENTS OF OUR SCHOOL OF NURSING AND THE MORE RECENT CONTRIBUTIONS OF OUR SCHOOLS OF REHABILITATION MEDICINE, AUDIOLOGY AND SPEECH SCIENCES, SOCIAL WORK, AND FAMILY AND

*...we can say with*

*confidence that we*

*are truly*

*B.C.'s centre of*

*teaching and research*

*in the*

*health sciences..*

NUTRITIONAL SCIENCES; WHEN WE SEE OUR FACULTY MEMBERS CHOSEN FOR PRESTIGIOUS NATIONAL SCIENTIFIC NETWORKS, WE CAN SAY WITH CONFIDENCE THAT WE ARE TRULY B.C.'S CENTRE OF TEACHING AND RESEARCH IN THE HEALTH SCIENCES.

OUR FIVE-YEAR WORLD OF OPPORTUNITY CAMPAIGN, LAUNCHED IN 1988, HAS ALREADY HAD A MAJOR

IMPACT ON OUR BIOMEDICAL AND HEALTH-CARE RESEARCH AND TEACHING, HELPING US TO REINFORCE WHAT IS ALREADY EXCELLENT. AS NUMEROUS CHAIRS, PROFESSORSHIPS AND ENDOWMENTS WERE FUNDED BY GENEROUS INDIVIDUALS, CORPORATIONS AND SOCIETIES AND WITH MATCHING PROVINCIAL GOVERNMENT FUNDS, WE HAVE BEGUN TO FILL THESE NEWLY CREATED FACULTY POSITIONS WITH WORLD-CALIBRE SCIENTISTS WHOSE EXPERTISE WILL HELP US BUILD ON OUR STRENGTHS. BEFORE THE CAMPAIGN ENDS, WE EXPECT TO HAVE FUNDED CLOSE TO 24 CHAIRS, SIX PROFESSORSHIPS AND FIVE

ENDOWMENTS IN HEALTH SCIENCES DISCIPLINES. INTELLECTUAL ENDEAVOR AND SCIENTIFIC RESEARCH REQUIRE SPACE, AND OUR PLANNED PHYSICAL DEVELOPMENT TAKES THAT INTO ACCOUNT:

- AS PART OF BIOTECHNOLOGY PHASE 1, THE CENTRES OF EXCELLENCE BUILDING IS NOW OPEN. THE PROVINCIAL GOVERNMENT IS PROVIDING GENEROUS INFRASTRUCTURE SUPPORT FOR THE NATIONAL NETWORKS OF CENTRES OF

EXCELLENCE, WHICH WILL LEASE SPACE THERE FOR THE THREE NETWORKS HEADQUARTERED ON CAMPUS.

- WE HAVE LAUNCHED A \$1.2-MILLION RENOVATION TO AND EXPANSION OF THE FACILITIES OF THE FACULTY OF DENTISTRY.

- WHEN THE JACK BELL RESEARCH CENTRE AT VANCOUVER GENERAL HOSPITAL IS TRANSFERRED TO THE UNIVERSITY, IT WILL BE INCORPORATED IN OUR 10-YEAR PLAN FOR CAPITAL DEVELOPMENT AND REQUIRE ADDITIONAL SUPPORT TO COMPLETE ITS DEVELOPMENT.

- THE SECOND PHASE OF THE BIOTECHNOLOGY LABORATORY IS EXPECTED TO BEGIN IN 1993 AS PART OF UBC'S CAPITAL PLAN, NOW SUBMITTED TO THE PROVINCIAL GOVERNMENT.

- AS PART OF THE BIOTECHNOLOGY LABORATORY, WE PLAN TO BUILD AN EXTENSION TO HOUSE A NATIONAL UNIVERSITY OF SINGAPORE RESEARCH-EXCHANGE LABORATORY.

- AS EARLY AS 1996, OUR CAPITAL PLANS, SUB-

MITTED TO THE GOVERNMENT, CALL FOR A MAJOR EXPANSION OF OUR HEALTH SCIENCES FACILITIES TO MAKE BETTER USE OF EXISTING SPACE AND TO PROVIDE SUITABLE ACCOMMODATION FOR BOTH BIOMEDICAL RESEARCH AND THE HEALTH-CARING DISCIPLINES.

- WITH HOSPITALS INCREASINGLY INVOLVED IN TEACHING AND RESEARCH, WE WILL HELP THEM PLAN FOR ANY ADDITIONAL SPACE THAT THEY MAY NEED TO FULFIL THEIR ROLE AS FULL PART-

*...we expect to have funded close*

*to twenty four*

*chairs, six*

*professorships and*

*five endowments in*

*health sciences*

*disciplines.*

NERS IN THE ENDEAVOR WITH THE UNIVERSITY. FINANCIAL SUPPORT FOR SUCH SPACE WILL COME FROM THE MINISTRY OF HEALTH, THE HOSPITALS THEMSELVES AND THEIR FOUNDATIONS. THIS SPACE WILL BE DEVELOPED IN ACCORD WITH THE ACADEMIC PLANS NOW BEING DEVELOPED BY THE DEAN IN CONSULTATION WITH ALL THOSE INVOLVED AND ITS INTEGRATION WILL BE SUBJECT TO ANNUAL REVIEW AND APPROVAL BY THE DEAN.

AS WELL AS THESE DEVELOPMENTS, OTHER PROPOSALS TO EXPAND OUR HEALTH SCIENCES FACILITIES ARE UNDER ACTIVE CONSIDERATION. THE NEWLY CREATED UBC REAL ESTATE CORPORATION IS CONDUCTING A FEASIBILITY STUDY FOR AN AMBULATORY CARE CENTRE THAT WOULD BE FULLY OR PARTIALLY SELF-FUNDING. SIGNIFICANT CHANGES ARE CONTEMPLATED AT THE BIOMEDICAL RESEARCH CENTRE ON CAMPUS AS IT IS BEING FULLY INTEGRATED INTO THE UNIVERSITY. IT WILL CONTINUE TO FOCUS ON ITS

ORIGINAL MISSION TO ENHANCE PHARMACEUTICAL RESEARCH IN THE PROVINCE. AND DISCOVERY PARKS — ORIGINALLY ENVISAGED TO DEVELOP THE INTELLECTUAL PROPERTY OF UBC PROFESSORS IN FACILITIES ADJACENT TO THE UNIVERSITY — IS NOW IN OUR CONTROL; WE PLAN TO DEVELOP THE PARK WITH SUCH ENDEAVORS AS THE REINFORCEMENT AND EXPANSION OF PHARMACEUTICAL RESEARCH.

CONCURRENTLY WITH THESE MAJOR DEVELOPMENTS, WE ARE WORKING WITH THE PROVINCIAL GOVERNMENT TO ENSURE THAT IN FUTURE UBC IS REIMBURSED, AS UNIVERSITIES ARE IN OTHER CANADIAN JURISDICTIONS, FOR THE SUBSTANTIAL CLINICAL SERVICES WE PROVIDE TO THE TEACHING HOSPITALS AND TO THE PROVINCIAL HEALTH-CARE SYSTEM.

THE PEOPLE OF BRITISH COLUMBIA HAVE RECENTLY TOLD THE B.C. ROYAL COMMISSION ON HEALTH CARE AND COSTS THAT THE PROVINCE HAS A GOOD HEALTH-CARE SYSTEM, BUT THAT IT NEEDS FINE-TUNING TO MAKE IT FAIRER AND MORE RESPONSIVE TO THE NEEDS OF THE PEOPLE OF THE PROVINCE. THE UNIVERSITY'S ROLE IN THIS SYSTEM IS TO CONDUCT HEALTH SCIENCES RESEARCH AND TEACHING. IN MAKING THIS IMPORTANT CONTRIBUTION, WE WILL MAINTAIN A BALANCE. ON THE ONE HAND, WE SUPPORT AND TRAIN THOSE WHO EXPLORE THE DIAGNOSTIC USES OF HIGH TECHNOLOGY AND DEVELOP THE DRAMATIC REMEDIAL PROCEDURES THAT SAVE THE SERIOUSLY ILL.

ON THE OTHER, WE SUPPORT AND TRAIN THOSE WHO SEEK PRAGMATIC WAYS TO SAVE COSTS, TO MAKE HEALTH CARE ACCESSIBLE, TO PROMOTE HEALTH AND TO IMPROVE THE CARE OF THE ILL AND DISABLED.

IN THE FINAL ANALYSIS, OUR GOAL IS TO CREATE A GREAT, COMPREHENSIVE HEALTH SCIENCES TEACHING AND RESEARCH CENTRE IN B.C. WHERE THE PURSUIT OF SCIENTIFIC KNOWLEDGE IS IN EQUILIBRIUM WITH THE PURSUIT OF COM-

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PASSIONATE WISDOM. WITH THE RESOURCES OF UBC AND WITH THE CLOSE COLLABORATION OF THE TEACHING HOSPITALS, THERE CAN BE SUCH A CENTRE IN B.C. TO THIS END, WE HAVE JUST SIGNED NEW AGREEMENTS WITH OUR TEACHING HOSPITALS AND HAVE DEVELOPED A NEW RESEARCH AGREEMENT WITH B.C.'S CHILDREN'S HOSPITAL THAT WILL BE A

MODEL FOR OTHERS. WE ARE EXPLORING THE QUESTION OF LINKAGES WITH OTHER HOSPITALS TO ENSURE THAT QUALITY MEDICAL CARE IS AVAILABLE TO ALL IN THE PROVINCE. BUOYED BY THIS RENEWED SPIRIT OF COOPERATION AND COLLABORATION, WE LOOK FORWARD TO PLAYING OUR ROLE IN THE COMING DECADE TO ENSURE THAT THE PEOPLE OF THIS PROVINCE ENJOY THE BEST POSSIBLE HEALTH AND HEALTH CARE.

# *Acknowledgements*

**THE UNIVERSITY OF BRITISH COLUMBIA:  
B.C.'S CENTRE OF TEACHING AND  
RESEARCH IN THE HEALTH SCIENCES**

WAS PRODUCED BY  
THE UBC COMMUNITY RELATIONS OFFICE

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P. 53

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P. 86

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