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NASA

Aerospace Medicine and Biology

A Continuing Bibliography with Indexes

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November 1983

25

25th Anniversary
1958-1983

(NASA-SP-7011(251)) AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 251) (National Aeronautics and Space Administration) 95 p HC A05/MF A01 CSCL 06E 00/52 N84-13767 Unclas 43232

Aerospace Medicine and Biology

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ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges.

STAR (N-10000 Series)	N83-30354 - N83-32706
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NASA SP-7011(251)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 251)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in October 1983 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

NASA Scientific and Technical Information Branch 1983
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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 322 reports, articles and other documents announced during October 1983 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA).* The first issue of the bibliography was published in July 1964.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged by *STAR* categories 51 through 55, the Life Sciences division. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. The *IAA* items will precede the *STAR* items within each category.

Six indexes -- subject, personal author, corporate source, contract, report number, and accession number -- are included

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1983 Supplements.

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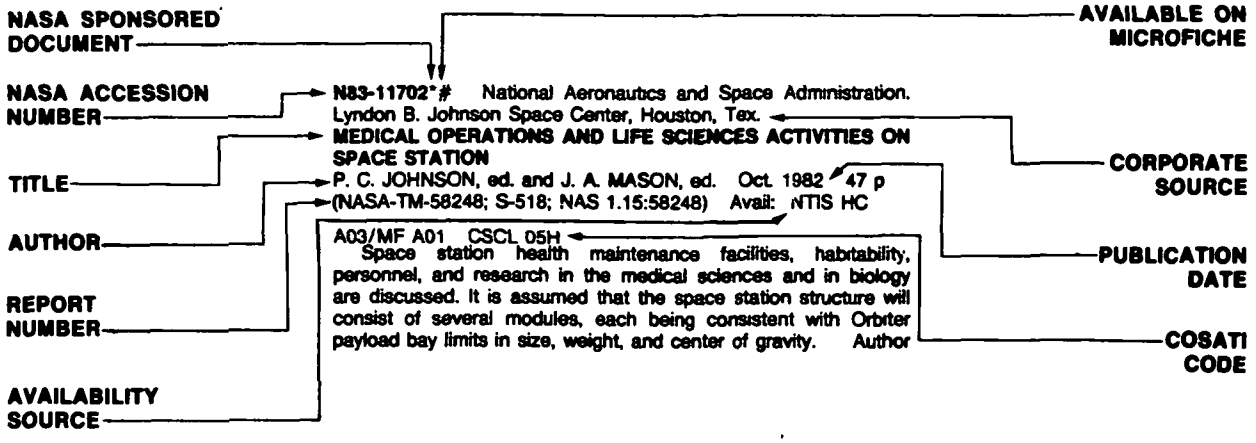

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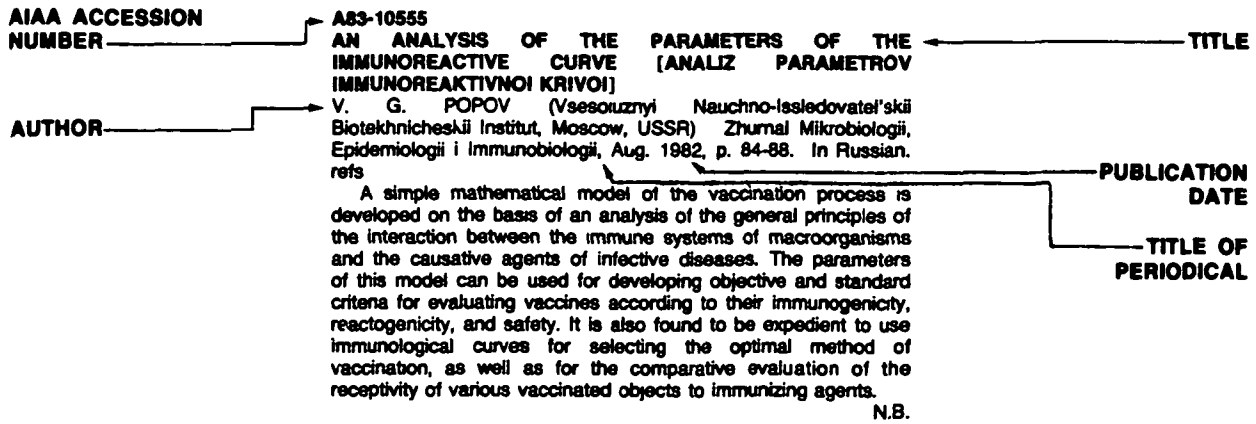

AEROSPACE MEDICINE AND BIOLOGY

(A Continuing Bibliography (Suppl. 251)

NOVEMBER 1983

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LIFE SCIENCES (GENERAL)

Includes genetics

A83-40810
INDUCTION AND DEDUCTION AS THE FUNCTION OF DIFFERENT HEMISPHERES [INDUKTSIIA I DEDUKTSIIA KAK FUNKTSII RAZNYKH POLUSHARII]
V L BIANKI (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, May 1983, p. 597-605 In Russian refs

The lateralization of fundamental processes of higher nervous activity was investigated in rats using the method of the motor-food conditioned reflex and the electrical-defensive method of active avoidance The models used in this study were the formation of a conditioned reflex, the generalization and specialization of a conditioned reflex, the dynamic stereotype, the synthesis of a visual image, and the conditioned reflex to complex stimuli Primary and secondary analysis and the synthesis of stimuli were distinguished Induction and deduction were considered as definite consequences in the time of analysis and synthesis It is shown that the left hemisphere primarily performs the primary analysis and the secondary synthesis, while the right hemisphere performs the primary synthesis and the secondary analysis It is concluded that the left hemisphere of the animals primary processes the information according to the principle of induction (from the particular to the general), while the right hemisphere reflects the influence of the environment on the principle of deduction (from the general to the particular). N B

A83-40811
THE EFFECTS OF THE ELECTRICAL STIMULATION OF THE VISUAL CORTEX OF CATS ON THE BEHAVIORAL MODEL OF THE PLACEMENT OF A PAW ON A SUPPORT [EFFEKTY ELEKTRICHESKOGO RAZDRAZHENIIA ZRITEL'NOI KORY MOZGA KOSHKI NA POVEDENCHESKOI MODELI POSTANOVKI LAPY NA OPORU]
V B POLIANSKII, O I LIAMIN, and G L RUDERMAN (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, May 1983, p 606-613 In Russian refs

The relationship of the latent period and the probability of the reaction of the placement of a paw on a support with the parameters of the electrical stimulation of the visual cortex (the duration of the pulse, the frequency in a series, the number of impulses in a series, and the current voltage) was investigated using 5 alert cats. The values of the current parameters were the same as those which produced phosphenes in humans Results show that the phosphenes and the motor reactions of the cats depend on the current parameters It is also determined that the addition of sound or electrodermal stimulation to the current decreases the threshold of the motor reaction to the current and increases its probability This reaction is particularly expressed in the case of weak and medium-intensity currents when the probability of correct responses to the current is low N B

A83-40812
THE DEPENDENCE BETWEEN SPATIAL AND SPATIAL-FREQUENCY CHARACTERISTICS OF THE RECEPTIVE FIELDS OF THE VISUAL CORTEX IN CATS [O ZAVISIMOSTI MEZHDU PROSTRANSTVENNYMI I PROSTRANSTVENNO-CHASTOTNYMI KHARAKTERISTIKAMI RETSEPTIVNYKH POLEI ZRITEL'NOI KORY KOSHKI]
V D GLEZER, V E GAUZELMAN, and T A SHCHERBACH (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, May 1983, p 614-622 In Russian refs

Spatial (the size and the eccentricity) and spatial-frequency (the optimal frequency and the bandwidth) characteristics of the receptive fields of the visual cortex were studied in experiments using cats Based on predictions of piecewise Fourier analysis, it is shown that the linear and quasi-linear receptive fields of the same size constitute a module in every field in which the complexity index (the ratio of the size of the field to the number of periods of its optimal frequency) equals the optimal frequency multiplied by a coefficient constant for a given module Five modules were found with field sizes of 2 6, 3 8, 5 2, 6 2, and 7 2 deg, moving toward the periphery of the visual field as the size of the module increases According to the predictions, the bandwidth decreases in reverse proportion to the size of the field in the case of a fixed index of complexity The results obtained directly confirm the hypothesis that the receptive fields carry out piecewise quasi-Fourier expansion of an image N B

A83-40813
THE CHANGE IN THE IMPULSE ACTIVITY OF BULBAR RESPIRATORY NEURONS IN CONDITIONS OF ACUTE HYPOXIA [IZMENENIE IMPUL'SNOI AKTIVNOSTI BUL'BARNYKH DYKHATEL'NYKH NEIRONOV V USLOVIIAKH OSTROI GIPOKSII]
N S AKOPIAN, O G BAKLAVADZHIAN, and M A. KARAPETIAN (Erevanskii Gosudarstvennyi Universitet, Yerevan, Armenian SSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, May 1983, p 623-629 In Russian refs

It is found that in conditions of acute hypoxia, the changes in the background activity of the respiratory neurons of rats have a phasic character. In the early stages of hypoxia (at a simulated altitude of 4000-5000 m), the frequency of the volley discharge of inspiratory and expiratory neurons increased, while at the maximum simulated altitude (8000-9000 m) this frequency decreased After the descent from the simulated altitude, the background activity of the respiratory neurons was restored A comparative analysis of the stability of respiratory neurons to hypoxia shows the high resistance of inspiratory neurons in comparison with expiratory neurons, which was expressed in the whole reaction of the respiratory system, i e , the greater stability of the inspiratory phase At a simulated altitude of 8000-9000 m, the inspiratory neurons were revealed, which has been in an inhibited state during conditions of normoxia, but were activated during acute oxygen demand N B.

A83-40814
THE CHARACTERISTICS OF THE AGGREGATION OF ERYTHROCYTES IN VARIOUS ANIMALS AND IN HUMANS [OSOBENNOSTI AGREGATSII ERITROTSITOV U RAZNYKH ZHIVOTNYKH I CHELOVEKA]
V A LEVTOV and I. V POTAPOVA (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, May 1983, p 660-665 In Russian refs

The problem of the adaptive role of erythrocyte aggregation was investigated by comparing the expression of erythrocyte aggregation in mammals occupying different positions in the evolutionary scheme. The aggregation of erythrocytes was determined in blood tests for 25 healthy humans and for 10 species of animals, including cats, dogs, rats, guinea pigs, rabbits, and goats The species characteristics of the erythrocyte aggregation were changed by adding high molecular weight polyoxyethylene to the blood plasma The nature of the species differences in the erythrocyte aggregation, the characteristics of the cell membranes, and the differences in the electrical charge of the cell membranes were examined It is found that the table of these mammalian species, grouped according to the characteristics of erythrocyte aggregation, does not conform to the general evolutionary scheme. N B

A83-40815
THE MECHANISM OF THE HEART DIASTOLE [O MEKHANIKE DIASTOLY SERDTSA]
V. N FATENKOV (Meditsinskii Institut, Kuibyshev, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, May 1983, p. 666-671 In Russian refs

The mechanical activity of the muscles which form the walls of the heart ventricles is studied during diastole in dogs In the first of two series of experiments, the EKG parameters, the tensocardiogram of the external oblique and circular muscles, the aortic pressure, and the pressure in the left and right ventricles were examined. In the second series, X-ray markers were placed into the muscles forming the walls of the ventricles, and these markers were used to obtain information about the heart during systole and diastole, It is determined that the contraction of the external oblique and internal straight muscles (which provide the smooth regular decrease in the intraventricular pressure and a change in the form and the development of the sucking action of the ventricles) is registered in the phases of reduced expulsion, isovolumetric decrease in the intraventricular pressure, and fast filling. The contraction of these muscles is accompanied by electrical phenomena in the diastole, which is recorded on the EKG as the peak U N B

A83-40816
THE CHANGE IN THE REACTION OF SYSTEMIC AND REGIONAL BLOOD CIRCULATION TO IMMOBILIZATION STRESS IN RATS IN THE CASE OF PHARMACOLOGICAL DESYMPATHIZATION [IZMENENIE REAKTSII SISTEMNOGO I REGIONARNOGO KROVOOBRASHCHENIIA NA FIKSATSIONNYI STRESS U KRYS PRI FARMAKOLOGICHESKOI DESIMPATIZATSII]
O A. KOVALEV, K. F. KOROVIN, S. K SHEREMETEVSKAIA, and M A. PARFENOVA (Leningradskii Institut, Usovershenstvovaniia Vrachei, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, May 1983, p. 672-677 In Russian refs

A83-40817
THE CHARACTERISTICS OF THE VASOMOTOR REACTIONS IN THE SKELETAL MUSCLES AND SKIN OF CATS DURING HEAT STRESS [KHARAKTERISTIKA VAZOMOTORNYKH REAKTSII V SKELETNYKH MYSHTSAKH I KOZHE U KOSHEK PRI TEPLOVOM STRESSE]
G F. SULTANOV, D P. DVORETSKII, and B. I TKACHENKO (Akademiia Meditsinskikh Nauk, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, May 1983, p 678-684. In Russian. refs

The reactions of the arteries and veins of skeletal muscles and the skin-muscle regions of the lower extremities during the action of acute heat stress were investigated in experiments with anesthetized cats using methods of resistography and volumetry of the extracorporeally-circulating blood A decrease in the resistance of the arteries and an increase in the tension of the veins of the skin were observed even in the initial stages of hyperthermy A significant increase in the resistance of the arterial vessels of skeletal muscles occurred only in the case of elevated body temperatures The tension of the venous vessels of the skeletal muscles changed only slightly during hyperthermy. These results indicate the significant redistribution of the blood flow and blood volume between the skin muscle vessels during heat stress. It is suggested that the differences in the rate of the development of these reactions result from the participation of various mechanisms N B.

A83-40818
THE PARTICIPATION OF AN INSULIN-DEPENDENT CYTOPLASMIC REGULATOR IN CARBOHYDRATE METABOLISM DURING IMMOBILIZATION [OB UCHASTII INSULINZAVISIMOGO TSITOPLAZMATICHESKOGO REGULIATORA V UGLEVODNOM OBMENE PRI IMMOBILIZATSII]
M KH GAINUTDINOV, E. B ABIBOVA, and IA KH TURAKULOV (Akademiia Nauk Uzbekskoi SSR, Institut Biokhimii, Tashkent, Uzbek SSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, May 1983, p 689-694 In Russian refs

The participation of an insulin-dependent cytoplasmic regulator in the regulation of gluconeogenesis, glycogenolysis, and the synthesis of glycogen in the liver during the anxiety phase and the stability phase was investigated in rats during immobilization It was found that immobilization lowered the activity of the insulin-dependent regulator in the liver, which serves as one of the causes for the intensified mobilization of liver glycogen, since the insulin-dependent regulator was an endogenous inhibitor of gluconeogenesis and glycogenolysis Observed during the recovery period following immobilization were a decrease of the sensitivity to insulin, a supercompensation of the synthesis of glycogen in the liver, and a rapid increase in the activity of the insulin-dependent cytoplasmic regulator in the liver, heart, and diaphragm up to a level far exceeding the initial values The sensitivity to the insulin-dependent cytoplasmic regulator in vitro also decreased It is suggested that the supercompensation of glycogen synthesis might be a result of the increased activity of the insulin-dependent cytoplasmic regulator during the recovery following immobilization. N B.

A83-40826
LIFE SCIENCES AND SPACE RESEARCH XX(1); PROCEEDINGS OF THE WORKSHOPS AND TOPICAL MEETING, OTTAWA, CANADA, MAY 16-JUNE 2, 1982
W R HOLMQUIST, ED. (California, University, Richmond, CA) Workshops sponsored by COSPAR Advances in Space Research (ISSN 0273-1177), vol 3, no. 8, 1983, 262 p

Papers are presented concerning the issues of planetary quarantine requirements, the biological effects of space radiation, and radiation safety standards. Specific topics include a new planetary protection policy, a proposed facility for the in-orbit quarantine of planetary return samples, and an Antarctic habitat serving as a model for the Martian environment. Attention is also given to the effects of high-Z, high-energy particles and space hadrons on bacteriophages, the inactivation and mutation of

bacterial spores by heavy ions, experiments with plant seeds on board Salyut 6 and the Cosmos 1129 biosatellite, the genetic risks to humans of radiation exposure during space flight, cataractogenesis from high-LET radiation, and the late effects of neutron irradiation A L W

A83-40834
EFFECT OF HZE PARTICLES AND SPACE HADRONS ON BACTERIOPHAGES
S S IUROV, I G AKOEV, and G A LEONTEVA (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 8, 1983, p 51-60 refs

The effects of particle radiation of the type encountered in space flight on bacteriophages are investigated Survival and mutagenesis were followed in dry film cultures or liquid suspensions of T4Br(+) bacteriophage exposed to high-energy (HZE) particles during orbital flight, to alpha particles and accelerator-generated hardrons in the laboratory, and to high-energy cosmic rays at mountain altitudes The HZE particles and high-energy hadrons are found to have a greater relative biological efficiency than standard gamma radiation, while exhibiting a highly inhomogeneous spatial structure in the observed biological and genetic effects In addition, the genetic lesions observed are specific to the type of radiation exposure, consisting primarily of deletions and multiple lesions of low revertability, with mode of action depending on the linear energy transfer A L W

A83-40835
THE EFFECT OF ALPHA PARTICLES ON BACTERIOPHAGE T4BR(+)
G A LEONTEVA, I G AKOEV, and A. E GRIGOREV (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 8, 1983, p 61-64 refs

The effects of heavy particle radiation, which is believed to be responsible for the high relative biological effectiveness (RBE) of space hadrons, on bacteriophages are investigated Dry film cultures of bacteriophage T4 were irradiated with 5 3 MeV Po-210 alpha particles to doses from 5 to 60 Gray, and compared with cultures irradiated by Co-60 gamma radiation Examination of the exponential dose-response curves for bacteriophage survival indicates an RBE of 4.68 for the alpha particles The r-mutation frequency per 10,000 surviving phages is found to peak at 7 1 at doses between 65 and 85 Gray for gamma radiation, however it declines steadily from a level of 10 2 per 10,000 survivors with increasing dose of alpha radiation Comparison of the mutation frequencies at the same levels of lethality and the spectra of mutations produced by the two types of radiation indicates alpha and gamma radiation to differ as well in the mechanisms of mutation production It is concluded that the observed high RBE of space hadrons cannot be explained by the presence of high-energy particles in the secondary radiation A L W

A83-40836
PHYSICAL DETERMINANTS OF RADIATION SENSITIVITY IN BACTERIAL SPORES
E L POWERS (Texas, University, Austin, TX) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol. 3, no 8, 1983, p 73-78 refs
(Contract NIH-GM-13557, DE-AS05-76EV-03408)

Several factors modifying radiation sensitivity in dry bacterial spores are described and discussed Vacuum inducing the loss of critical structural water, very low dose rates of radiation from which the cell may recover, radiations of high linear energy transfer, and the action of temperature over long periods of time on previously irradiated cells are recognized from extensive laboratory work as important in determining survival of spores exposed to low radiation doses at low temperatures for long periods of time Some extensions of laboratory work are proposed Author

A83-40837
INACTIVATION, MUTATION INDUCTION AND REPAIR IN BACILLUS SUBTILIS SPORES IRRADIATED WITH HEAVY IONS
G HORNECK (Detusche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmedizin, Cologne, West Germany) and H BUECKER (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 8, 1983, p 79-84. refs

Of the various types of radiation encountered in space, the heavy ion component has produced the greatest concern due to the penetrating power and the great potential for damage associated with these particles The present paper reports results of an experiment conducted to study the inactivation and mutation of Bacillus subtilis spores induced by heavy ions from an accelerator Analysis of dose-survival curves for radiation at different energies and linear energy transfer (LET) has shown the maximum sensitivity of the organism to be at an LET of around 2000 MeV sq cm/g, which corresponds to a maximal relative biological effectiveness of around 4 Inactivation cross section values follow a saturation curve, plateauing at an LET of 2000 MeV sq cm/g and a cross section of 2 5 x 10 to the -9th sq cm Lethal damage at LETs less than 2000 sq cm/g is found to be repairable, with recombination repair more effective than excision repair In addition, the frequency of induced mutations is observed to be drastically reduced at high LET, supporting the presence of at least two qualitatively different lesions depending on LET A L W

A83-40838
INACTIVATION PROBABILITY OF HEAVY ION-IRRADIATED BACILLUS SUBTILIS SPORES AS A FUNCTION OF THE RADIAL DISTANCE TO THE PARTICLE'S TRAJECTORY
R FACIUS, M SCHAEFER, K. BALTSCHUKAT, and H BUECKER (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmedizin, Cologne, West Germany) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 8, 1983, p 85-94 refs

The mechanism for the inactivation of bacterial spores exposed to heavy ion cosmic radiation is studied through examination of the dependence of the probability of inactivation on radial distance to the particle trajectory Experiments were performed on spores of Bacillus subtilis held in fixed contact with visual nuclear track detectors so that the effects of single ions on individual cells may be observed Measurements of the impact parameter, defined as the distance between the spore center and the particle track, at low fluences (1,000,000 ions/sq cm) of heavy ions at energies up to 10 MeV/amu, show the effective range of inactivation to extend beyond the range where inactivation by secondary electrons is possible Furthermore, the inactivation probability is observed to depend nonmonotonically on impact parameter, and to be substantially below unity even for direct hits. Results are thus inconsistent with the view that the relative biological effectiveness of HZE particles is due to secondary electrons A L W

A83-40839
EFFECT OF HEAVY IONS ON BACTERIAL SPORES
T TAKAHASHI, F. YATAGAI, and S KITAYAMA (Institute of Physical and Chemical Research, Wako, Saitama, Japan) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no. 8, 1983, p 95-104 refs

A83-40840
HEAVY ION ACTION ON YEAST CELLS - INHIBITION OF RIBOSOMAL-RNA SYNTHESIS, LOSS OF COLONY FORMING ABILITY AND INDUCTION OF MUTANTS
J KIEFER, S RASE, F SCHOEPFER, E SCHNEIDER, K WEBER (Giessen, Universitaet, Giessen, West Germany), and G KRAFT (Gesellschaft fuer Schwerionenforschung mbH, Darmstadt, West Germany) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 8, 1983, p 115-125. Research supported by the Gesellschaft fuer Schwerionenforschung mbH and European Communities. refs

The action of heavy ions (Ar to U) accelerated to specific energies up to about 10 MeV/amu on different functions of yeast cells was studied. Ribosomal-RNA synthesis is inhibited according to a single-hit mechanism Inactivation cross sections were linearly related to the ratio of the squares of the effective charge and the velocity of the ions. It is concluded from the analysis that the range of the most energetic delta-electrons is larger than previously assumed. There is no such dependence for survival and induction of mutants. In both cases cross sections increase with the ion's specific energy indicating an important contribution of long-range delta-electrons The analysis shows the diploid yeast is not killed by a single-hit mechanism even by very heavy ions if the track width is too small The relative importance of the penumbral region is even more pronounced with the more sensitive strains Author

A83-40841
EXPERIMENTS WITH AIR-DRIED SEEDS OF ARABIDOPSIS THALIANA (L) HEYNH. AND CREPSIS CAPILLARIS (L) WALLR., ABOARD SALYUT 6
I D. ANIKEEVA, L N KOSTINA, and E N VAULINA (Akademiia Nauk SSSR, Institut Obshchei Genetiki, Moscow, USSR) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 8, 1983, p 129-133 refs

Space flight factors resulted in the accumulation of genetic damage in embryonic meristem cells of seeds of Arabidopsis thaliana and Crepis capillaris in flights of different duration (49, 226, 408 and 827 days) aboard the orbital station Salyut 6 As a result, the viability of seeds and seedlings was reduced, and the sterility of plants grown from seeds exposed on Salyut 6 was increased The effect depended upon the flight duration The data obtained suggest an acceleration of seed aging under flight conditions Author

A83-40842
RESULTS ON ARTEMIA CYSTS, LETTUCE AND TOBACCO SEEDS IN THE BIOBLOC 4 EXPERIMENT FLOWN ABOARD THE SOVIET BIOSATELLITE COSMOS 1129
Y GAUBIN, H PLANEL, G. GASSET, B PIANEZZI, M DELPOUX (Toulouse III, Universite, Toulouse, France), J CLEGG (Miami, University, Miami, FL), E. E. KOVALEV, V. NEVZGODINA, E N MAXIMOVA (Ministersvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR), and A T MILLER (Akademiia Nauk Latviiskoi SSR, Institut Biologii, Riga, Latvian SSR) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 8, 1983, p. 135-140 refs

The effects of space flight factors, in particular the heavy ion component of cosmic rays, on dormant stages of life forms were investigated as part of the Biobloc 4 experiment flown aboard the Cosmos 1129 biosatellite Artemia cysts and seeds of tobacco and lettuce plants were placed in tubes and in monolayers sandwiched between layers of visual particle track detectors. Although Artemia cysts exposed in the dry state did not differ from ground controls, hydrated cysts exhibited a slight decrease in hatchability and reduced (C-14)O2 incorporation and protein and nucleic acid synthesis. For cysts held in the monolayers, hits by HZE particles were observed to stimulate emergence, hatching and survival Higher proportions of chromosomal aberrations were found in lettuce seeds hit by HZE particles, while space flight produced a stimulatory effect on both germination rate and abnormality frequency in both hit and nonhit tobacco seeds.
A.L W

A83-40843
SOME RESULTS OF THE EFFECT OF SPACE FLIGHT FACTORS ON DROSOPHILA MELANOGASTER
L P FILATOVA, E. N VAULINA, T. YA. GROZDOVA (Akademiia Nauk SSSR, Institut Obshchei Genetiki, Moscow, USSR), C. PRUDHOMMEAU, and J PROUST (Paris XI, Universite, Orsay, Essonne, France) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 8, 1983, p. 143-146 refs

Chromosomal effects of space flight factors were investigated in Drosophila melanogaster flown aboard the Salyut 6 orbital station. Drosophila males heterozygous for four linked traits were exposed to space flight conditions for periods of eight days, and the progeny when the males were mated with homozygous recessive females were compared with those from control flies exposed to the same vibration and acceleration environment, and the progeny of laboratory controls Increases in recombination and nondisjunction frequencies were observed in the flies exposed to the space environment, with recombinant flies also found in the F1 generation of the vibration and acceleration controls Results suggest that it is the action of heavy particles that accounts for the major portion of the genetic effects observed A L W.

A83-40845
GENETIC RISKS ASSOCIATED WITH RADIATION EXPOSURES DURING SPACE FLIGHT
D GRAHN (Argonne National Laboratory, Argonne, IL) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol. 3, no 8, 1983, p. 161-170 refs
(Contract W-31-109-ENG-38)

Although the genetic risks of space radiation do not pose a significant hazard to the general population, the risks may be very important to the individual astronaut The present paper summarizes some experimental results on the induction of dominant lethal mutations and chromosomal damage in the first generation which may be used in the prediction of the genetic risks of radiation exposures of space crews. Young adult male mice were exposed to single, weekly and continuous doses of gamma rays, neutrons in single doses and weekly exposures and continuous doses of Pu-239 alpha particles Evaluation of fetal survival rates in females mated to the exposed males shows the mutation rate in individuals exposed to gamma rays to decline as the exposure period is prolonged and the dose rate is reduced, while the response to neutrons is in the opposite direction Cytological determinations show the rate of balanced chromosomal translocations to drop as gamma ray exposures change from one-time to continuous, however little or no dose rate effect is seen with neutron radiation and alpha particle exposure shows no regular dose-response. Based on the above results, it is predicted that the rate of dominant mutations and transmissible chromosome aberrations in astronauts on a 100-day mission will increase by 4.5 to 41 25 percent over the spontaneous rate A L.W

A83-40847
UNIQUE BIOLOGICAL ASPECTS OF RADIATION HAZARDS - AN OVERVIEW
P TODD (Pennsylvania State University, University Park, PA) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol. 3, no 8, 1983, p. 187-194 refs

The biological effects of HZE (high-Z energetic) particle radiation are discussed as they relate to the hazards of deep-space flight The properties of HZE particles, generally defined as particles with atomic number 2 or greater and energy above 50

MeV/nucleon, are discussed, and the inapplicability of most common radiobiological measures, including rad doses and relative biological effectiveness, to HZE particles is pointed out The microlesion concept is then presented as a meaningful measure of radiation damage due to HZE particles, and examples of studied microlesions are presented A critical level for a microlesion event is suggested that corresponds to an ionization level with a high probability of inactivating the nucleus of a struck cell, and it is noted that HZE particles appear less effective in cell killing than gamma radiation Future directions for studies of the effects of HZE particles on structures of the eye, development, the nervous system and carcinogenesis are indicated A L W

A83-40848* Colorado State Univ , Fort Collins
CATARACTOGENESIS FROM HIGH-LET RADIATION AND THE CASARETT MODEL
A B COX, A C LEE, J T LETT (Colorado State University, Fort Collins, CO), E J AINSWORTH, and J G JOSE (California University, Berkeley, CA) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 8, 1983, p 211-219 refs
(Contract NSG-9045, NAG9-10, NIH-AG-0005, NASA ORDER T-3516-G, W-7405-ENG-48, DOE-31-109-38-4992)

The long-term effects on specific animal tissues of exposure to heavy ion irradiation are studied in experiments on cataractogenesis in mice and rabbits Five groups of rabbits at ages from 8 weeks to 5 3 years were irradiated to a dose of 9 0 Gy of Bragg plateau Ne-20 ions, while mice were exposed to single and total fractionated doses of 4 17 Gy gamma rays or 0 40 to 1 20 Gy of C-12, Ne-20 or Ar-40 particles Measurements of lens opacities over time show that in the year since irradiation, cataractogenesis is delayed and less severe in rabbits irradiated at age 6 months compared to younger animals, although it is possible that the late effects in adults will surpass those found in the young The fractionation of the total dose of gamma rays in mice is observed to lead to a marked reduction in the extent of lens opacity after one year, while fractionated heavy ion doses caused a greater degree of posterior lens opacification Evaluations of the effects of the LET of different ions on cataractogenesis are consistent with RBEs of about 5, 3 and 1-2 for Ar-40, Ne-20 and C-12 ions, respectively Results thus support the Casarett model of radiation damaging stem cell populations that are not necessarily part of the vasculature A L W

A83-40849* Colorado State Univ , Fort Collins
LATE SKIN DAMAGE IN RABBITS AND MONKEYS AFTER EXPOSURE TO PARTICULATE RADIATIONS
D S BERGTOLD, A B COX, J T LETT (Colorado State University, Fort Collins, CO), and C M SU (Ohio State University, Columbus, OH) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 8, 1983, p 221-229 Research supported by the U S Department of Energy refs
(Contract NGR-06-002-128, NSG-9045, NAG9-10, NIH-AG-00005)

Preliminary results are reported of experiments on the late effects of exposure to particulate radiations on stem cell populations Skin biopsies were taken from the ears of rabbits irradiated 2-5 years previously with 530 MeV/amu Ar ions (LET 90 keV/micron), or 365 MeV/amu Ne ions (LET 35 keV micron), and from the chests and inner thighs of rhesus monkeys irradiated 16-18 years previously with 32-MeV protons (LET about 1.2 keV/micron) Skin fibroblast cultures obtained from the biopsy samples in rabbits were observed to undergo dose-dependent decreases in in vitro life span, with estimated survival curves showing the effects of Ar-ion irradiation to be more severe than those of Ne-ion irradiation In addition, the healing of the biopsy wound was observed to become slower as radiation dose increased In the monkey, radiation reduced the average number of fibroblasts at the time of cessation of growth in culture Results thus demonstrate the capacity of skin sampling to reveal stem cell destruction, and have important implications for astronauts and other persons at risk of particle exposure with regard to healing responses to trauma or surgery. A L W.

A83-40904
CORONARY ARTERY SPASM INDUCED IN ATHEROSCLEROTIC MINIATURE SWINE
H SHIMOKAWA, H TOMOIKE, S NABEYAMA, H YAMAMOTO, H ARAKI, M NAKAMURA, Y ISHII, and K TANAKA (Kyushu University, Fukuoka, Japan) Science (ISSN 0036-8075), vol 221, Aug 5, 1983, p 560-562 Research supported by the Takeda Science Foundation, Chiyoda Mutual Life Foundation, and Taisha Ijo Foundation, Ministry of Education, Science, and Culture of Japan refs
(Contract MOESC-56570338, MOESC-57440053, MOESC-57570353; MOESC-58870058, MOESC-587067)

Angiographically demonstrable coronary artery spasm could be provoked repeatedly by giving intracoronary or intravenous injections of histamine to miniature swine with experimentally induced atherosclerotic lesions of the coronary artery The spasm induced in this way subsided either spontaneously or after the administration of nitroglycerin and was prevented by a calcium antagonist or an agent that blocks histamine H1 receptors This model, which suggests that atherosclerotic changes may be one of the primary factors in the occurrence of coronary artery spasm, should facilitate studies on the pathogenesis of this condition Author

A83-40905
COPING AND IMMUNOSUPPRESSION - INESCAPABLE BUT NOT ESCAPABLE SHOCK SUPPRESSES LYMPHOCYTE PROLIFERATION
M L LAUDENSLAGER (Denver, University, Denver, CO), S M RYAN, R C DRUGAN, R L HYSON, and S F MAIER (Colorado, University, Boulder, CO) Science (ISSN 0036-8075), vol 221, Aug 5, 1983, p 568-570 refs
(Contract NSF BNS-78-00508)

Rats were given series of escapable shocks, identical inescapable shocks, or no shock The subjects were reexposed to a small amount of shock 24 hours later, after which an in vitro measure of the cellular immune response was examined Lymphocyte proliferation in response to the mitogens phytohemagglutinin and concanavalin A was suppressed in the inescapable shock group but not in the escapable shock group This suggests that the controllability of stressors is critical in modulating immune functioning Author

A83-40906
LOCAL CEREBRAL BLOOD FLOW INCREASES DURING AUDITORY AND EMOTIONAL PROCESSING IN THE CONSCIOUS RAT
J E LEDOUX, M E THOMPSON, C IADECOLA, L W TUCKER, and D J REIS (Cornell University, New York, NY) Science (ISSN 0036-8075), vol 221, Aug 5, 1983, p 576-578 refs
(Contract PHS-HL-18974)

Local cerebral blood flow was measured in rats by the C-14 labeled iodoantipyrine technique with quantitative autoradiography during the processing of environmental stimuli Presentation of a tone increased blood flow in the auditory but not the visual pathway. When the animal had previously been conditioned to fear the tone, blood flow additionally increased in the hypothalamus and amygdala Local cerebral blood flow can thus be used to detect patterns of cerebral excitation associated with transient (30- to 40-second) mental events in experimental animals Author

A83-40914* Illinois Univ , Urbana.
SEQUENCE OF THE 16S RIBOSOMAL RNA FROM HALOBACTERIUM VOLCANII, AN ARCHAEBACTERIUM
R. GUPTA, J M LANTER, and C R WOESE (Illinois, University, Urbana, IL) Science (ISSN 0036-8075), vol 221, Aug 12, 1983, p 656-659 refs
(Contract NSG-7044)

The sequence of the 16S ribosomal RNA (rRNA) from the archaebacterium Halobacterium volcanii has been determined by

DNA sequencing methods. The archaebacterial rRNA is similar to its eubacterial counterpart in secondary structure. Although it is closer in sequence to the eubacterial 16S rRNA than to the eukaryotic 16S-like rRNA, the H. volcanii sequence also shows certain points of specific similarity to its eukaryotic counterpart Since the H. volcanii sequence is closer to both the eubacterial and the eukaryotic sequences than these two are to one another, it follows that the archaebacterial sequence resembles their common ancestral sequence more closely than does either of the other two versions. *Author*

A83-41002
THE MECHANISM OF THE RADIATION DAMAGE OF THE SECONDARY STRUCTURE OF DNA [MEKHANIZM RADIATSIONNOGO NARUSHENIIA VTORICHNOI STRUKTURY DNK]
B. I SUKHORUKOV and L. I SHABARCHINA (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) Radiobiologiia (ISSN 0033-8192), vol. 23, May-June 1983, p. 296-301. In Russian refs

A83-41003
THE MECHANISM OF THE SECONDARY POSTIRRADIATION DEGRADATION OF DNA IN THYMOCYTES OF IRRADIATED RATES. I - THE SUBSTRATE SPECIFICITY OF ALKALINE ENDONUCLEASE [MEKHANIZM VTORICHNOI POSTRADIATSIONNOI DEGRADATSII DNK V TIMOTSITAKH OBLUCHENNYKH KRYS. I - SUBSTRATNAIA SPETSIFICHNOST' SCHCHELOCHNYKH ENDONUKLEAZ]
B P. IVANNIK and N I RIABCHENKO (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Radiobiologiia (ISSN 0033-8192), vol 23, May-June 1983, p 302-306 In Russian refs

A83-41004
A THEORETICAL ANALYSIS OF THE EFFECT OF THE PHOTOREACTIVATION OF E. COLI CELLS IRRADIATED BY GAMMA-RAYS [TEORETICHESKII ANALIZ EFFEKTA FOTOREAKTIVATSII KLETOK E. COLI, OBLUCHENNYKH GAMMA-KVANTAMI]
V. A. PITKEKVICH, V V. DUBA, M. N MIASNIK, I V PETROVA, and V. G. SKVORTSOV (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Radiobiologiia (ISSN 0033-8192), vol. 23, May-June 1983, p 307-311. In Russian. refs

A83-41005
THE ROLE OF CHANGES IN THE CONCENTRATION OF OXYGEN IN THE CASE OF THE REPRODUCTIVE DEATH OF CELLS IN VITRO. III - THE MODIFICATION OF THE RADIOSENSITIVITY BY OXYGEN-REDUCING COMPOUNDS [ROL' IZMENENIIA KONTSENTRATSII KISLORODA PRI MODIFIKATSII RADIOCHUVSTVITEL'NOSTI SOEDINENIIAMI VOSSTANAVLIVAIUSHCHIMI KISLOROD]
IU. N KORYSTOV (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) Radiobiologiia (ISSN 0033-8192), vol. 23, May-June 1983, p 318-322. In Russian refs

A83-41006
THE REACTION OF THE HUMAN LYMPHOCYTE CHROMOSOME TO GRADED DOSES OF NEUTRONS DURING IRRADIATION IN VITRO [REAKTSIIA KHROMOSOM LIMFOTSITOV CHELOVEKA NA FRAKTSIONIROVANIE DOZY NEITRONOV PRI OBLUCHENII IN VITRO]
A V SEVANKAEV, V. A. NASONOVA, and G I GOLOVINOVA (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Radiobiologiia (ISSN 0033-8192), vol 23, May-June 1983, p. 332-336 In Russian refs

A83-41007
THE RELATIVE BIOLOGICAL EFFECTIVENESS OF NEUTRONS IN CONDITIONS OF MIXED GAMMA AND NEUTRON IRRADIATION [OTNOSITEL'NAIA BIOLOGICHESKAIA EFFEKTIVNOST' NEITRONOV V USLOVIIAKH SMESHANNOGO GAMMA-NEITRONNOGO OBLUCHENIIA]
L. N POSTNIKOV, A G SVERDLOV, G A LAVROVA, and N G. NIKANOROVA (Akademiia Nauk SSSR, Institut Iadernoi Fiziki, Leningrad, USSR) Radiobiologiia (ISSN 0033-8192), vol. 23, May-June 1983, p. 337-343. In Russian refs

The dependence of RBE(n/x) (the relative biological effectiveness of neutrons in comparison with the action of neutron radiation n and rarely-ionizing radiation x) on the ratio of gamma quanta and neutrons in combined radiation was investigated using rats and mice. The animals were exposed to varying ratios of gamma-rays and neutrons, at doses averaging 0.12-0 15 gram-roentgens/min It was found that the RBE(n/x) decreased with a decrease in the share of neutrons in the combined radiation. This finding is viewed as the manifestation of the nonadditive effects of neutrons and rarely-ionizing radiation on irradiated animals N B.

A83-41008
THE MECHANISM OF THE REGENERATION OF ERYTHROPOIESIS IN CONDITIONS OF LOCAL IRRADIATION OF BONE MARROW [K MEKHANIZMU REGENERATSII ERITROPOEZA V USLOVIIAKH LOKAL'NOGO OBLUCHENIIA KOSTNOGO MOZGA]
A. M DYGAI, E. D GOLDBERG, and L A. KOLMOGOROVA (Tomskii Gosudarstvennyi Meditsinskii Institut, Tomsk, USSR) Radiobiologiia (ISSN 0033-8192), vol. 23, May-June, 1983, p 349-353. In Russian. refs

It has been shown that lymphocytes (primarily thymocytes) migrate into the irradiated bone marrow in conditions of local iradiation in the period prior to the active recovery of hemopoiesis. The mechanism of the regeneration of erythron in conditions of local irradiation was investigated using BALB/c mice The right hind feet of the animals were irradiated with a total of 7 gram-roentgens of radiation (at 0 65 gram-roentgens/min). Results showed that following the irradiation there was a significant accumulation of T lymphocytes in the bone marrow of the irradiated area which stimulated the processes of the proliferation of erythroid cells This stimulation of the proliferation of erythroid cells acted to accelerate the postirradiation regeneration of eerythropoiesis N B

A83-41009
THE CHARCTERISTICS OF THE BIOSYNTHESIS OF NUCLEIC ACIDS DURING THE ACTIVATION OF ERYTHROID CELL PROLIFERATION EVOKED BY PROLONGED GAMMA-IRRADIATION [OSOBENNOSTI BIOSINTEZA NUKLEINOVYKH KISLOT PRI AKTIVATSII PROLIFERATSII ERITROIDNYKH KLETOK, VYZVANNOI DLITEL'NYM GAMMA-OBLUCHENIEM]
G S MUSHKACHEVA and E. I KISELGOF (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol 23, May-June 1983, p 363-366 In Russian refs

A83-41010
AN INVESTIGATION OF THE POTENTIAL RADIATION DAMAGES OF CHROMOSOMES IN THE CELLS OF MAMMALS WITH THE AID OF CHEMICAL MODIFICATION AND PREMATURE CHROMOSOME CONDENSATION [ISSLEDOVANIE POTENTSIAL'NYKH RADIATSIONNYKH POVREZHDENII KHROMOSOM V KLETKAKH MLEKOPITAIUSHCHIKH S POMOSHCH'IU KHIMICHESKOI MODIFIKATSII I PREZHDEVREMENNOI KONDENSATSII KHROMOSOM]
G. F APTIKAEVA, S I. ZAICHKINA, and E E GANASSI (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) Radiobiologiia (ISSN 0033-8192), vol 23, May-June 1983, p 366-369. In Russian refs

A83-41011
CIRCULATING MACROMOLECULAR COMPLEXES IN RATS FOLLOWING RADIATION, THERMAL, AND COMBINED TRAUMA [TSIRKULIRUIUSHCHIE MAKROMOLEKULIARNYE KOMPLEKSY U KRYS, PERENESSHIKH RADIATSIONNUIU, TERMICHESKUIU I KOMBINIROVANNUIU TRAVMY]
D V KOROGODIN, O. I KUROCHKINA, A M POVERENNYI, and A I BRITUN (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Radiobiologiia (ISSN 0033-8192), vol 23, May-June 1983, p 369-372 In Russian refs

A83-41012
THE CHANGES IN THE WATER-ELECTROLYTE METABOLISM IN THE BRAIN OF RATS DURING GAMMA-IRRADIATION OF THE HEAD AT HIGH DOSES [IZMENENIIA VODNO-ELEKTROLITNOGO OBMENA GOLOVNOGO MOZGA KRYS PRI GAMMA-OBLUCHENII GOLOVY V VYSOKIKH DOZAKH]
I B USHAKOV and V P FEDOROV Radiobiologiia (ISSN 0033-8192), vol 23, May-June 1983, p. 372-375 In Russian refs

A83-41013
THE PROCESSES OF PROTEOLYSIS IN THE SMALL INTESTINE OF RATS IN THE CASE OF THE INTESTINAL FORM OF ACUTE RADIATION SICKNESS [PROTSESSY PROTEOLIZA V TONKOI KISHKE KRYS PRI KISHECHNOI FORME OSTROI LUCHEVOI BOLEZNI]
V S NESTERENKO (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Radiobiologiia (ISSN 0033-8192), vol 23, May-June 1983, p 379-381 In Russian. refs

A83-41014
THE MECHANISMS OF THE POTENTIATION AND THE PROLONGATION OF THE RADIOPROTECTIVE EFFECT OF MULTICOMPONENT PREPARATIONS [MEKHANIZMY POTENTSIROVANIIA I PROLONGIROVANIIA RADIOZASHCHITNOGO EFFEKTA MNOGOKOMPONENTNYKH RETSEPTUR]
V G VLADIMIROV, S M SMIRNOVA, and L G TARNOPOLSKAIA (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) Radiobiologiia (ISSN 0033-8192), vol 23, May-June 1983, p 389-392 In Russian refs

The distribution of the radioprotective agent cystamine following intraperitoneal injection in mice was studied, and the effects of mexamine, ethyrone, and gutimine on the conversion of cystamine was investigated It is shown that mexamine, ethyrone, and gutimine (at doses lower than radioprotective) act to potentiate and prolong the radioprotective action of cystamine The basis of this ability to prolong and potentiate the radioprotective effects is found to be a result of a complex (mexamine + ethyrone + gutimine) which inhibits the conversion of the sulfur-containing cystamine in the tissues of the animals The decrease in the rate of metabolism of cystamine allows it to be retained in radiosensitive tissues where it can provide a radioprotective effect at doses lower than normal and for periods longer than normal (i e , without the action of the complex of mexamine, ethyrone, and gutimine) N.B

A83-41015
THE MODIFICATION OF THE INTESTINAL SYNDROME WITH THE AID OF A GAS HYPOXIC MIXTURE AT VARIOUS CONDITIONS OF THE IRRADIATION OF ANIMALS [MODIFITSIROVANIE KISHECHNOGO SINDROMA S POMOSHCH'IU GAZOVOI GIPOKSICHESKOI SMESI V RAZLICHNYKH USLOVIIAKH OBLUCHENIIA ZHIVOTNYKH]
R B. STRELKOV, N G KUCHERENKO, and V M. KOZLOV (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Radiobiologiia (ISSN 0033-8192), vol 23, May-June 1983, p 392-395 In Russian refs

The effects of a gas hypoxic mixture containing 10 percent oxygen and 90 percent nitrogen on the development of the intestinal syndrome following the irradiation of several strains of rats and mice were studied The radiation (6 5-10 0 gram-roentgens) was applied to the animals at rest or during physical activity, following the injection of biologically-active compounds, following exposure to microwaves, in combination with thermal radiation damage, using many small doses of radiation, and using animals that had recovered from radiation sickness Results show that this gas hypoxic mixture increased the survivability of the animals by moderating the effects of radiation damage during the period of the intestinal syndrome of acute radiation sickness This protective effect was expressed for all conditions studied N.B

A83-41016
'PSEUDONORMAL' THYMOCYTES - A PECULIAR REACTION OF LYMPHOID ELEMENTS OF THE THYMUS CORTEX TO HIGH DOSES OF IONIZING RADIATION ['PSEVDONORMAL'NYE' TIMOTSITY - SVOEOBRAZNAIA REAKTSIIA LIMFOIDNYKH ELEMENTOV KORY TIMUSA NA VYSOKIE DOZY IONIZIRUIUSHCHEGO IZLUCHENIIA]
S E ALEKSANDROVA and V A GULIAEV (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Radiobiologiia (ISSN 0033-8192), vol 23, May-June 1983, p 401-403 In Russian. refs

A83-41017
THE CHANGE OF IMMUNOBIOLOGICAL REACTIVITY FOLLOWING THE COMBINED EFFECTS OF MICROWAVES, INFRASOUND, AND GAMMA-IRRADIATION [IZMENENIE IMMUNOBIOLOGICHESKOI REAKTIVNOSTI PRI KOMBINIROVANNOM DEISTVII MIKROVOLNOVOGO, INFRAZVUKOVOGO I GAMMA-IZLUCHENII]
IU G GRIGOREV, G V BATANOV, and V S STEPANOV (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol. 23, May-June 1983, p 406-409. In Russian refs

The effects of microwave radiation in combination with gamma-irradiation and infrasound were evaluated using immunobiological indicators in rats and rabbits The rats were irradiated with microwaves at 9.3 GHz, 200 microW/sq cm for 30 min each day for 8 days following a single dose of gamma-irradiation of 5 5 gram-roentgen, while the rabbits received microwaves at 0 1 GHz, 1530 microW/sq cm for 60 min followed by a single exposure to ultrasound at 8 Hz, 115 dB for 47 min Various immunobiological parameters were studied before, during, and after these tests, including the blastransformation reactions of lymphocytes in cultures of peripheral blood, complement fixing reactions, and autoimmune processes Results showed that pre-irradiation with microwaves increased the resistance of the animals to gamma-irradiation, while the combination of microwaves and infrasound increased the biological effect of gamma-irradiation N.B

A83-41018
PREDICTING RADIATION DAMAGE ON THE BASIS OF THE RESPONSE OF AN ORGANISM TO ACUTE HYPOXIA [PROGNOZIROVANIE RADIATSIONNOGO PORAZHENIIA NA OSNOVANII OTVETA ORGANIZMA NA OSTRUIU GIPOKSIIU]
A IU GRIGOREV and K. M SKRYLEV (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol 23, May-June 1983, p 412-414. In Russian refs

The relationship of the response to acute hypoxia with the outcome of radiation damage is evaluated in experiments using rats The rats were placed in a pressure chamber which was decompressed to a simulated altitude of 11,200 m The resistance of the animals to acute hypoxic conditions at this simulated altitude was evaluated using the tests for the preservation time of the position reflex and the recovery time of the position reflex One week following the acute hypoxic evaluations, the rats were exposed to gamma-radiation at a dose of 8 gram-roentgens during 30 days (LD50-30). Results show that the individual radiosensitivity of rats can be predicted with an accuracy of 57 7-65 8 percent based on the resistance of the rats to acute hypoxia N B

A83-41132
ACCLIMATIZATION TO HIGH ALTITUDE IN GOATS WITH ABLATED CAROTID BODIES
R A STEINBROOK, J. C. DONOVAN, R A GABEL, D E LEITH, and V. FENCL (U.S Army, Research Institute of Environmental Medicine, Natick, Brigham and Women's Hospital, Harvard University, Boston, MA) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, July 1983, p. 16-21. refs
(Contract NIH-HL-19170)

A83-41134
ALTERATION OF ISCHEMIC CARDIAC FUNCTION IN NORMAL HEART BY DAILY EXERCISE
D. R. KNIGHT and H. L STONE (Oklahoma, University, Oklahoma City, OK) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, July 1983, p 52-60 refs
(Contract NIH-HL-22154)

Experimental trials were run with 26 dogs to measure any changes in the contractile function of an ischemic zone before and after 4 weeks of daily exercise on a treadmill Prior to the tests, a Doppler flow tube and hydraulic occluder were placed around the left circumflex coronary artery (LCCA), ultrasonic dimension gages were implanted in the myocardial wall, and a heparin-filled catheter was inserted into the left atrium Additionally, five of the dogs received pressure transducers in the left ventricular chamber Measurements were taken of the regional myocardial segment length in the potentially ischemic region, the regional myocardial blood flow (using isotope injection), and heart rate The ischemic zone function improved after 4 weeks, and was correlated with a 50 percent increase in the coronary collateral flow to the ischemic zone M S K

A83-41135
GENDER DIFFERENCES IN HYPOXIC VASCULAR RESPONSE OF ISOLATED SHEEP LUNGS
R. C WETZEL and J T SYLVESTER (Johns Hopkins University, Baltimore, MD) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, July 1983, p 100-104 refs

A83-41136
EFFECTS OF HYPERBARIC OXYGEN EXPOSURE AT 31.3 ATA ON SPONTANEOUSLY BEATING CAT HEARTS
T J. DOUBT and D E EVANS (U.S Navy, Naval Medical Research Institute, Bethesda, MD) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, July 1983, p 139-145 Navy-supported research refs

A83-41138* National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Tex
CHANGES IN TOTAL BODY CALCIUM BALANCE WITH EXERCISE IN THE RAT
A D LEBLANC, H J EVANS, P C JOHNSON, and S JHINGRAN (NASA, Johnson Space Center, Medical Science Div, Baylor College of Medicine, Houston, TX) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 55, July 1983, p 201-204 refs

The purpose of this study was to evaluate the effect of deconditioning on the total body calcium in rats Two separate experiments were performed using female Sprague-Dawley rats, 187-266 days of age Total body calcium was measured in experimental and control rats during and following several weeks of voluntary exercise The slope from the least-squares fit of total body calcium with time was used to obtain an average calcium balance for each animal during each study period In both groups, the exercised rats had a significantly decreased calcium balance after cessation of exercise, whereas no significant change was seen in nonexercised controls In both groups, the exercised animals gained calcium at a significantly greater rate than controls. The findings indicate that while exercised rats may gain calcium at a faster rate compared with nonexercising controls, the rate of gain following cessation of exercise is less than in the controls Author

A83-41168
THERMOELECTRIC ENERGY CONVERSION COULD BE AN ENERGY SOURCE OF LIVING ORGANISMS
A W J MULLER Physics Letters (ISSN 0031-9163), vol 96A, July 11, 1983, p 319-321 refs

A cell containing biomembranes which have ferroelectric properties and across which a voltage difference is present can convert heat into electrical energy during temperature cycling This electrical energy can be converted into ATP by oxidative phosphorylation Author

A83-41438
THE NATURE OF 'CONGESTIVE' EXCITATION DURING EMOTIONAL STRESS AS A BASIS FOR CARDIOVASCULAR DISORDERS [O PRIRODE 'ZASTOINOGO' VOZBUZHDENIIA PRI EMOTSIONAL'NOM STRESSE KAK OSNOVY SERDECHNO-SOSUDISTYKH NARUSHENII]
K V. SUDAKOV (Akademiia Meditsinskikh Nauk SSSR, I Moskovskii Meditsinskii Institut, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol 23, April 1983, p 10-16 In Russian refs

A review is presented of recent research concerning the nature of 'congestive' emotional excitation in the genesis of cardiovascular disorders during emotional stress The role of the limboreticular formation in the mechanism of cardiovascular responses of immobilized rabbits, evoked by the periodic electrical stimulation of negative emotional centers of the ventromedial hypothalamus, is discussed It is shown that 'congestive' excitation during emotional stress is formed in the structures of the limbocortical formation due to the changes in the chemical sensitivity of their neurons to neuromediators and neuropeptides The role of oligopeptides such as angiotensin II, bradykinin, renin, and the delta-sleep producing peptide in the formation of cardiovascular disorders during the stimulation of emotiogenic zones of the ventromedial hypothalamus is examined N.B.

A83-41442
THE PREVENTION OF EARLY FORMS OF MEDICATION-INDUCED OTOTOXICOSIS IN EXPERIMENTAL STUDIES [O PROFILAKIKE RANNIKH FORM MEDIKAMENTOZNOGO OTOTOKSIKOZA V EKSPERIMENTE]
R M KHANAMIRIAN and B I DUNAIVITSER (Ministerstvo Zdravookhraneniia SSSR, Erevanskii Institut Usovershenstvovanii Vrachei, Yerevan, Armenian SSR) Vestnik Otorinolaringologii (ISSN 0042-4668), May-June 1983, p 28-31 In Russian refs

A83-41443
THE DISTRIBUTION OF STREPTOMYCIN IN THE STRUCTURES OF THE INNER EAR FOLLOWING ITS PARENTERAL ADMINSTRATION (A HISTOAUTORADIOGRAPHIC INVESTIGATION) [RASPREDELENIE STREPTOMITSINA V STRUKTURAKH VNUTRENNEGO UKHA PRI PARENTERAL'NOM EGO VVEDENII /GISTOAVTORADIOGRAFICHESKOE ISSLEDOVANIE/]
V F ANICHIN and G S MARGOLIN (Leningradskii Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad, USSR) Vestnik Otorinolaringologii (ISSN 0042-4668), May-June 1983, p 23-28. In Russian. refs

The distribution of streptomycin sulfate, with labelled S-35, in the structures of the inner ear following parenteral adminstration was studied in white mice using a histoautoradiographic technique The streptomycin was administered at a dose of 50 millicuries per 1 kg body weight (total dose of 200,000 units/kg). Following a single adminstration of streptomycin, the antibiotic was found to be distributed relatively equally in moderate quantities in all structures of the inner ear However, following 15 days of daily injections, the streptomycin was found to be accumulated mainly in the nerve elements It is concluded that streptomycin is tropic to the eighth pair of the cranial nerves. N B.

A83-41460
THE DEVELOPMENT OF THE VESTIBULAR APPARATUS IN CONDITIONS OF WEIGHTLESSNESS [RAZVITIE VESTIBULIARNOGO APPARATA V USLOVIIAKH NEVESOMOSTI]
IA A VINNIKOV, O G GAZENKO, D V LYCHAKOV, and L R PALMBAKH (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR) Zhurnal Obshchei Biologii (ISSN 0044-4596), vol 44, Mar -Apr 1983, p 147-163. In Russian refs

The effect of weightlessness on the morphogenesis and structural organization of the vestibular apparatus of amphibian and fish larvae was investigated in a series of experiments conducted in space flight conditions Results of morphological and chemical studies showed that the development of the larvae from fertilized eggs in weightless conditions proceeded without serious morphological disorders The vestibular apparatus developed, and its organization in the experimental animals did not differ qualitatively from that of the control animals It is concluded that a specific stimulus (gravity) is evidently not required for the development of gravity receptors in ontogenesis, although it is evident that the appearance of the vestibular apparatus in phylogenesis was linked with gravity stimulation N B

A83-41461
THE DEVELOPMENT OF SEVERAL IDEAS OF V. V. PARIN IN THE PHYSIOLOGY AND THE PATHOPHYSIOLOGY OF BLOOD CIRCULATION [RAZVITIE NEKOTORYKH IDEI V. V. PARINA V FIZIOLOGII I PATOFIZIOLOGII KROVOOBRASHCHENIIA]
F Z MEERSON (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Uspekhi Fiziologicheskikh Nauk (ISSN 0301-1798), vol 14, Apr -June 1983, p 7-27 In Russian refs

Three lines of investigations are discussed based on the ideas of V V Parin concerning the physiology and pathophysiology of blood circulation The first direction leads to the conclusion that a severe prolonged stress-reaction results in a deep depression of the contractile function and adrenoreactivity of the portal vein and, consequently, disturbs the return of the blood to the heart The second direction leads to the conclusion that the physiological growth of the heart is not accompanied by an increase in the quantity of cardiomyocytes, but is provided by the increasing size of each cardiomyocyte Therefore, the individual strength of mechanisms responsible for the active transport of Ca(2+) decreases and the age-related depression of the contractile function of the heart occurs The third direction leads to principles of preliminary stress injuries of the heart by means of the selective suppression of certain links in the pathogenetic chain by antistressor metabolites of the organism and their antistressor analogs N B

A83-41517
NEUROPHYSIOLOGICAL ASPECTS OF COLOR VISION IN PRIMATES: COMPARATIVE STUDIES ON SIMIAN RETINAL GANGLION CELLS AND THE HUMAN VISUAL SYSTEM
E ZRENNER (Max-Planck-Institut fuer physiologische und klinische Forschung, Bad Nauheim, West Germany) Research supported by the Max-Planck-Institut fuer physiologische und klinische Forschung, Universitaet, Frankfurt, National Institutes of Health, and Columbia University Berlin/New York, Springer-Verlag (Studies of Brain Function. Volume 9), 1983, 235 p refs

A discussion is presented of recent research concerning various aspects of color vision in primates, based on studies on single ganglion cells in monkey retinas and on the visually evoked cortical potential in man Also examined are the corresponding psychophysical mechanisms of human perception The basic mechanisms of color vision are considered using a comprehensive approach which takes into account new mechanisms found in single cells and relates them to those found valid for the entire visual system The processing of color signals is traced from the retina to the visual cortex and to the perceptual centers Attention is also given to the detection in the perceptive phenomena of the action of the neuronal mechanisms of single cells, which contribute to building up such perceptions as simultaneous color contrast, flicker-induced colors, brightness enhancement, and transient tritanopia N B

A83-41565
RHYTHMS IN THE RANGE OF 4.5-12 HZ OF THE BACKGROUND EEG FROM THE VISUAL AND SENSOMOTOR CORTEX IN RATS UNDER DIFFERENT PATTERNS OF LOCOMOTOR ACTIVITY
N D. NIKOLOV, L. P. CHERESHAROV, V H STOMONIAKOV, and P S CHOBANOV (B'lgarska Akademiia na Naukite, Tsentralna Laboratoriia za Izuchavane na Moz'ka, Sofia, Bulgaria) Bolgarskaia Akademiia Nauk, Doklady (ISSN 0366-8681), vol 36, no. 4, 1983, p 485-488 refs

A83-41827
THE ROLE OF MAGNESIUM IN THE PATHOGENESIS OF OTOSCHLEROSIS AND THE RESULTS OF THE CONSERVATIVE TREATMENT OF PATIENTS WITH OTOSCHLEROSIS BY A METHOD OF INNER EAR ELECTROPHORESIS OF MAGNESIUM SULFATE [O ROLI MAGNIIA V PATOGENEZE OTOSKLEROZA I REZUL'TATY KONSERVATIVNOGO LECHENIIA BOL'NYKH OTOSKLEROZOM METODOM VNUTRIUSHNOGO ELEKTROFOREZA MAGNIIA SUL'FATA]
N P BELKINA, N I KRAEVA, L I EVSTRATOVA, N A KRIUKOVA, N V KRYLOVA, and A A LANTSOV (Leningradskii Nauchno-Issledovatel'skii Institut po Bolezniam Ukha, Gorla, Nosa i Rechi, Leningrad, USSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), Mar -Apr 1983, p 21-27 In Russian refs

A83-41833
CHANGES IN THE FORMATION OF ANTIBODIES CAUSED BY THE ADMINISTRATION OF IMMUNOMODULATORS IN THE RESPIRATORY ORGANS [IZMENENIIA ANTITELOOBRAZOVANIIA, OBUSLOVLENNYE VVEDENIEM IMMUNOMODULIATOROV V ORGANY DYKHANIIA]
N E ALEKSEEVA (Kievskii Nauchno-Issledovatel'skii Institut Otolaringologii, Kiev, Ukrainian SSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), Mar -Apr 1983, p 54, 55 In Russian

The characteristics of the modulation of local and systemic antibody formation were determined for 16 mice in their response to immunization by thymus-dependent antigens during injections into the respiratory organs of an effective immunodepressor (asathioprine) and immunostimulator (levamisole) It is found that the intratracheal administration of asathioprine induces primarily a local immunodeficiency in the mice The effective stimulation of local antibody formation in the respiratory organs by injection of levamisole indicates that this immunostimulator may be useful in clinical studies N B

A83-41841
SEVERAL SPECIFIC AND NONSPECIFIC RESPONSES OF THE BODIES OF HUMANS AND ANIMALS TO THE ACTION OF SHIP NOISE [O NEKOTORYKH SPETSIFICHESKIKH I NESPETSIFICHESKIKH REAKTSIIAKH ORGANIZMA CHELOVEKA I ZHIVOTNYKH NA VOZDEISTVIE SUDOVOGO SHUMA]
S S MARKARIAN, A A. VOLKOV, and A B SYSOEV (Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Gigieny Vodnogo Transporta, Moscow, USSR) Vestnik Otorinolaringologii (ISSN 0042-4668), Mar.-Apr. 1983, p 8-11 In Russian refs

The effects of ship noise on rats was studied in laboratory experiments and in natural conditions during a 3 month sea voyage. It was found that the effect of ship noise at a level of up to 85 dB evokes various changes in the physiological and biochemical parameters of the animals These effects were more pronounced with ship noise above 55 dB, values which are typical for cargo ships In addition, the dependence of the changes of specific (auditory) and nonspecific (psychological, physiological, and biochemical) parameters of humans on the intensity of ship noise and the accompanying effects of low-frequency vibration during relaxation in living quarters were investigated during a 1 5 and 3 month sea voyage The results of this study were used to establish

a level of sound which corresponds to hygienic demands in the conditions of extended sea voyages N B.

A83-41844
THE EFFECT OF ELECTROSTIMULATION OF THE HYPOTHALAMUS ON THE METHYLATION OF DNA FROM THE LIVERS OF RATS [VLIIANIE ELEKTROSTIMULIATSII GIPOTHALAMUSA NA METILIROVANIE DNK PECHENI KRYS]
G D BERDYSHEV, L N PAVLENKO, T. A BELODED, and A I MASIUK (Kievskii Gosudarstvennyi Universitet, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol 29, Mar.-Apr. 1983, p 221-223 In Russian refs

The mechanisms of the influence of the hypothalamus on the functional activity of the liver were studied by determining the influence of electrostimulation of the paraventricular nucleus of the hypothalamus on the change in the content of 5-methylcytosine in the DNA of rat liver cells. Results show that the content of 5-methylcytosine in the livers of the rats increased by 1.7 times over the control value 30 min after the electrostimulation of the hypothalamus One hour after the electrostimulation the content of 5-methylcytosine declined to 1 5 times the control value, while 2 hours after the electrostimulation it was only 1 1 times the control value It is proposed that the methylation of DNA is employed by the central nervous system to regulate many functions of the genetic apparatus of visceral organs. N B

A83-41845
THE DETERMINATION OF THE MINUTE VOLUME OF THE BLOOD BY A THERMAL DILUTION METHOD [K OPREDELENIIU MINUTNOGO OB'EMA KROVI METODOM TERMORAZVEDENIIA]
IU E DIACHENKO and R. K KHAIRETDINOV (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol 29, Mar -Apr 1983, p. 246-248. In Russian refs

A device is developed for measuring the minute volume of the blood which, during the injection of the indicator into the blood using a catheter, minimizes the errors caused by the heating of the catheter by the blood. A catheter is designed with a special thermistor which contains a heat sensitive element This catheter can measure the temperature of the indicator at the moment of injection, and can also register the thermal dilution curve in small laboratory animals. The construction and use of this catheter for the determination of the minute volume of the blood is examined, and diagrams of the catheter and the corresponding amplifier are presented. N B

A83-41846
A TECHNIQUE FOR THE EVALUATION OF THE TEMPERATURE PROFILE DURING LOCAL COOLING OF THE MEDULLA OBLONGATA [SPOSOB OTSENKI TEMPERATURNOGO PROFILIA PRI LOKAL'NOM OKHLAZHDENII PRODOLGOVATOGO MOZGA]
B IA. PESKOV, V. A. KULCHITSKII, and G B RABINOVICH (Kuibyshevskii Meditsinskii Institut, Kuibyshev, USSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol 29, Mar -Apr. 1983, p 249, 250 In Russian

A method is developed for determining the temperature field of the brain during local cooling of the ventral surface of the medulla oblongata This method of mathematical modeling, based on experimental data, allows a significant simplification of these determinations and can provide all of the necessary information. The use of this method was evaluated based on data obtained in experiments on 12 cats It is determined that the mathematical equations of thermal conductivity can be used to evaluate the temperature profile in the region of the chemically sensitive structures of the brain It is concluded that this mathematical model can be employed for studies of the distribution of the temperature profile of the brain during local cooling of the surface of the medulla oblongata N B.

A83-41847
A TECHNIQUE FOR OBTAINING ISOLATED SMOOTH MUSCLE CELLS [SPOSOBY POLUCHENIIA IZOLIROVANNYKH GLADKOMYSHECHNYKH KLETOK]
N V. KULIKOVA, V L ZIMA (Kievskii Gosudarstvennyi Universitet, Kiev, Ukrainian SSR), and P G BOGACH Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 29, Mar -Apr 1983, p. 251-253. In Russian. refs

A method is developed for obtaining a suspension of isolated smooth muscle cells which is a modification of previous techniques (Fay et al , 1976, Small, 1974) that provides a significantly increased yield of isolated cells This method was tested using tissue from the ureter and stomach of guinea pigs Several parameters were employed to analyze the method, including the yield of isolated cells, the form and size of the cells, the contractile capability of the cells during the action of acetylcholine and K(+) depolarization. It is concluded that the intact activity of isolated smooth muscle cells can be obtained by the use of trypsin and collagenase in a solution with a minimum concentration of Ca(2+) The use of this method preserves the main morphological characteristics of smooth muscle cells and the normal functional condition of the cells. N B

A83-41853* Miami Univ , Coral Gables, Fla.
MEMBRANE, ACTION, AND OSCILLATORY POTENTIALS IN SIMULATED PROTOCELLS
R M. SYREN, S. W FOX (Miami, University, Coral Gables, FL), A T PRZYBYLSKI, and W P. STRATTEN Naturwissenschaften (ISSN 0028-1042), vol 69, 1982, p 561-563 refs
(Contract NGR-10-007-008)

Electrical membrane potentials, oscillations, and action potentials are observed in proteinoid microspheres impaled with (3 M KCl) microelectrodes. Although effects are of greater magnitude when the vesicles contain glycerol and natural or synthetic lecithin, the results in the purely synthetic thermal protein structures are substantial, attaining 20 mV amplitude in some cases The results add the property of electrical potential to the other known properties of proteinoid microspheres, in their role as models for protocells Author

A83-41858* Miami Univ., Coral Gables, Fla
SELF-ORGANIZATION OF THE PROTOCELL WAS A FORWARD PROCESS
S. W FOX (Miami, University, Coral Gables, FL) and K MATSUNO (Nagoaka, Technological University, Nagoaka, Japan) Journal of Theoretical Biology (ISSN 0022-5193), vol 101, 1983, p 321-323. Research supported by the National Foundation for Cancer Research refs
(Contract NGR-10-007-008)

Yockey's (1981) interpretation of information theory relative to concepts of self-organization in the origin of life is criticized on the ground that it assumes that each amino acid residue type in a given sequence is an unaided information carrier throughout evolution It is argued that more than one amino acid residue can act as a unit information carrier, and that this was the case in prebiotic protein evolution Forward-extrapolation should be used to study prebiotic evolution, not backward-extrapolation Transposing the near-random internal order of modern proteins to primitive proteins, as Yockey has done, is an unsupported assumption and disagrees with the results of experimental models of the primordial type. Studies indicate that early primary information carriers in evolution were mixtures of free alpha amino acids which necessarily had the capability of sequencing themselves. C D

A83-41859* National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif.
TIBIAL CHANGES IN EXPERIMENTAL DISUSE OSTEOPOROSIS IN THE MONKEY
D R YOUNG, W. J NIKLOWITZ, and C R. STEELE (NASA, Ames Research Center, Moffett Field, CA) Calcified Tissue International (ISSN 0008-0594), vol 35, 1983, p 304-308 refs

The mechanical properties and structural changes in the monkey tibia with disuse osteoporosis and during subsequent recovery are

investigated Bone mending stiffness is evaluated in relation to microscopic changes in cortical bone and Norland bone mineral analysis. Restraint in the semireclined position is found to produce regional losses of bone most obviously in the anterior-proximal tibiae After six months of restraint, the greatest losses of bone mineral in the proximal tibiae range from 23 percent to 31 percent, the largest changes in bone stiffness range from 36 percent to 40 percent Approximately eight and one-half months of recovery are required to restore the normal bending properties Even after 15 months of recovery, however, the bone mineral content does not necessarily return to normal levels Histologically, resorption cavities in cortical bone are seen within one month of restraint, by two and one-half months of restraint there are large resorption cavities subperiosteally, endosteally, and intracortically After 15 months of recovery, the cortex consists mainly of first-generation haversian systems After 40 months, the cortex appears normal, with numerous secondary and tertiary generations of haversian systems C.R

A83-41861* National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif
ROLE OF METABOLIC RATE AND DNA-REPAIR IN DROSOPHILA AGING IMPLICATIONS FOR THE MITOCHONDRIAL MUTATION THEORY OF AGING
J MIQUEL, R BINNARD (NASA, Ames Research Center, Moffett Field, CA), and J E FLEMING (Linus Pauling Institute of Science and Medicine, Palo Alto, CA) Experimental Gerontology (ISSN 0531-5565), vol 18, 1983, p 167-171 refs

The notion that injury to mitochondrial DNA is a cause of intrinsic aging was tested by correlating the different respiration rates of several wild strains of Drosophila melanogaster with the life-spans Respiration rate and aging in a mutant of D melanogaster deficient in postreplication repair were also investigated In agreement with the rate of living theory, there was an inverse relation between oxygen consumption and median life-span in flies having normal DNA repair The mutant showed an abnormally low life-span as compared to the controls and also exhibited significant deficiency in mating fitness and a depressed metabolic rate Therefore, the short life-span of the mutant may be due to the congenital condition rather than to accelerated aging C D

A83-41989
PHOTORECEPTORS: THEIR ROLE IN VISION
A FEIN and E Z SZUTS (Woods Hole Oceanographic Institution, Marine Biological Laboratory, Woods Hole, MA) Cambridge, Cambridge University Press (IUPAB Biophysics Series, 5), 1982, 222 p refs

A basic text book of the role and physical characteristics of photoreceptors in vision is presented Attention is given to the physical parameters of light and the means by which photoreceptors extract data from the light The cellular morphology, visual pigment chemistry, and receptor physiology are explored, with an emphasis shared between vertebrate and nonvertebrate receptors Note is taken of membrane biochemistry, color vision, the psychophysics of threshold phenomena, and of extracellularly recorded potentials by apparatus such as the electroretinogram Molecular models for visual excitation and adaptation are defined, as are the microphysiological processes of phototransduction M S K

A83-42029
LIFE SCIENCES AND SPACE RESEARCH XX(2); PROCEEDINGS OF THE WORKSHOP AND TOPICAL MEETING, OTTAWA, CANADA, MAY 16-JUNE 2, 1982
W R HOLMQUIST, ED (California, University, Berkeley, CA) Workshop and meeting sponsored by COSPAR Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, 277 p

Papers are presented on recent research concerning chemical evolution and the origin of life, global ecology and remote sensing, and gravitational biology Topics discussed include amino acids in meteorites, the atmosphere of the primitive earth and the prebiotic synthesis of organic compounds, peptide synthesis and reactions of nucleosides and nucleotides, the use of remote sensing in global biosystem studies, satellites for the study of ocean primary productivity, and prebiotic oligodeoxynucleotide synthesis in a cyclic evaporating system at low temperatures. Also examined are gravity and positional homeostasis of the cell, the gravitational field and brain function, gravitational effects on human cardiovascular responses to isometric muscle contractions, the state of gravity sensors and peculiarities of plant growth during different gravitational loads, and gravitational effects on the concentration of plant growth hormone N B

A83-42039
CHANGES IN THE AMINO ACID CODE
T H JUKES (California, University, Berkeley, CA) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 107-111 refs

The evolution of the amino acid genetic code is examined, focusing on the implications of the discovery of the mammalian mitochondrial code which differs from the universal genetic code It is shown that differences exist from the universal code in mitochondrial coding systems, and that mitochondrial systems also differ from each other It is suggested that archetypal codes having fewer anticodons than at present preceded the present universal code The mammalian mitochondrial code may be an early code, intermediate between the archetypal and universal code Possible steps in the evolution of the universal code are examined based on the properties of the mitochondrial code N B

A83-42043
EXPERIMENTAL AND THEORETICAL ANALYSIS OF THE INFLUENCE OF GRAVITY AT THE CELLULAR LEVEL - A REVIEW
M G TAIRBEKOV, G. P PARFENOV, E IA. SHEPELEV, and F V SUSHKOV (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 153-158 refs

A review is presented of experimental studies of the influence of gravity at the cellular level It is shown that unicellular free-living organisms are indifferent to alterations of the extent and the direction of the gravitational field. Weightlessness is found not to directly affect cell metabolism, since the main biological processes at the subcellular and molecular levels are gravity-independent. Weightlessness is determined to alter integral indices of functioning of the suspension of unicellular organisms, such as the population density, the growth dynamics, and the release of biomass However, these alterations are shown to be of an indirect nature and can be realized due to changes in concentration gradients within the medium In addition, an effect of weightlessness at the cellular level is found to be possible provided that the cell functions within the single multicellular organism These cellular changes are a result of the shift of general metabolism at the level of a whole organism N B

A83-42044* Michigan Univ , Ann Arbor
GRAVITY AND POSITIONAL HOMEOSTASIS OF THE CELL
G W NACE (Michigan, University, Ann Arbor, MI) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 159-168 refs
(Contract NAGW-29; NAS2-10945)

The effect of gravity upon cytoplasmic aggregates of the size present in eggs and upon cells is investigated An expression is developed to describe the tendency of torque to rotate the egg and reorganize its constituents This expression provides the net torque resulting from buoyancy and gravity acting upon a dumbbell-shaped cell, with heavy and light masses at either end and floating in a medium Torques of approximately 2 5 x 10 to the -13th to 0.85 dyne-cm are found to act upon cells ranging

from 6 4 microns to 31 mm (chicken egg). It is noted that cells must expend energy to maintain positional homeostasis against gravity, as demonstrated by results from Skylab 3, where tissue cultures used 58 percent more glucose on earth than in space The implications for developmental biology, physiology, genetics, and evolution are discussed It is argued that at the cellular and tissue levels the concept of gravity receptors may be unnecessary. N B

A83-42045
THE GRAVITATIONAL FIELD AND BRAIN FUNCTION
L MEI, C -D. ZHOU, J.-Q LAN, Z -G. WANG, W -C WU, and X -M XUE (Institute of Space Medico-Engineering, Beijing, People's Republic of China) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no. 9, 1983, p 171-177 refs

The significance of the growth of complexity and function of the human frontal lobe is discussed with regard to problems caused by microgravity conditions Correlations have been found between brain and body weight, with creatures having larger brains having evolved from species with lighter bodies The frontal lobe is the most recent of cephalic evolutionary steps, and developed in a time of complex locomotion and tool handling in a gravitational field Tests with humans under 10 g acceleration have revealed that an augmentation of the negative, rather than positive, potential spikes of the brain, combined with synchronization of the high frequency components in the power spectra, were acompanied by improved human performance The reverse results were obtained with bed rest studies The increased frontal brain activity was also observed in rabbits undergoing gravity alterations However, some memory impairment has been experienced by orbiting astronauts The Chinese Qigong meditative state, reached in a manner similar to biofeedback, has produced frontal state hypersynchronization, thus opening the possibility of autonomic control of brain functions with ancient techniques and/or a brain-computer link M S K

A83-42046* Michigan Univ , Ann Arbor
GRAVITY AND THE CELLS OF GRAVITY RECEPTORS IN MAMMALS
M D ROSS (Michigan, University, Ann Arbor, MI) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 179-190 refs
(Contract NSG-9047, NAS2-10535)

A model of the mammalian gravity receptor system is presented, with attention given to the effects of weightlessness Two receptors are on each side of the head, with end organs in the saccule and utricle of the vestibular membranous labyrinth of the inner ear, embedded in the temporal bone Each end organ has a macula, containing hair cells and supporting cells, and an otoconial complex, an otoconial membrane and mineral masses called otoconia X ray powder diffraction examinations have revealed that the otoconia can behave like crystals, i e., with piezoelectric properties, due to the mineral deposits Bending of the hair cells because of acceleration can put pressure on the otoconial mineral, producing an electrical signal in the absence of a gravitational field. The possibility that pyroelectricity, as well as piezoelectricity, is present in the otoconial complexes, is discussed M S K.

A83-42047* Medical Coll of Wisconsin, Milwaukee
RESEARCH ON THE ADAPTATION OF SKELETAL MUSCLE TO HYPOGRAVITY PAST AND FUTURE DIRECTIONS
D A. RILEY (Wisconsin, Medical College, Milwaukee, WI) and S ELLIS (NASA, Ames Research Center, Moffett Field, CA) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol. 3, no 9, 1983, p 191-197 refs

The results of previous research on the cellular effects of microgravity on rat tissue are reviewed and areas of future necessary research are identified The rats were flown on board Cosmos 605, 782, and 936 Postflight tissue analyses revealed increases in connective tissue cells and focal disruption of muscle fibers due to the microgravity environment of space Evidence has been found for muscular and neural changes occurring as a result of reentry stresses. It is suggested that a data base be established for quantizing muscle function with electromyography, measurements of force output, and length measurement The data can serve as a reference for comparisons with data obtained in orbiting laboratories such as the Spacelab The experiments will have a goal of defining and preventing the mechanism of neuromuscular atrophy M S K

A83-42050
THE STATE OF GRAVITY SENSORS AND PECULIARITIES OF PLANT GROWTH DURING DIFFERENT GRAVITATIONAL LOADS
A J MERKYS, R S LAURINAVICHIUS, O J RUPAINENE, E K SAVICHENE, A V JAROSHIUS, D V SHVEGZHDENE, and D P BENDORAITYTE (Lithuanian Academy of Sciences, Institute of Botany, Vilnyus, Lithuanian SSR) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p. 211-219 refs

The state of the art in identification of plant gravity receptors is assessed, together with the ability of plants to tolerate gravity loads. Altered gravitational growth was examined by growing plants in an inverted state, on a horizontal clinostat, and on a centrifuged clinostat, as well as on the Salyut 6 space station Alterations in the positions of the amyloplasts indicated that any change in the usual direction and value of gravity will produce modification of the morphological structure and growth of root cells. The polarizing effect of gravity in the longitudinal direction of the cell was concluded to be a constant dynamic process involving a gravitation vector interaction with the active streaming and convective currents of the cytoplasm The growth-to-seeding of Aridopsis on board the Salyut 7 station demonstrated that the gravity receptors do not control the growth and formative processes of plants, although some gravitational input may be necessary to orient the plant in a suitable growth direction M S.K

A83-42051* Texas Univ , Austin
CALCIUM MOVEMENTS AND THE CELLULAR BASIS OF GRAVITROPISM
S J ROUX, R L BIRO, and C C HALE, II (Texas, University, Austin, TX) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no. 9, 1983, p 221-227. refs
(Contract NSG-7480)

Evidence that calcium is a significant factor in gravitropism of plants is examined, together with the regulatory mechanism that controls calcium efflux in plant cells Calcium has been found to accumulate on the upper surface of a plant placed in a horizontal attitude, which is followed by growth to the vertical within a half-hour It has also been determined that the upper surface of the plant simultaneously experiences a reduced growth rate, compared to the lower surface The substance calmodulin has been identified as the calcium-binding regulatory protein most influential in the transduction process leading to gravitropism, while chlorpromazine can inhibit its effects The calcium is transported by ATPase located in the cell membrane A possibility that the calcium pump is regulated by a feedback mechanism involving the presence of calmodulin is discussed M S K

A83-42052* Michigan State Univ , East Lansing
GRAVITATIONAL EFFECTS ON PLANT GROWTH HORMONE CONCENTRATION
R S BANDURSKI and A. SCHULZE (Michigan State University, East Lansing, MI) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 229-235 refs
(Contract NAGW-97, NSF PCM-79-04637, NASA ORDER 25796)

Dolk's (1936) finding that more growth hormone diffuses from the lower side of a gravity-stimulated plant shoot than from the upper side is presently confirmed by means of both an isotope dilution assay and selected ion monitoring-gas chromatography-mass spectrometry, and it is established that the asymmetrically distributed hormone is indole-3-acetic acid (IAA) This is the first physicochemical demonstration that there is more IAA on the lower sides of a geostimulated plant shoot It is also found that free IAA primarily occurs in the conductive vascular tissues of the shoot, while IAA esters predominate in the growing cortical cells A highly sensitive gas chromatographic isotope dilution assay shows that the hormone asymmetry also occurs in the nonvascular tissue O C

A83-42053
FUNCTIONAL STATE OF CHROMATIN AND PROLIFERATIVE ACTIVITY OF MERISTEMATIC CELLS IN PEA SEEDLINGS UNDER VARIOUS CLINOSTATIC CONDITIONS
V M FOMICHEVA and V A ZASLAVSKII (Ukrainian Academy of Sciences, Institute of Botany, Kiev, Ukrainian SSR) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 237-240 refs

A83-42054* Hawaii Univ , Honolulu
SHORT-TERM AND LONG-TERM CLINOSTAT AND VIBRATION-INDUCED BIOCHEMICAL CHANGES IN DWARF MARIGOLD STEMS
S M SIEGEL and B Z SIEGEL (Hawaii, University, Honolulu, HI) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 241-245 refs
(Contract NGR-12-001-053, NAS2-6624, NAS2-8687)

Stems of 21-day dwarf marigold plants cultivated on the clinostat were compared with plants cultivated on vertical axis rotators ('vibrational controls') and stationary controls for long-term changes in cell wall composition Stems of 21-day plants grown under stationary conditions and subsequently exposed to the clinostat for 24 hours were also analyzed Among the long-term markers, calcium, lignin, and protein-bound hemicellulose (possibly cell wall glycoprotein) clearly differentiated the effects of vibration from those of the clinostat Short-term differential responses included rate of ethylene production, nastic movement and peroxidase activity of the cell wall, but not of the protoplast Author

A83-42055
PECULIARITIES OF GENITAL ORGAN FORMATION IN ARABIDOPSIS THALIANA (L) HEYNH. UNDER SPACEFLIGHT CONDITIONS
E L KORDIUM, K M SYTNIK, and I I. CHERNIAEVA (Ukrainian Academy of Sciences, Institute of Botany, Kiev, Ukrainian SSR) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 247-250 refs

An experiment was carried out aboard the Salyut 6 research orbital station on Arabidopsis thaliana cultivations The seeds were sprouted in the Svetoblok 1 device which provides for plant growth in the agar medium under sterile conditions and at 4000 lux illumination The experimental plants, as well as the controls, reached approximately the same developmental stages both flowered and began to bear fruit A microscopic examination of the generative organs in the control and experimental plants shows that in normally formed (by appearance) flower buds and flowers of the experimental plants, as distinct from the controls, there were no fertile elements of the adroecium and gynoecium Degeneration of the latter occurred at different stages of generative organ development Possible reasons for this phenomenon in plants grown under weightless conditions are considered Author

A83-42056
BIOLOGICAL EFFECTS OF WEIGHTLESSNESS AND CLINOSTATIC CONDITIONS REGISTERED IN CELLS OF ROOT MERISTEM AND CAP OF HIGHER PLANTS
K M SYTNIK, E L KORDIUM, N A BELIAVSKAIA, E M NEDUKHA, and V A TARASENKO (Ukrainian Akademy of Sciences, Institute of Botany, Kiev, Ukrainian SSR) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 251-255 refs

A83-42057
INFLUENCE OF ZERO GRAVITY SIMULATION ON TIME COURSE OF MITOSIS IN MICROPLASMODIA OF PHYSARUM POLYCEPHALUM
V SOBICK and W BRIEGLEB (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmedizin, Cologne, West Germany) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 259-262 refs

Detrimental effects of weightlessness are no longer expected to hinder successful mitosis Experiments in space and on the fast clinostat give no hints of this Nevertheless a g sensitivity during the process of chromosome condensation and distribution is suggested The time course of nuclear division in microplasmodia of the slime mold Physarum polycephalum was investigated under 0 g simulation on the fast rotating clinostat in comparison to 1 g controls The result of this experiment is A significant shortening of mitosis under 0 g simulation compared to 1 g controls Author

A83-42058
CHANGES IN SYMBIOTIC AND ASSOCIATIVE INTERRELATIONS IN A HIGHER PLANT-BACTERIAL SYSTEM DURING SPACE FLIGHT
V A KORDIUM, V G MANKO (Ukrainian Academy of Sciences, Institute of Molecular Biology and Genetics, Kiev, Ukrainian SSR), A F. POPOVA, O. KH SHCHERBAK (Ukrainian Academy of Sciences, Institute of Botany, Kiev, Ukrainian SSR), A L MASHINSKII (All-Union Scientific Research Institute of Bioengineering, Moscow, USSR), and MR. NGUEN-HGUE-THYOK (Vietnam National Research Center, Institute of Biology, Hanoi, Democratic Republic of Vietnam) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 265-268

The miniature cenosis consisting of the water fern Azolla with its associated symbiotic nitrogen-fixing cyanobacterium Anabaena and the concomitant bacteria was investigated. Ecological closure was shown to produce sharp quantitative and qualitative changes in the number and type of concomitant bacteria Changes in the distribution of bacterial types grown on beef-extract broth after space flight were recorded Anabaena azollae underwent the most significant changes under spaceflight conditions Its cell number per Azolla biomass unit increased substantially Thus closure of cenosis resulted in a weakening of control over microbial development by Azolla This tendency was augmented by spaceflight factors Reduction in control exerted by macro-organisms over development of associated microorganisms must be taken into account in constructing closed ecological systems in the state of weightlessness Author

A83-42069
THE DISCRIMINATION OF AMPLITUDE AND TEMPORAL PARAMETERS OF THE DIRECT ELECTRICAL STIMULATION OF THE VISUAL CORTEX [O RAZLICHENII AMPLITUDNYKH I VREMENNYKH PARAMETROV PRIAMOI ELEKTRICHESKOI STIMUL'IATSII ZRITEL'NOI KORY]
E B. KOMPANEETS (Rostovskii Gosudarstvennyi Universitet, Rostov-on-Don, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 270, no 5, 1983, p. 1254-1256 In Russian refs

The possibility of differentiating the direct electrostimulation of the visual cortex in the case of equivalent spatial positioning of the electrodes but with various parameters of stimuli through the electrodes is studied in experiments with cats Results show a high allowance capability of the visual cortex of cats in conditions of direct electrical stimulation The patterns of the conditioned-reflex differentiated mosaic of the electrical stimulation of the visual cortex are found to have equivalent spatial characteristics which differ by the parameters of the stimulation by separate channels. This finding indicates a possible method for the coding of the properties of light signals in conditions of a direct injection of visual information into the brain It is also noted that the conditioned-reflex differentiated mosaic of electrical stimulations, which differs according to the frequency of the movement of stimuli, is characterized by a lesser solidity N B

A83-42090
THE ROLE OF INHIBITION IN THE FORMATION OF A DYNAMIC MOSAIC OF NEURONAL ASSEMBLIES IN THE CEREBRAL CORTEX [O ROLI TORMOZHENIIA V FORMIROVANII DINAMICHESKOI MOZAIKI NEIRONNYKH ANSAMBLEI V KORE MOZGA]
A B. KOGAN and P. N. ERMAKOV (Rostovskii Gosudarstvennyi Universitet, Rostov-on-Don, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, June 1983, p 721-726 In Russian refs

The role of inhibition in the formation of a mosaic of neuronal assemblies is investigated in rats by studying the spatial and temporal organization of the neuronal reaction in the visual cortex of rats to the effect of a light stimulus of various sizes on the retina Results show that inhibition plays a leading role in the formation of dynamic mosaics of neuronal assemblies Two different systems of inhibition (afferent and recurrent) are determined to participate in various degrees to the organization of the working brain mechanisms during the action of various stimuli. The system of recurrent inhibition causes the formation of a mosaic of neuronal activity which corresponds to local stimuli Diffuse light stimulation activates the genetically complex links of various levels of the visual analyzer The formation of the microfoci of the stimulus is connected with the system of afferent inhibition, which also inhibits the afferent signals through the intercalative neurons N B

A83-42091
THE LATERALIZATION OF THE HEMISPHERE CONTROL OF INHIBITION STABILITY [LATERALIZATSIIA POLUSHARNOGO KONTROLIA POMEKHOUSTOICHIVOSTI]
V L. BIANKI and G. P. UDALOVA (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, June 1983, p 727-738 In Russian refs

Bilateral mechanisms, the hemisphere specialization, and the sexual dimorphism of inhibition resistance of the visual system were studied in conditioned reflex and electrophysiological experiments using rats and cats A right-sided specialization of the hemisphere control of visual recognition in noise and its inhibition stability was found in rats The activity of the right hemisphere was found to contribute more than the activity of the left hemisphere The role of bilateral mechanisms in the inhibition stability of the visual system is described for rats and cats After the callosotomy, the discrimination of the signal from the noise can either get worse or improve, depending on several conditions The role of the dominant mechanisms in the formation of a certain level of inhibition stability is shown. The finding of a significant sexual dimorphism of inhibition resistance in rats indicates that both the intact and split brain are more stable to inhibition and have a greater asymmetry in males than in females N B

A83-42092
THE CHARACTERISTICS OF THE EVOKED ELECTRICAL REACTIONS OF THE NUCLEUS LATERALIS POSTERIOR OF THE THALAMUS OF RABBITS AND THEIR DEPENDENCE ON THE FUNCTIONAL CONDITION OF THE CORTEX AND THE RETICULAR FORMATION [KHARAKTERISTIKA VYZVANNYKH ELEKTRICHESKIKH REAKTSII NUCLEUS LATERALIS POSTERIOR TALAMUSA KROLIKA I IKH ZAVISIMOST' OT FUNKTSIONAL'NOGO SOSTOIANIIA KORY I RETIKULIARNOI FORMATSII]
S. A. GASANOVA, N A. GADZHIEVA, and A I. DMITRENKO (Akademiia Nauk Azerbaidzhanskoi SSR, Institut Fiziologii, Baku, Azerbaidzhan SSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, June 1983, p. 739-747 In Russian. refs

A83-42093
THE CHANGES IN THE CONTENT OF CATECHOLAMINES IN THE DOPAMINE-SYNTHESIZING NUCLEI OF THE BRAIN OF RATS IN CONDITIONS OF IMMOBILIZATION STRESS [IZMENENIIA SODERZHANIIA KATEKHOLAMINOV V DOFAMINSINTEZIRUIUSHCHIKH IADRAKH MOZGA KRYS V USLOVIIAKH IMMOBILIZATSIONNOGO STRESSA]
T I BELOVA, R KVETNANSKII, Z OPRSHALOVA, and A. KISH (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR, Slovenska Akademia Vied, Ustav Experimentalnej Endokrinologie, Bratislava, Czechoslovakia) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, June 1983, p 761-767 In Russian refs

A83-42094
THE ORGANIZATION OF THE RECEPTOR INPUTS OF THE RECEPTIVE FIELDS OF GANGLIONIC CELLS OF THE RETINA OF FROGS [ORGANIZATSIIA RETSEPTORNYKH VKHODOV RETSEPTIVNYKH POLEI GANGLIOZNYKH KLETOK SETCHATKI LIAGUSHKI]
B. A FUNTIKOV and A IA KORESHEV (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, June 1983, p 789-794 In Russian refs

A83-42095
THE REACTION OF RESPIRATORY NEURONS OF RATS TO INCREASING HYPERCAPNIA [REAKTSII DYKHATEL'NYKH NEIRONOV KRYSY NA NARASTAIUSHCHUIU GIPERKAPNIIU]
O S SERGEEV (Meditsinskii Institut, Kuibyshev, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, June 1983, p. 811-818 In Russian. refs

The responses of 247 respiratory neurons of the ventrolateral structures of the medulla oblongata (the region of the ambigual complex) were studied in anesthetized laboratory rats in conditions of hypercapnia (2-6 percent CO2 in O2 or air) In both the transitory state and in the steady state, the activity of inspiratory and expiratory cells increased The number of spikes increased, the length of the interspike intervals shortened, and the mean and instantaneous rates of firing increased The response of several expiratory neurons to hypercapnia was expressed in the lengthening of the burst duration and the increase in the number of spikes. The character of the distribution of the interspike intervals remained unchanged N B.

A83-42096
AGE-RELATED CHARACTERISTICS OF THE PROSTAGLANDIN SYSTEM IN SEVERAL ORGANS [VOZRASTNYE OSOBENNOSTI PROSTAGLANDINOVOI SISTEMY V NEKOTORYKH ORGANAKH]
KH M MARKOV, I A IVANOVA, and G F ZADKOVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, June 1983, p 832-837 In Russian refs

The biosynthesis of PGE2, PGF2-alpha, and PGI2 from (C-14)-arachidonic acid and the catabolism of (H-3)-PGF1-alpha and (H-3)-PGE2 were studied in homogenates from the kidney, aorta, and lungs of young (1 5 months) and fully-grown (3 5 months) rats An increased synthesis of PGE2 was observed in the aorta and kidneys and PGI2 in the lungs and heart of young rats The formation of PGF2-alpha in the kidneys did not change with age The catabolism of (H-3)-PGE2 in the lungs and kidneys was more intensive in young rats, while the degradation of (H-3)-PGF1-alpha in the kidneys did not change with age A close correlation was found between the biosynthesis coefficients PGF/PPE in the kidneys and the arterial pressure in young (but not in fully-grown) rats A reciprocal relationship was found between the biosynthesis and catabolic coefficients PGF/PGE in the kidney, aorta, and lungs of both young and fully-grown rats It is concluded that the processes of biosynthesis and catabolism of prostaglandins maintain a constant level of these biologically active substances in the systemic circulation N B

A83-42097
THE EFFECT OF PROSTAGLANDIN ANALOGS ON SYSTEMIC BLOOD CIRCULATION [DEISTVIE ANALOGOV PROSTAGLANDINA NA SISTEMNOE KROVOOBRASHCHENIE]
L I OSADCHII and R P KHROPYCHEVA (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, June 1983, p. 851-855 In Russian refs

The effects of two prostaglandin analogs, E-DL-11-deoxy E1 (I) and DL-15B-Me-deoxy E1 (II), on the parameters of the systemic hemodynamics (arterial pressure and cardiac output) were studied in cats and these effects were compared with the action of standard preparations of optically active prostaglandin E1 The injection of both I and II always evoked a decrease in the arterial pressure The hypotensive effect began after 2-3 sec, achieved a maximum after 20-25 sec, and disappeared after 1-2 min It is concluded that the depressing reaction observed following the injection of these prostaglandin analogs causes primarily a systemic vasodilation The coronary component of this response is caused by both the direct effect on the myocardium and the secondary action on the cardiac processes occurring in the vascular system N B

A83-42098
A DEVICE FOR THE CONTINUOUS DETERMINATION OF THE OXYGEN DEMAND AND THE WATER LOSS OF SMALL ANIMALS [USTROISTVO DLIA NEPRERYVNOGO OPREDELENIIA POTREBLENIIA KISLORODA I VLAGOPOTER' U MELKIKH ZHIVOTNYKH]
I P VORONOVA, P V LAZARENKO, and M A IAKIMENKO (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, June 1983, p 859-861 In Russian refs

A83-42156* Alabama Univ , Birmingham
EXPERIMENTAL STUDIES RELATED TO THE ORIGIN OF THE GENETIC CODE AND THE PROCESS OF PROTEIN SYNTHESIS - A REVIEW
J C LACEY, JR and D W MULLINS, JR (Alabama, University, Birmingham, AL) Origins of Life (ISSN 0302-1688), vol 13, March 1983, p 3-42 refs
(Contract NGR-01-010-001)

A survey is presented of the literature on the experimental evidence for the genetic code assignments and the chemical reactions involved in the process of protein synthesis In view of the enormous number of theoretical models that have been advanced to explain the origin of the genetic code, attention is confined to experimental studies Since genetic coding has significance only within the context of protein synthesis, it is believed that the problem of the origin of the code must be dealt with in terms of the origin of the process of protein synthesis It is contended that the answers must lie in the nature of the molecules, amino acids and nucleotides, the affinities they might have for one another, and the effect that those affinities must have on the chemical reactions that are related to primitive protein synthesis The survey establishes that for the bulk of amino acids, there is a direct and significant correlation between the hydrophobicity rank of the amino acids and the hydrophobicity rank of their anticodonic dinucleotides C R.

A83-42159* National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif
STABILIZATION OF THE YEAST DESATURASE SYSTEM BY LOW LEVELS OF OXYGEN
C M VOLKMANN and H P KLEIN (NASA, Ames Research Center, Moffett Field, CA) Origins of Life (ISSN 0302-1688), vol 13, March 1983, p. 57-59 refs

The stability of particulate palmitoyl-CoA desaturase preparations from anaerobically grown yeast cells was increased by exposure to low levels of oxygen The stabilizing effect of oxygen may be based upon the increased amounts of palmitoleic acid and ergosterol that become available to the cells These results suggest the evolutinary appearance of this system at a time when atmospheric oxygen was at a low level Author

A83-42174* National Aeronautics and Space Administration Goddard Inst for Space Studies, New York
THE ENCHANTED LOOM
R JASTROW (NASA, Goddard Institute for Space Studies, Columbia University, New York, NY, Dartmouth College, Hanover, NH) New York, Simon and Schuster, 1981, 183 p.

The evolution of intelligence began with the movement of Crossopterygian fish onto land The eventual appearance of large dinosaurs eliminated all but the smallest of mammalian creatures, with the survivors forced to move only nocturnally, when enhanced olfactory and aural faculties were favored and involved a larger grey matter/body mass ratio than possessed by the dinosaurs Additionally, the mammals made comparisons between the inputs of various senses, implying the presence of significant memory capacity and an ability to abstract survival information More complex behavior occurred with the advent of tree dwellers (forward-looking eyes), hands, color vision, and the ability to grip and manipulate objects An extra pound of brain evolved in the human skull in less than a million years The neural processes that can lead to an action by a creature with a brain are mimicked by the basic AND and OR gates in computers, which are rapidly approaching the circuit density of the human brain It is suggested that humans will eventually produce computers of higher intelligence than people possess, and computer spacecraft, alive in an electronic sense, will travel outward to explore the universe M S K

A83-42397
EVOLUTION OF THE AMINO ACID CODE - INFERENCES FROM MITOCHONDRIAL CODES
T H JUKES (California, University, Berkeley, CA) Journal of Molecular Evolution (ISSN 0022-2844), vol 19, July 1983, p 219-225 refs

The amino acid code is usually presented as a table of 64 codons Actually the code results from the action of tRNA molecules that carry amino acids to codons in mRNA by means of codon-anticodon pairing The tRNA molecules are transcribed from genes that undergo evolution and the number of anticodons can therefore increase during evolution, but the number of codons is fixed at 64 Mammalian mitochondrial codes contain only 22 anticodons for 20 amino acids as compared with 54 anaticodons for 20 amino acids in the universal code It is proposed that an archetypal code containing 16 anticodons for 15 amino acids

evolved into the universal code by gene duplication, followed by mutations that modified the anticodons and amino acid acceptor sites. In substantiation of this proposal, it is noted that the mammalian mitochondrial code is simplified by comparison with the universal code For example, single anticodons are used for each of eight amino acids in the mammalian mitochondrial code. This simplification may represent an evolutionary retrogression towards the proposed archetypal code Author

A83-42399
THE EVOLUTIONARY PATTERN OF AROMATIC AMINO ACID BIOSYNTHESIS AND THE EMERGING PHYLOGENY OF PSEUDOMONAD BACTERIA
G S BYNG, R J WHITAKER, R A. JENSEN (New York, State University, Binghamton, NY), J. L. JOHNSON (Virginia Polytechnic Institute and State University, Blacksburg, VA), and R. L. GHERNA (American Type Culture Collection, Rockville, MD) Journal of Molecular Evolution (ISSN 0022-2844), vol 19, July 1983, p 272-282. refs
(Contract NSF DEB-82-08956)

A83-42639
COMPUTER SIMULATION OF THE MAIN GEL-FLUID PHASE TRANSITION OF LIPID BILAYERS
O G MOURITSEN (Aarhus Universitet, Aarhus, Denmark), A BOOTHROYD, R HARRIS, M J ZUCKERMANN (McGill University, Montreal, Canada), N. JAN, T LOOKMAN, L. MACDONALD, and D A PINK (Saint Francis Xavier University, Antigonish, Nova Scotia, Canada) Journal of Chemical Physics (ISSN 0021-9606), vol 79, Aug 15, 1983, p. 2027-2041 Research supported by the A/S De Danske Spritfabrikkers Jubileumslegat, Natural Sciences and Engineering Research Council of Canada, Ministere de l'Education du Quebec, Saint Francis Xavier University, and Statens Naturvidenskabelige Forskningsrad. refs

A83-42822
THE BIOSPHERE
P CLOUD Scientific American (ISSN 0036-8733), vol 249, Sept 1983, p 176-181, 183-185, 187-189

The influence of the lithosphere, the hydrosphere, and the atmosphere on the evolution of life is discussed The growth of an oxygen atmosphere during the history of life, and the increasing ability of living things to make use of it, are described The role of natural selection in this process is stressed The history of pre-Phanerozoic and Cambrian evolution is recapitulated, describing and discussing each major evolutionary advance and relating it to physical conditions C D

A83-43476
CANINE BLOOD VOLUME AND CARDIOVASCULAR FUNCTION DURING HYPERTHERMIA
K. MIKI, T MORIMOTO, H NOSE, T ITOH, and S YAMADA (Kyoto Prefectural University of Medicine, Kyoto, Japan) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Aug 1983, p 300-306. refs

The effect of acute hyperthermia on hemodynamic functions and blood volume regulation was examined in eight splenectomized dogs A rise in core temperature of about 2 C resulted in peripheral vasodilatation to dissipate body heat. Consequently, total peripheral resistance decreased by about 20 percent, which caused an increase in cardiac output. Simultaneously, blood was redistributed from the splanchnic to the cutaneous circulation These circulatory changes caused a relatively higher retention of infused fluid within the vascular space during hyperthermia than during normothermia Although plasma volume remained constant during the heating period, the mechanism causing preferential increased fluid retention within the intravascular space during heat exposure plays an important role in maintaining cardiovascular function C D

A83-43478
OXYGEN TOXICITY IN CULTURED AORTIC ENDOTHELIUM SELENIUM-INDUCED PARTIAL PROTECTIVE EFFECT
B HOUSSET, C ODY, D B. RUBIN, G ELEMER, and A. F. JUNOD (Hopital Cantonal Universitaire, Geneva, Switzerland) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Aug. 1983, p. 343-352 Sponsorship Swiss National Science Foundation refs
(Contract SNSF-3,721,80)

A83-43486
EFFECT OF CATECHOLAMINE DEPLETION ON VENTILATORY CONTROL IN UNANESTHETIZED NORMOXIC AND HYPOXIC RATS
D R MCCRIMMON, J A. DEMPSEY, and E. B OLSON, JR (Wisconsin, University, Madison, WI) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Aug. 1983, p 522-528 refs
(Contract NIH-HL-15469, NIH-HL-24429, DAMD17-77-C-7006)

The ventilatory effects produced by pharmacological depletion of endogeneous catecholamines were examined during air-breathing eupnea and acclimatization to hypoxia in awake unrestrained rats. The methods used are described, including the animal preparation, measurement of ventilation, of oxygen consumption, and of arterial blood gases, tissue analysis, experimental protocols, reproducibility of measurements, statistical analysis, and chemicals. Results are presented for monoamine depletion, ventilatory effects of vehicle injections and of monoamine depletion in normoxia, acute exposure to hypoxia and return to normoxia, and long-term hypoxia and acute return to normoxia The results indicate that a marked depletion of catecholamines is required to produce even a relatively small ventilatory effect, and implicated norepinephrine and/or carotid body dopamine in a mild inhibition of breathing in the awake, intact rat. Neither norepinephrine nor dopamine appear to be required for mediation of ventilatory acclimatization to chronic hypoxia C D

A83-43487
EFFECTS OF CHRONIC HYPOXIA ON PULMONARY VASCULAR RESPONSES TO BIOGENIC AMINES
R J PORCELLI (U S Veterans Administration Medical Center, Northport, NY) and M J BERGMAN (New York, State University, Stony Brook, NY) Journal of Applied Physiology. Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 55, Aug 1983, p 534-540 Research supported by the U S Veterans Administration refs
(Contract NIH-HL-23210)

The effect of chronic hypoxia on pulmonary vascular resistance changes to histamine, 5-hydroxytryptamine (5-HT), norepinephrine (NE), and KCl were studied in isolated perfused lungs from control rats and rats exposed to 7, 14, and 28 days of hypoxia Histamine, which produced linear increases in pulmonary vascular resistance with increasing doses in the control, was reversed to vasodilation by chronic hypoxia of 7 and 14 days, at 28 days, vasodilation to this amine still predominated Control responses to 5-HT were unaltered by seven days of hypoxia but enhanced at 14 and 28 days Control responses to NE showed either vasoconstriction or vasodilation At seven days of hypoxia, NE had no significant vasoactivity, but at 14 days vasoconstriction and vasodilation were both observed, the latter being more effective The pressor response to KCl were not affected by chronic hypoxia of any duration C D

A83-43488
A COMPARISON OF METHODS FOR QUANTITATION OF METABOLITES IN SKELETAL MUSCLE
R L SABINA, J L SWAIN, J J HINES, and E W HOLMES (Duke University Medical Center, Durham, NC) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Aug 1983, p 624-627 refs
(Contract NIH-AM-12413, NIH-HL-26831; NIH-RR-30)

Quantitation of gastrocnemius muscle metabolites in mice was evaluated using three commonly employed descriptors wet weight,

total protein, and total creatine A fourth previously unreported descriptor, NAD(+), was also evaluated In resting muscle the coefficients of variation were similar when the metabolite data were normalized by any of the four descriptors However, in tetanically stimulated muscle, normalization by wet weight yielded metabolite levels which were 23-25 percent lower than the results obtained when the data were normalized by total protein, total creatine, or NAD(+) Author

A83-43545
SPECIFICITY OF CORTICO-CORTICAL CONNECTIONS IN MONKEY VISUAL SYSTEM
M S LIVINGSTONE and D. H HUBEL (Harvard University, Boston, MA) Nature (ISSN 0028-0836), vol 304, Aug 11, 1983, p 531-534 Research supported by the Klingenstein Fund and Rowland Foundation refs
(Contract NIH-EY-00605)

It is noted that when the primate primary visual cortex, area 17, is stained for the mitochondrial enzyme cytochrome oxidase, it shows a striking polka-dot pattern (cytochrome oxidase blobs) Area 18, the second visual area, exhibits a cytochrome-oxidase pattern of coarse alternating thick and thin stripes running perpendicular to the 17-18 border and separated by lighter (interstripe) regions It is shown here that the thin cytochrome oxidase stripes and, possibly, the thick stripes as well in area 18 receive projections specifically from the blobs in area 17 and that the interstripe regions of 18 receive projections from the interblob matrix of area 17 This suggests a specificity of cortico-cortical connections far exceeding the demands of topographical mapping Together with the physiological results, it indicates that within the pathway from area 17 to area 18 different kinds of information may be handled separately and in parallel C R

N83-31276# Junta de Energia Nuclear, Madrid (Spain) Div de Isotopos
EFFECT OF GAMMA RADIATION ON GROWTH, PRODUCTIVITY AND PROTEIN CONTENT OF CHLORELLA PYRENOIDOSA
C MARTINMORENO and J FERNANDEZGONZALEZ 1983 51 p refs In SPANISH, ENGLISH summary
(JEN-537, ISSN-0081-3397, ISBN-84-500-8668-X) Avail NTIS HC A04/MF A01

The effect of five doses of gamma radiation (10, 100, 500, 1000 and 5000 Gy at a dose rate of 4 500 Gy/h) on growth, productivity and protein content of Chlorella Pyroneldosa was studied High doses of gamma radiation were observed to inhibit cellular division of Chlorella Pyrenoldosa Culture growth stopped 48 hours after irradiation at 5 000 Gy and 72 hours after irradiation at 500 and 1000 Gy. The lowest dose (10 Gy) produced a little growth stimulation that was not statistically significant Protein and amino acid content did not show any change for the gamma radiation doses studied. Author

N83-31277# Junta de Energia Nuclear, Madrid (Spain) Div de Quimica y Medio Ambiente
THERMO-RADIOSENSITIVITY OF THE GRANULOCYTE AND MACROPHAGE PRECURSOR CELLS OF MICE. PART 1: DEVELOPMENT OF THE IN VIVO CULTURE AND EFFECTS INDUCED BY THE HYPERTHERMIA
J A BUEREN and M NIETO 1983 159 p refs In SPANISH, ENGLISH summary
(JEN-526, ISSN-0081-3397, ISBN-84-500-8367-2) Avail NTIS HC A07/MF A01

The agar diffusion chamber technique for culturing granulocyte macrophage precursor cells obtained from mice bone marrow is described Diffusion chambers containing the bone marrow suspension are implanted intraperitoneally into mice and constitute a compartment which avoids the migration of cells, but allows the transit of the mouse biological fluxes, necessary for the cellular proliferation By means of this technique, the lethal effects of the hyperthermia on the precursors and their capacity to repair sublethal damage were studied The results indicate the high thermosensitivity of the cells and also their multiplicity of targets that, in agreement with the statement of other authors, seem to be composed of proteins Author

N83-31278# Junta de Energia Nuclear, Madrid (Spain) Div de Isotopos
ISOLATION OF C-14 LABELLED AMINO ACIDS BY BIOSYNTHESIS IN MAIZE PLANTS (ZEA MAIS L.)
N CARRERAS and M P MAZON 1983 85 p refs In SPANISH, ENGLISH summary
(JEN-536, ISSN-0081-3397, ISBN-84-500-8474-1) Avail NTIS HC A05/MF A01

A method of obtaining (14)C labelled amino acids by biosynthesis in maize plants which had assimilated (14)CO2, was assayed The plants were labelled for 60 minutes with (14)CO2 produced from Ba(14)CO3 (specific activity of 148 KBg/micromol) An extract of the soluble compounds was obtained with 80% ethanol and the amino acids were separated from the rest of the soluble compounds by ion exchange chromatography on column of Dowex 50-X8 resin Finally, seventeen amino acids were isolated and identified from the purified extract The acid amino acids were separated in an anionic column (Dowex 1-X8) and the neutral and basic amino acids in catlonic columns (Dowex 50-X4) Author

N83-31279# Junta de Energia Nuclear, Madrid (Spain) Div de Quimica y Medio Ambiente
THERMO-RADIOSENSITIVITY OF THE GRANULOCYTE AND MACROPHAGE PRECURSOR CELLS OF MICE. PART 2: X-IRRADIATION EFFECTS AND INFLUENCE OF HYPERTHERMIA ON THE RADIOSENSITIVITY
J A BUEREN and M NIETO 1983 62 p refs In SPANISH, ENGLISH summary
(JEN-527, ISSN-0081-3397, ISBN-84-500-8365-6) Avail NTIS HC A04/MF A01

The effects of the X-Irradiation on the viability of the granulocyte macrophage precursors, were determined by means of the agar diffusion chamber culture technique The results show the high radiosensitivity of these cells, with survival parameters similar to those previously reported in the literature about different granulocyte crophage precursors When a hyperthemic treatment is performed prior to the X-irradiation, a radiosensitization phenomenon is observed due to the sinergism existent between hyperthemia and X-rays on the lethality of the precursors. Author

N83-31280*# National Aeronautics and Space Administration, Washington, D C
ULTRASTRUCTURE OF THE ROOT CAP OF ARABIDOPSIS THALIANA L. HEYNH UNDER SPACEFLIGHT CONDITIONS
Apr 1983 6 p refs Transl into ENGLISH from Dopovidi Akad Nauk URSR, Ser B, Geol, Khim ta Biol Nauky (USSR), no 7, 1982 p 76-78 Transl by Kanner (Leo) Associates, Redwood City, Calif
(Contract NASW-3541)
(NASA-TM-77258, NAS 1 15 77258) Avail NTIS HC A02/MF A01 CSCL 06C

Peculiarities of the ultrastructural organization of Arabidopsis root cap cells grown from the stage of two cotyledonous leaves in the Svetoblok-1 apparatus aboard the Salyut 6 research orbital station and in the laboratory are assessed It is established that under conditions of real space flight vacuolization of the root cap cells increses consoderably compared to the control variant Changes in the topographya and ulstrastructure of amyloplasts as well as lysis of cell walls are observed in the material under study An assumption is advanced on analogous cell responses observed at the ultrastructural level to weightlessness and clinostatic conditions Author

N83-31281*# State Univ of New York, Stony Brook. Dept. of Ecology and Evolution.
THE EFFECT OF FAST AND REGENERATION IN LIGHT VERSUS DARK ON REGULATION IN THE HYDRA-ALGAL SYMBIOSIS Final Report
P BOSSERT and L. B. SLOBODKIN 29 Jul 1983 14 p Sponsored by part by Mobil Oil Foundation and NSF
(Contract NAGW-144)
(NASA-CR-172916; NAS 1 26:172916; CONTRIB-450) Avail. NTIS HC A02/MF A01 CSCL 06C

Green hydra are able to regenerate tentacles after fast durations which cause brown, i e , asymbiotic, hydra to fail completely, but the presence of endosymbiotic algae does not always enhance regeneration in fasted hydra Green hydra whose nutritional state falls below some threshold, exhibit a light induced inhibition of regeneration. That is, hydra, fasted in the light, then randomly assigned to light or dark after decapitation, regenerate better in the dark. This effect of light does not appear to be present either in brown hydra or in normally green hydra from which the algae were removed. In a large strain of Chlorohydra viridissima, after fasts of intermediate duration (10 and 15 days), this light induced inhibition of regeneration is associated with an increase in the number of algae per gastric cell in regenerating hydra relative to non-regenerating controls. Author

N83-31282*# National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif
PHYTOXICITY STUDY OF THE PRODUCTS OF WET OXIDATION OF A REPRESENTATIVE BIOMASS (LETTUCE)
B L ONISKO and T. WYDEVEN Jul 1983 26 p refs
(NASA-TM-84383; A-9390; NAS 1.15 84383) Avail NTIS HC A03/MF A01 CSCL 06C

In an attempt to verify the results reported previously concerning the phytotoxicity of wet-oxidation (wet-ox) products, lettuce solids were suspended in water and then heated to 548 K for 3.6 ksec (1 hr) under 4 1x10 to the -7 Pa (400 psig at 294 K) oxygen pressure and 1 52x10 to the 8th (1500 psig at 548 K) total pressure Such treatment resulted in oxidation of 80% of the initial organic carbon to carbon dioxide. Thirty-three percent of the remaining organic carbon was present in acetic acid Organic nitrogen in the feed was decreased 90% by the wet-ox treatment Ammonia and nitrogen gas were the main nitrogen products. Analysis of the liquid product of wet-ox indicated that most of the minerals essential for plant growth were present However, when tested using a lettuce-root growth-rate assay, the solution was toxic. This toxicity was not due to excessive salt or ammonia or to an improper pH Analysis of the wet-ox solution revealed the presence of silver and chromium, thus implicating reactor corrosion as the cause of the phytotoxicity. Both cation and anion exchange resins removed the silver and the toxicity of the liquid effluent, indicating silver as the toxic component. Uptake of both silver and chromium by lettuce roots correlated with diminished root growth Toxicity of the solution from wet-ox was not observed when precautions were taken to minimize contact of the liquid in the reactor with the metal reactor components. Author

N83-31283*# National Aeronautics and Space Administration, Washington, D C
ULTRASTRUCTURE OF MERISTEM AND ROOT CAP OF PEA SEEDLINGS UNDER SPACEFLIGHT CONDITIONS
K M. SYTNYK, E. L. KORDYUM, N. O BILYAVSKA, and V O TARASENKO Apr. 1983 8 p refs Transl. into ENGLISH from Dopovidi Akad. Nauk URSR, Ser. B, Geol , Khim. ta Biol Nauky (USSR), no. 6, 1982 p 75-78 Transl by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASW-3541)
(NASA-TM-77259; NAS 1 15:77259) Avail NTIS HC A02/MF A01 CSCL 06C

Data of electron microscopic analysis of meristem and root cap of pea seedlings grown aboard the Salyut-6 orbital research station in the Oazis apparatus and in the laboratory are presented The main morphological and anatomical characteristics of the test and control plants are shown to be similar At the same time, some differences are found in the structural and functional organization of the experimental cells as compared to the controls They concern first of all the plastic apparatus, mitochondria and Golgi apparatus It is assumed that cell function for certain periods of weightlessness on the whole ensures execution of the cytodifferentiation programs genetically determined on the Earth. Biochemical and physiological processes vary rather markedly due to lack of initially rigorous determination. Author

N83-31284*# National Aeronautics and Space Administration, Washington, D. C.
SOME RESULTS FROM STUDIES ON THE EFFECTS OF WEIGHTLESSNESS ON THE GROWTH OF EPIPHYTIC ORCHIDS
T. M CHEREVCHENKO and T K. MAYKO Jul. 1983 11 p refs Transl into ENGLISH from Visnyk Akad. Nauk Ukr RSR (USSR), no 1, 1983 p 31-35 Original language document was announced as A83-34967 Transl by Kanner (Leo) Associates, Redwood City, Calif
(Contract NASW-3541)
(NASA-TM-77262, NAS 1 15:77262) Avail. NTIS HC A02/MF A01 CSCL 06C

Epidendrum orchids were placed in a Malakhit-2 micro-greenhouse aboard the Soyuz-36-Salyut-6 space station to test their growth under weightless conditions. Growth occurred but was less than in control plants left on Earth, cells were smaller and parenchymal development slowed in all tissues. Stems, roots, and leaves were smaller The number of stomas on the leaves was about the same as in the controls, but, because of the smaller leaf size, there were more per unit area A modeling experiment using a clinostat revealed a large decrease in gibberellin activity and auxin activity. It was assumed that weightlessness primarily affects gibberellin biosynthesis, inhibiting cell growth Reestablishment of growth compound activity upon return of the plants to Earth was indicated by the fact that the orchids resumed growth thereafter. Author

N83-31285# European Space Agency, Paris (France).
SPACE BIOLOGY WITH EMPHASIS ON CELL AND DEVELOPMENTAL BIOLOGY
N LONGDON, comp and O MELITA, comp. May 1983 137 p refs Proc. of Workshop, Cologne, 9-11 Mar. 1983, sponsored by European Low Gravity Research Association (ELGRA), ESA and DFVLR
(ESA-SP-206; ISSN-0379-6566) Avail: NTIS HC A07/MF A01

Spacelab Biorack investigations of the effects of reduced gravity were outlined Sensitivity to gravity, cell differentiation, cell polarization, antibacterial activity, and embryogenesis were discussed The use of clinostats, and experimental design were considered

N83-31286*# Pennsylvania Univ , Philadelphia.
THE SIGNIFICANCE OF GRAVITY ON BIOLOGICAL SYSTEMS
A. H BROWN *In* ESA Space Biol with Emphasis on Cell and Develop Biol. p 3-9 May 1983 refs Sponsored by NASA Headquarters Life Science Research Program
Avail: NTIS HC A07/MF A01

Ground based and spaceborne (Biosatellite) research into the effects of hypogravity on biological systems is summarized A concept of sensitivity to gravity is defined: sensitivity = dR/dQ x 1/standard deviation of R, where R is the measured biological response to a quantitative stimulus, Q. Detection and transformation of gravity information by the organism are discussed. The role of an uncommon gravity force environment as stimulus for physiologic adaptations, rather than stress, is introduced. Author (ESA)

N83-31288# Utah State Univ, Logan Plant Science Dept UMC 48
GROUND-BASED STUDIES ON GRAVITROPISM AND ON MAXIMUM YIELD OF WHEAT
F B SALISBURY *In* ESA Space Biol with Emphasis on Cell and Develop. Biol p 17-19 May 1983 refs
Avail NTIS HC A07/MF A01

The production of ethylene by clinostated plants due to mechanical stress, and leaf epinasty provoked by the ethylene were investigated Plants were stressed mechanically without gravity compensation, and gravity compensation was provided with a minimum of mechanical stress Mechanical stress does not induce epinasty. Clinostat epinasty and epinasty produced by periodically inverting plants is greatly reduced by ethylene inhibitors It is suggested that normal stem growth occurs as pith tissues elongate against the resistance of outer layers Author (ESA)

N83-31289# Institut fuer Allgemeine Botanik, Hamburg (West Germany)
A METHOD TO RECORD THE CIRCADIAN RHYTHM IN A UNICELLULAR GREEN ALGAE UNDER EXTRATERRESTRIAL CONDITIONS
D MERGENHAGEN *In* ESA Space Biol with Emphasis on Cell and Develop Biol p 21-24 May 1983 refs
Avail NTIS HC A07/MF A01

A device for the study of the circadian rhythm of photoaccumulation by chlamydomonas reinhardii on a space shuttle is described A focussed light beam emitted by a tungsten light bulb shines through the cell suspension (in plastic cuvettes) A photocell mounted underneath the cuvette responds to variations of the light intensity caused by accumulation of cells in the illuminated area of the cuvette Signals from the photocells are amplified and transferred to the data acquisition unit of the space transportation system Each cuvette is illuminated once in 2hr Tests with miniaturized cuvettes confirm the usefulness of the test set-up Author (ESA)

N83-31290# Bonn Univ (West Germany) Inst of Botany
HOW TO PROVE THE SENSITIVITY OF PLANTS TOWARDS GRAVITY
D. VOLKMANN and A SIEVERS *In* ESA Space Biol. with Emphasis on Cell and Develop. Biol. p 25-26 May 1983 refs Sponsored by Bundesministerium fuer Forschung und Technologie
Avail: NTIS HC A07/MF A01

A Spacelab experiment on the perception of gravity by plants is outlined. Response kinetics of the roots are correlated with the ultrastructural aspect of the gravity perceiving cells Dry cress seeds are imbibed in a special culture vessel in orbit After germination, growth kinetics are registered by photographs Later on the roots are chemically fixed by glutaraldehyde and potassium permanganate Vibration effects on dry seeds especially during launch, stability of chemical fixatives during the preflight phase, imbibition of seeds, handling of solutions under conditions of microgravity, and storage of fixed material during the postflight phase pose problems Author (ESA)

N83-31291# Toulouse Univ (France) Lab de Biologie Medicale
EFFECTS OF SPACE ENVIRONMENTAL FACTORS ON CELL PROLIFERATION
H PLANEL, R TIXADOR, G GASSET, G RICHOILLEY, and J C BES *In* ESA Space Biol with Emphasis on Cell and Develop Biol p 29-31 May 1983 refs
Avail NTIS HC A07/MF A01

The roles of microgravity and cosmic rays on the growth rate, volume and water content of paramecia cells are examined A set of cultures grown on Earth (control), a set cultivated in space and exposed to cosmic rays and radiation, and a set cultivated in the Biorack centrifuge and exposed to cosmic rays and 1g gravity are compared Protein content, extracellular and intracellular electrolyte content, and ultrastructural data are acquired Author (ESA)

N83-31292# Dornier-Werke G m b.H., Friedrichshafen (West Germany).
GROWTH AND DIFFERENTIATION OF BACILLUS SUBTILIS AT MICROGRAVITY
H J RHAESE (Frankfurt Univ) and P SCHILLER *In* ESA Space Biol with Emphasis on Cell and Develop. Biol p 33-36 May 1983 refs
Avail NTIS HC A07/MF A01

Two experiments suggested for determining the effect of prolonged microgravity on growth and sporulation of the prokaryote Bacillus subtilis are outlined Short generation times (25 min) and remarkable sizes in population (1 billion individuals) permit the study of proliferation in 10 and more generations The influence of microgravity on spore formation, especially on asymmetric septum formation, a typical differentiation associated event observed at the beginning of sporulation, can also be studied Growth is monitored by optical density measurements, and differentiation by electron microscope examination of samples fixed with glutaraldehyde at different stages of sporulation Author (ESA)

N83-31294# Paris VI Univ (France). Lab de Pathologie Cellulaire
EFFECTS OF LOW GRAVITY ON MAMMALIAN CELL POLARIZATION AT THE ULTRASTRUCTURAL LEVEL
M BOUTEILLE, M GREGOIRE, F BARD, C. A. BOURGEOIS, A M DUPUY-COIN, D HEMON, and G GERAUD *In* ESA Space Biol. with Emphasis on Cell and Develop Biol p 41-43 May 1983 refs
Avail NTIS HC A07/MF A01

Spaceborne investigation of changes due to gravity in the ultrastructure of highly polarized, suspended plasma cells is proposed Statistical analysis of random sections, goniometry, and three dimensional reconstruction of serial sections are used to demonstrate the three dimensional character of cell organization The effects of 1g force on cell structure can be compared with the effects of all forces ensuring molecular cohesion in living cells, and with the effects of structures such as the cytoskeleton The role of gravity in the evolution of life on Earth at the cell level can be examined Author (ESA)

N83-31295# Bern Univ (Switzerland) Inst of Pathology
THE PROBLEM OF LONG-TERM FUNCTION OF NEUTROPHILS IN STUDIES ON THE EFFECTS OF GRAVITY ON MOTILITY, SHAPE AND STRUCTURE OF LOCOMOTOR CELLS
A ZIMMERMANN, H. U KELLER, and H COTTIER *In* ESA Space Biol with Emphasis on Cell and Develop Biol p 45-48 May 1983 refs Sponsored by Swiss National Science Foundation and Krebsliga
Avail NTIS HC A07/MF A01

The polarization of neutrophils under conditions imposed by the Spacelab Biorack schedule was investigated, since neutrophils are to be used to test whether spherical cells in suspension can polarize in response to external stimulation in a nongradient situation, study the position and distribution of intracellular organelles, and assess the vigor and coordination of crawling-like movements under microgravity. Polarization and locomotor responses decrease with storage time at 4 C and preincubation at 37 C Maintenance of these functions is not improved by increasing the buffer capacity of the medium, addition of vitamins, pyruvate and nonessential amino acids or dihydroxybenzoic acid, or by lowering cell concentration Author (ESA)

N83-31296# Paris VI Univ (France). Lab de Cytologie et Morphogenese Vegetales
GRAVIPERCEPTION, MITOTIC ACTIVITY AND CELL DIFFERENTIATION IN LENTIL SEEDLING ROOTS
G. PERBAL, N DARBELLEY, D DRISS-ECOLE, and G SALLE *In* ESA Space Biol with Emphasis on Cell and Develop Biol p 49-52 May 1983 refs
Avail. NTIS HC A07/MF A01

A spaceborne investigation of the role of the endoplasmic reticulum-amyloplasts (er-a) complex in the perception of gravity

and the effects of microgravity on cell differentiation and meristematic activity in lentil roots is proposed One group of seedlings is grown in microgravity, one in a 1g centrifuge with the roots growing in the direction of centrifugal acceleration A third group is cultivated in 0g and placed on the centrifuge for 3hr to see if the plants are still able to respond to a 1g acceleration Root orientation, root growth, mitotic activity, cell differentiation, statocyte ultrastructure, and er-a complex ultrastructure are examined. Author (ESA)

N83-31297# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Aerospace Medecine

PHYSARUM POLYCEPHALUM: CONTRACTION BEHAVIOR, DIRECTION AND VELOCITY OF PROTOPLASMIC STREAMING IN NEAR WEIGHTLESSNESS

V. SOBICK and I BLOCK *In* ESA Space Biol. with Emphasis on Cell and Develop. Biol. p 53-56 May 1983 refs

Avail: NTIS HC A07/MF A01

A Spacelab Biorack investigation of cell sensitivity to acceleration stimuli, using the slime mold Physarum polycephalum, is outlined. In order to analyze a significant but transient decrease in period duration of the strand's radial activity during 0 g simulation, and the velocity increase of the protoplasmic streaming (shuttle streaming) up to the termination of the 0 g simulation, under microgravity conditions, special hardware was developed It consists of sub sample containers, a glove box microscope combined with a photodiode system (for measuring the strand's radial activity) and a cinecamera (for registration of the velocity and direction of the shuttle streaming). Author (ESA)

N83-31299# Technische Universitaet, Munich (West Germany) Inst. fuer Botanisches

SOMATIC EMBRYOGENESIS IN ANISE (PIMPINELLA ANISUM L.) CELL CULTURES IN MICROGRAVITY ENVIRONMENT

R A. KUDIELKA and R R THEIMER *In* ESA Space Biol with Emphasis on Cell and Develop. Biol p 63-68 May 1983 refs Sponsored by Bundesministerium fuer Forschung und Technologie

Avail NTIS HC A07/MF A01

A Spacelab Biorack investigation of the regeneration of dedifferentiated anise cell aggregates is outlined. Every 24 hr aliquots are transferred to embryogenic growth medium under microgravity conditions to induce somatic embryogenesis. During the 7 day period of the mission the cell aggregates differentiate into torpedo shaped embryoids via globular and heart shaped embryo forms. After return, embryoids in each stage of differentiation are recovered and intact anise plants are regenerated These and part of the embryoids are examined using morphological, biochemical and physiological methods. The data are compared to those obtained with plant material differentiated under simulated Spacelab conditions in 1 g environment on Earth Author (ESA)

N83-31300# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst for Aerospace Medicine.

THE INFLUENCE OF NEAR WEIGHTLESSNESS CONDITIONS ON THE DEVELOPMENT OF THE VERTEBRATE GRAVITY SENSING SYSTEM: STATEX EXPERIMENT SPACELAB MISSION D1

J NEUBERT, W BRIEGLEB, and A. SCHATZ *In* ESA Space Biol with Emphasis on Cell and Develop Biol p 69-74 May 1983 refs

Avail NTIS HC A07/MF A01

The test facility of the Spacelab frog statolith experiment on the effect of weightlessness on embryo and tadpole development, is described The experimental unit (EU) houses sample containers with growing embryos and tadpoles A 1g reference centrifuge is mounted inside the EU for control experiments. The tadpoles feed off algae, for slight algae growth, diode illumination is used The inner walls of the EU are coated with water imbibed cellulose The EU atmosphere is enriched with 40% oxygen The EU is stored at 10 C during ascent and descent in order to slow down the metabolism and reduce acceleration and vibration effects Author (ESA)

N83-31301# Pavia Univ. (Italy) Dept of Genetics and Microbiology.

EFFECTS OF MICROGRAVITY ON THE MECHANISMS FOR GENETIC RECOMBINATION

O. CIFERRI, M SOSIO, A M ORLANDONI, O TIBONI, and P. G MAZZA *In* ESA Space Biol with Emphasis on Cell and Develop. Biol. p 75-76 May 1983 refs Sponsored by CNR Piano Spaziale Nazionale

Avail. NTIS HC A07/MF A01

Spacelab Biorack investigation of the effect of microgravity on the transfer of DNA from cell to cell in bacterial cells undergoing conjugation, transduction, or transformation is outlined The activity of the cell membrane and the interactions cell/cell, cell/bacteriophage, and cell/DNA, are studied Author (ESA)

N83-31302# Koninklijke Nederlandse Akademie van Wetenschappen, Utrecht Hubrecht Lab

THE ROLE OF GRAVITY IN THE ESTABLISHMENT OF THE DORSO-VENTRAL AXIS IN THE DEVELOPING AMPHIBIAN EMBRYO

G A UBBELS, T G BROM, H P WILLEMSEN (Centrum voor Constructie en Mechanisatie, Nuenen, Netherlands), and J J H VANNUNEN (Centrum voor Constructie en Mechanisatie, Nuenen, Netherlands) *In* ESA Space Biol with Emphasis on Cell and Develop Biol p 77-82 May 1983 refs Sponsored by Netherlands Agency for Aerospace Programs (NIVR)

Avail NTIS HC A07/MF A01

The establishment of polarities in early embryogenesis is discussed Centrifuge experiments in Xenopus laevis eggs show that gravitationally induced rearrangements of the yolk predictably determine the orientation of the dorso-ventral axis of the embryo, regardless of the original position of the sperm entry point or the gray crescent This suggests a role of gravitation in the determination of bilateral symmetry Preparatory experiments and the development of an automatic experiment container for fertilization and fixation of Xenopus eggs for a Biorack investigation of this suggestion are described. Author (ESA)

N83-31303# Universidad Autonoma de Madrid, Cantoblanco (Spain) Dept de Bioquimica.

THE POSSIBLE INVOLVEMENT OF GRAVITATIONAL FORCES IN THE TOPOLOGICAL DISTRIBUTION OF CYTOPLASMIC DETERMINANTS IN DROSOPHILA MELANOGASTER EMBRYOS

R MARCO, I VERNOS, M CERVERA, and A. DOMINGO *In* ESA Space Biol with Emphasis on Cell and Develop Biol p 83-87 May 1983 refs Sponsored by Spanish Ministry of Defense, Ministry of Education and Ministry of Health

Avail NTIS HC A07/MF A01

A Spacelab Biorack investigation of the involvement of gravitational forces in the shaping of the topological distribution of the maternal information in the early embryo is outlined. Correlation of developmental abnormality with microgravity conditions during oogenesis is examined Eggs laid at the start of the flight are compared with others layed during, and immediately after, the mission Vitellogenesis is suggested as the development stage most sensitive to gravitational effects, with the cytoskeletal network of the oocyte maintaining the topological organization of the cytoplasmic determinants in the early embryo Author (ESA)

N83-31304# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany)
BIORACK EXPERIMENT A08/19 D: DOSIMETRIC MAPPING INSIDE BIORACK
H BUECKER, O C. ALLKOFER (Kiel Univ), R BEAUJEAN ((Kiel Univ), W ENGE (Kiel Univ), R. FACIUS, H FRANCOIS (Atomic Energy Commission, France), W HEINRICH (Siegen Univ., West Germany), G HORNECK, R PFOHL (CNR, Strasbourg), G PORTAL (Atomic Energy Commission, France) et al *In* ESA Space Biol with Emphasis on Cell and Develop Biol. p 89-91 May 1983 refs
Avail NTIS HC A07/MF A01

A Spacelab experiment which documents the radiation environment inside Biorack is outlined Experimental data are compared with those of other spaceflights and with theoretical predictions, to provide radiation baseline data for the other Biorack experiments Six type 1 containers housing stacks of radiation detectors (cellulose nitrate, lexan, CR 39, nuclear emulsions, AgCl, and LiF-thermoluminescence dosimeters) are accomodated in the incubators of Biorack Author (ESA)

N83-31305# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany)
EXPERIMENT A08/18 D ON BIORACK: EMBRYOGENESIS AND ORGANOGENESIS OF CARAUSIUS MOROSUS UNDER SPACEFLIGHT CONDITIONS
H BUECKER, H FRANCOIS (Atomic Energy Commission, France), E H GRAUL (Marburg Univ., West Germany), W. HEINRICH (Siegen Univ , West Germany), H HOEFFKEN (Marburg Univ , West Germany), G HORNECK, G REITZ, W RUETHER (Marburg Univ , West Germany), R PFOHL (CNR, Strasbourg), G PORTAL (Atomic Energy Commission, France) et al *In* ESA Space Biol with Emphasis on Cell and Develop Biol p 93-96 May 1983 refs
Avail NTIS HC A07/MF A01

A Spacelab experiment on the effects of heavy ions on living organisms is outlined The influence of particles with high charge z and energy loss, of cosmic radiation and microgravity, on embryogenesis and organogenesis of insects is studied in Carausius morosus eggs Five different stages of development, which differ in radiation sensitivity and regenerative capacity are used The eggs, in monolayers, are sandwiched between visual track detectors Results give information on the effect of heavy ions of cosmic radiation on developmental processes in insects, disturbances of differentiation processes by microgravity, and combined effects of radiation and microgravity Author (ESA)

N83-31306# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany) Inst for Aerospace Medicine
THE CLINOSTAT: A TOOL FOR ANALYZING THE INFLUENCE OF ACCELERATION ON SOLID-LIQUID SYSTEMS
W BRIEGLEB *In* ESA Space Biol with Emphasis on Cell and Develop Biol p 97-101 May 1983 refs
Avail: NTIS HC A07/MF A01

The use of the fast clinostat is outlined A platform rotates about a horizontal axis Near the center of rotation a stiff, closed cuvette filled with a liquid suspension of particles is mounted Depending on the density difference between the particles and the liquid and on the viscosity of the liquid, particles may settle within circular trails These trails become points if the speed of rotation of the clinostat increases, the particles become motionless in respect to gravity Instead of gravity centrifugal forces become effective But within microscopic dimensions the influence of the centrifugal force on particles can be balanced by Brownian movement For typical cell systems the degree of 0 g simulation is 100% From experiments with different cell systems on clinostats, indications for regulatory reactions of different cell parameters during 0 g simulation are obtained Author (ESA)

N83-31308# Bonn Univ (West Germany) Inst of Botany.
THE USE OF HORIZONTAL CLINOSTATS IN PLANT PHYSIOLOGY
W HENSEL *In* ESA Space Biol with Emphasis on Cell and Develop. Biol. p 107-108 May 1983 refs Sponsored by Bundesministerium fuer Forschung und Technologie
Avail NTIS HC A07/MF A01

The use of slow rotating clinostats (e g 2 rpm) in experiments on gravitropism is discussed If normal grown roots are subjected to clinostat rotation for 20 hr, ultrastructural response of statocytes, delay in gravireponse, increase in ethylene production and shortening of the cycle time of root meristem are caused These effects can be avoided if plants develop on the clinostat from onset of soaking of the seeds Only under these specific conditions do clinostats simulate physiological 0 g, and can be used without too many restrictions Author (ESA)

N83-31309# Eidgenoessische Technische Hochschule, Zurich (Switzerland) Lab fuer Biochemie
INFLUENCE OF GRAVITY ON CELL GROWTH AND MIGRATION
A TSCHOPP and A COGOLI *In* ESA Space Biol with Emphasis on Cell and Develop Biol p 109-114 May 1983 refs
(Contract SNSF-3 034-0 81)
Avail NTIS HC A07/MF A01

Ground based investigations of gravitational effects are summarized When HeLa cells, chicken embryo fibroblasts, sarcoma Galliera cells, Friend leukemia virus transformed cells and human lymphocytes are cultured in a hypergravitational field (10 g) growth rate is increased by 20 to 30%, whereas glucose consumption per cell is lower than at 1 g Tracking of cell movements on gold coated substrates reveals that cell migration is hindered at high g Results suggest that under gravitational stress the cell is either capable of shifting to other metabolic pathways and/or consumes less energy at high g than at 1 g Author (ESA)

N83-31310# Army Research Inst of Environmental Medicine, Natick, Mass
VENTILATORY RESPONSE TO CO2 REBREATHING AFTER ADRENERGIC BLOCKADE IN GOATS
S E WEINBERGER (Beth Israel Hospital), R. A GABEL, R A. STEINBROOK, D E LEITH, R HARRIS, and V FENCL 25 Feb 1983 24 p refs Presented at the 66th Ann Meeting of the Federation of American Soc for Exptl Biol , 1982
(Contract DA PROJ 3E1-61102-BS-10)
(AD-A126279, USARIEM-M-10/83) Avail NTIS HC A02/MF A01 CSCL 06O

Administration of adrenergic agonists enhances resting ventilation and increases responsiveness to CO2 inhalation, though there are conflicting data about the effect of adrenergic blockade on ventilatory responses In this study, we investigated the effect of alpha- or beta-adrenergic blockade on the ventilatory response to hyperoxic CO2 rebreathing in awake goats Five goats were studied before and after intravenous administration of phentolamine (3 8 mg bolus followed by 0 19 mg/min) or propranolol (0 15 mg/kg) Adequacy of alpha- or beta-adrenergc blockade was subsequently demonstrated by assessing the pressor response to norepinephrine or the heart rate response to isoproterenol, respectively There was no difference (compared to control studies) in the mean slope, x-intercept, or ventilation at end-tidal PCO2 = 70 torr for the C02 response curves after the goats had received either phentolamine or propranolol. When mean inspiratory flow rate (VT/Ti) was plotted against end-tidal PCO2, there was also no change in slope x-intercept or VT/Ti at end-tidal PCO2 = 70 torr after the goats had received propranolol GRA

N83-31311# California Univ., Los Angeles. Dept. of Chemistry
ENERGY CAPTURE AND USE IN PLANTS AND BACTERIA
P. D BOYER Oct 1982 7 p
(Contract DE-AT03-76ER-70102)
(DE83-010009; DOE/ER-70102/T1) Avail: NTIS HC A02/MF A01

Predictions of the binding change mechanism of ATP synthesis in photophosphorylation and oxidative phosphorylation was evaluated. Important areas of progress were made on the characterization of a deactivated state of the chloroplast ATP synthase that results when chloroplast thylakoid membranes are deenergized, and probes of labeling patterns of bound nucleotides These give further evidence that both catalytic and noncatalytic tightly bound nucleotides are present. A second important phase of research was characterization of the patterns of oxygen exchange accompanying the synthesis of ATP with various nucleoside diphosphate substrates and the hydrolysis of ATP by purified CF1 ATPase with various nucleoside triphosphate substrates These point to similar mechanisms with all nucleotides. DOE

N83-31312# Midwest Research Inst., Golden, Colo Biotechnolyg Branch
FERMENTATION OF SOLUBLE CELLO-OLIGOSACCHARIDES BY YEAST
S M LASTICK, D D SPINDLER, and K. GROHMANN Feb 1983 14 p refs Presented at the Natl. Meeting of the Am Chem Soc , Kansas City, Mo , 16-17 Sep. 1982
(Contract DE-AC02-77CH-00178, EG-77-C-01-4042)
(DE83-007317, SERI/TP-232-1733, CONF-820909-18) Avail NTIS HC A02/MF A01

Yeast strains that ferment cellobiose were examined with respect to fermentation on soluble cellodextrin preparations Hydrolysis of the fermentation products was followed using thin layer chromatography, Candida and Brettanomyces sp hydrolyze cellobiose and, at a much lower rate, cellotriose, indicating the presence of beta-glucosidase (EC 3 2.1 21) activity. Enzyme asseys conducted on B clausenii fermentations indicated that the beta-glucosidase remained cell associated during fermentation Torulopsis sp hydrolyzed all of the cello-oligo-saccharides, indicating exoglucanase (EC 3.2.1 91) activity The exogluconanase, a glycoprotein with an apparent molecular weight of 00084 daltons, is exported into the culture medium. DOE

N83-31313# Stichting Mathematisch Centrum, Amsterdam (Netherlands) Dept of Applied Mathematics.
ASYMPTOTIC METHODS IN MATHEMATICAL BIOLOGY
J. GRASMAN Oct 1982 23 p refs Submitted for publication
(MC-TW-227/82) Avail NTIS HC A02/MF A01

Asymptotic methods for differential equation models of physiological and ecological phenoma are reviewed Hopf bifurcation, almost linear oscillations, relaxation oscillations, nonlinear reaction-diffusion and the change in stability of an ecological system due to periodic forcing are discussed
Author (ESA)

N83-32277*# National Aeronautics and Space Administration, Washington, D. C
PECULIARITIES IN FORMATION OF ARABIDOPSIS THALIANA (L.) HEYNH, GENERATIVE ORGANS UNDER SPACE FLIGHT CONDITIONS
Y. L. KORDYUM and I I. CHERNYAYEVA Jul. 1983 8 p refs Transl into ENGLISH from Dopovidi Akad. Nauk Ukr RSR, (USSR), no 8, Ser. B , 1982 p 67-70 Transl by Kanner (Leo) Associates, Redwood City, Calif
(Contract NASW-3541)
(NASA-TM-77263; NAS 1.15:77263) Avail: NTIS HC A02/MF A01 CSCL 06C

Peculiarities in the formation of the andrecium and gynecium elements are described for Arabidopsis plants grown from the stages of two cotyledonous leaves in the Svitoblok-1 device on board the Salyut 6 orbital research station and in the laboratory It is established that flower buds and flowers, normally formed in habitus, contain sterile elements of andrecium and gynecium whose degeneration occurs at different developmental stages of the Arabidopsis plants in the experiment under conditions of weightlessness. Author

N83-32278# Houston State Psychiatric Inst., Tex Research Inst of Mental Sciences.
EVOKED POTENTIAL STUDIES OF THE EFFECTS OF IMPACT ACCELERATION ON THE MOTOR NERVOUS SYSTEM
B. SALTZBERG, W. D BURTON, JR., N. R. BURCH, C L EWING, D J THOMAS, M. S. WEISS, M. D BERGER, A SANCES, JR , P. R WALSH, J MYKLEBUST et al. 1983 22 p refs Prepared in cooperation with Naval Biodynamics Lab., New Orleans and Medical Coll of Wisconsin, Milwaukee
(Contract N00014-76-C-0911)
(AD-A127562) Avail NTIS HC A02/MF A01 CSCL 06S

The initial results of a continuing investigation into the effects of various levels of impact acceleration on the functional integrity of the motor nervous system are summarized The results are based on the measurement of alterations in neural transmission along the motor pathway of the Rhesus monkey as revealed by latency and amplitude changes in the motor pathway evoked potential (EP) following the delivery of various levels of impact acceleration to a test vehicle The EPs were produced by electrical stimulation of and recording from the motor pathway of experimental animals subjected to -Y (lateral impact) acceleration and animals subjected to -X (frontal impact) acceleration. High resolution latency and amplitude measures of the EP recorded from these animals before and after impact were tracked so that the time course of recovery of nerve propagation following impact could be accurately assessed Analysis of these EP measures revealed that the time course of recovery to pre-impact values is directly related to the intensity of the acceleration impulse delivered to the test vehicle GRA

N83-32279# Naval Aerospace Medical Inst., Pensacola, Fla.
THE THERMAL BASIS FOR DISRUPTION OF OPERANT BEHAVIOR BY MICROWAVES IN THREE ANIMAL SPECIES
J. O DELORGE Jun 1982 22 p refs
(Contract MF5852402C)
(AD-A127370, NAMRL-1286) Avail NTIS HC A02/MF A01 CSCL 06R

A large variety of microwave producing devices are used in contemporary naval communications and weapons systems Public and scientific concern about potential biological effects of microwave irradiation such as produced by these various devices requires documentations of such effects Currently, the only well documented direct effect of microwaves is heating of the exposed organism The present report is of a series of studies whose aim was to explore several microwave frequencies and their effect on performance and simultaneously to investigate the relationship to core heating in the exposed animals Three difficult sized species of animals were used so that generalization to larger animals could be made Rats, squirrel monkeys, and rhesus monkeys showed consistent effects of 60-minute exposures to microwaves when their body temperatures were increased at least 1 C above baseline temperatures Performance was not reliably affected when body temperatures remained below this level. Greater intensities of microwaves were required to influence the animals' temperature and behavior as the animal size increased. A direct relationship between frequency and power density was observed in the rhesus monkey, e g , as the frequency of the microwaves increased, the power density needed to affect behavior and temperature also increased GRA

N83-32280# Naval Aerospace Medical Research Lab , Pensacola, Fla

OPERANT BEHAVIOR AND COLONIC TEMPERATURE OF RHESUS MONKEYS, MACACA MULATTA, EXPOSED TO MICROWAVES AT FREQUENCIES ABOVE AND NEAR WHOLE-BODY RESONANCE Final Report

J. O DELORGE Jan 1983 24 p refs

(AD-A127326, NAMRL-1289) Avail NTIS HC A02/MF A01 CSCL 06R

Microwave radiation is extensively used in environments occupied by naval personnel. Recently scientific reports have indicated that behavioral changes can be induced by relatively low levels of microwave energy The reported behavioral changes do not reflect the beneficial or detrimental nature of such changes The present study was designed to produce in a non-human primate a behavior analogous to human behavior and discover if that behavior was enhanced, disrupted or not affected by microwave energy from radar sources similar to those currently in use in naval communications and weapons systems Performance by five rhesus monkeys on an observing-response task requiring sustained vigilance was assessed when the monkeys were consecutively exposed to microwaves at frequencies of 1 3 GHz, 5 8 GHz, and 225 MHz Observing-response performance was impaired at increasingly intense power densities at all frequencies The threshold power density necessary to disrupt performance at 225 MHz was 8.1 mW/sq cm ; at 1 3 GHz it was 57 mW/sq cm, and at 5 8 GHz it was 140mW/sq.cm These power densities were associated with increases in colonic temperatures above sham exposure levels The mean increase was typically in the range of 1 C and response rate changes were not observed in the absence of concomitant temperature increases GRA

N83-32281# Technology, Inc , San Antonio, Tex Life Sciences Div

TEMPERATURE CYCLING IN RATS EXPOSED REPETITIVELY TO RADIOFREQUENCY RADIATION Final Report, 1 Sep. 1980 - 31 Aug. 1981

F HEINMETS, M R FREI, R N FRIEDMAN, J R JAUCHEM, and C BALLENTINE Brooks AFB, Texas School of Aerospace Medicine Dec 1982 33 p refs

(Contract F33615-80-C-0614, AF PROJ 7757)

(AD-A126895, SAM-TR-82-48) Avail NTIS HC A03/MF A01 CSCL 06R

A series of temperature cycling experiments during radiofrequency radiation (RFR) exposure of rats was performed This type of exposure procedure permits electromagnetic energy to be introduced into biological systems while the systems are maintained at physiologically acceptable temperatures Experiments were carried out at various average power densities (50-200 mW/sq cm), using continuous wave (CW) and pulsed radiation while the carrier frequency was maintained at 2 06 GHz Single-day RFR exposures produced no observable effect on temperature regulation of rats in terms of heat-dissipation efficiency Repeated exposure of rats during several months revealed that the heat-dissipation time (D) gradually increased, indicating reduced efficiency After a prolonged resting period, however, the rat's ability to dissipate heat showed considerable improvement No significant difference in thermoregulation was observed when CW and pulsed RFR exposures at pulse durations of 1-10 ms were compared

Author (GRA)

N83-32282# School of Aerospace Medicine, Brooks AFB, Tex

RETROGRADE AMNESIA, IN RATS, PRODUCED BY ELECTRON BEAM EXPOSURE Final Report, Jul. - Sep. 1982

T. G WHEELER, K. A HARDY, and D W. BLICK Feb 1983 30 p refs

(Contract AF PROJ 7757)

(AD-A126870, SAM-TR-83-3) Avail NTIS HC A03/MF A01 CSCL 05J

It has been demonstrated that electron beam exposure produces retrograde amnesia (RA). RA production was evaluated using a single trial avoidance task across a 10,000 dose range for 10 microseconds, 1 microsecond, and 0 1 microseconds pulsed exposures The dose-response curve obtained at each pulse duration showed significant RA production The most effective dose range was 0 1-10 rads at a dose rate of 1 million rad/sec Our conclusion was that the RA effect might be due to sensory system activation which provided a novel stimulus that masked previous stimuli (produced RA). . GRA

N83-32283# California Univ , Berkeley. Lawrence Berkeley Lab Biology and Medicine Div

IDEAS ON THE UNIFICATION OF RADIOBIOLOGICAL THEORIES

S B. CURTIS Oct 1982 12 p refs Presented at the 8th Symp on Microdosimetry, Juelich, West Germany, 27 Sep - 1 Oct 1982 Submitted for publication

(Contract DE-AC03-76SF-00098)

(DE83-004188, LBL-15193, CONF-82031-12) Avail: NTIS HC A02/MF A01

A unified formulation of cell inactivation has been developed that incorporates major ideas of several theories (hypotheses) of how individual mammalian cells are inactivated by ionizing radiation Elements from the repair-misrepair, lethal-potentially lethal, sublesion interaction, and track structure models are combined to produce a single set of mutually compatible hypotheses DOE

N83-32284# Iowa State Univ of Science and Technology, Ames Dept of Botany

PROLINE METABOLISM IN PLANTS UNDER ENVIRONMENTAL STRESSES Progress Report, 1 Apr. - 31 Dec. 1982

C R STEWART and T E. ELTHON Dec 1982 27 p refs

(Contract DE-AC02-82ER-12028)

(DE83-002735, DOE/ER-12028/1) Avail NTIS HC A03/MF A01

The basic mechanisms involved in proline accumulation by plants under environmental stresses is summarized This accumulation is thought to be part of the process of osmoregulation - an adaptive phenomenon that occurs in plants and other organisms to aid survival in arid and saline environments This understanding will aid in developing cultural strategies for producing food and biomass in marginal lands and environments Proline transport into the mitochondrial matrix is protonmotive, thus energy dependent but not driven by an electrical gradient Transport rates exceed oxidation rates under non-phosphorylating conditions The nature of specific inhibition of proline oxidation using an artificial inhibitor, thiazolidine-4-carboxylate was studied This compound mimics the effects of stress on proline oxidation Attempts were made to obtain cell free proline synthesis in pursuit of the enzyme, gamma glutamokinase which is probably the enzyme most affected by stress DOE

N83-32285# National Bureau of Standards, Washington, D.C.

NBS (NATIONAL BUREAU OF STANDARDS) AND INDUSTRIAL BIOTECHNOLOGY: INSTRUMENTATION AND ASSOCIATED MEASUREMENT NEEDS

T. C OBRIEN Mar. 1983 63 p refs

(PB83-191114, NBSIR-83-2667) Avail NTIS HC A04/MF A01 CSCL 06B

This report describes some initial steps NBS could take to identify industrial biotechnology's instrument needs and associated measurement related problems, areas where there will likely be an industry underinvestment in resolving these needs/problems, and the appropriate research and service activities NBS could undertake in order to be responsive to some of this industry's infrastructure technology needs It accomplishes this by. (1) examining biotechnology instrumentation trends, (2) identifying specific instrumentation measurement related R&D barriers and opportunities, and (3) providing examples of NBS scientific capabilities related to industrial biotechnology instrument needs and instrument development directions. GRA

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AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness

A83-40748
VISUAL FIELDS FOR FRONTAL PLANE MOTION AND FOR CHANGING SIZE
D REGAN and K I BEVERLEY (Halifax Infirmary, Halifax, Canada) Vision Research (ISSN 0042-6989), vol 23, no 7, 1983, p 673-676 Sponsorship Natural Sciences and Engineering Research Council of Canada refs
(Contract NSERC-A-0323, AF-AFOSR-78-3711)

Thresholds were measured in 15 subjects for 2-Hz oscillations of size and for 2-Hz oscillatory motion in the frontal plane using test squares of side lengths 0 5, 1 0 and 2 0 deg Size-oscillation thresholds were lowest (i e , sensitivity was greatest) for the 2 0 deg square while thresholds were highest (i e , sensitivity was least) for the 0 5 deg square in 28 of 34 tests Frontal plane motion thresholds, on the other hand, did not generally depend on square size. Equal-threshold contours in the visual field were roughly elliptical in 10 of 13 subjects for both types of oscillation None of 13 subjects had visual field defects for oscillating-size or frontal plane motion, in contrast with the known incidence of stereo-motion scotomata One subject was known to be selectively 'blind' to stereoscopically-oscillating disparity in some areas of the visual field, but oscillating-size sensitivity was normal in these regions, thus perserving an alternative basis for motion-in-depth judgments Author

A83-40750
COMPARISON OF THE SPATIAL RESPONSE PROPERTIES OF THE HUMAN RETINA AND CORTEX AS MEASURED BY SIMULTANEOUSLY RECORDED PATTERN ERGS AND VEPS
S SOKOL, K JONES, and D NADLER (Tufts University, New England Medical Center, Boston, MA) Vision Research (ISSN 0042-6989), vol 23, no 7, 1983, p. 723-727 refs
(Contract NIH-EY-00-926, NIH-EY-70-27-5)

Electroretinograms and visual evoked potentials were simultaneously recorded from adult subjects using a checkerboard pattern stimulus reversing at 0 94, 3 75 and 7 5 Hz Two contrast levels were used 30 and 85 percent The data obtained from the cortex (VEPs) show spatial tuning properties for all temporal frequencies at both contrast levels, with the peak of the amplitude-check size function occurring between 15 and 30 min Tuning properties were found at the retina but only at the high contrast level and for the faster (3.75 and 7 5 Hz) temporal frequencies. The results demonstrate that spatial tuning is present in the human retina but not under as wide a range of conditions as found at the cortex Author

A83-40846* San Francisco Univ , Calif
RADIATION EXPOSURES DURING SPACE FLIGHT AND THEIR MEASUREMENT
E. V BENTON and R P HENKE (San Francisco, University, San Francisco, CA) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 8, 1983, p 171-185 refs
(Contract NAS9-15152)

The paper reviews radiation exposures recorded during space flights of the U S and USSR Most of the data are from manned missions and include discussion of absorbed dose and dose rates as a function of parameters such as altitude, inclination, spacecraft type and shielding. Preliminary data exist on the neutron and HZE-particle component, as well as the LET spectra For low earth-orbit missions, the dose encountered is strongly altitude-dependent, with a weaker dependence upon inclination The doses range from about 6 millirad per day for the Space Transportation System No 3 flight to about 90 mrad per day for Skylab The effective quality factor (QF) for the near-earth orbits and free space has been estimated to be about 1.5 and about 5 5 respectively Complete shielding from the galactic cosmic rays does not appear practical because of spacecraft weight limitations Author

A83-40981
THE STABILITY OF PHYSIOLOGICAL AND PSYCHOLOGICAL FUNCTIONS OF HUMANS DURING THE ACTION OF EXTREME FACTORS [USTOICHIVOST' FIZIOLOGICHESKIKH I PSIKHOLOGICHESKIKH FUNKTSII CHELOVEKA PRI DEISTVII EKSTREMAL'NYKH FAKTOROV]
V I MEDVEDEV Leningrad, Izdatel'stvo Nauka, 1982, 104 p In Russian refs

The main propositions of the theory of the adaptation of humans as a factor providing for the stability of human activity are presented Topics examined include accommodation and adaptation as a form of stability, the pattern of accommodation reactions, behavioral adaptation, specific and nonspecific components of adaptation, adaptation as a compromise decision, and the prediction and control of adaptation The types and forms of vegetative and behavioral adaptation are discussed A theory is developed for human adaptation as the search for a compromise reaction to the action of multiple environmental factors and social tasks which a human must fulfill N B

A83-40983
THE CARDIOVASCULAR SYSTEM AND THE FITNESS FOR WORK OF ATHLETES [SERDECHNO-SOSUDISTAIA SISTEMA I RABOTOSPOSOBNOST' SPORTSMENOV]
B T TURUSBEKOV and A M ABAKAROV Frunze, Izdatel'stvo Kyrgyzstan, 1982, 88 p In Russian

A study is presented of the functioning of the cardiovascular system in athletes (track and field athletes, wrestlers, and weightlifters) during various physiological conditions depending on the length of training, in order to determine the appropriate devices and methods of the training process Attention is given to the results of long-term dynamic studies focusing on the same athletes throughout their yearly training cycles The physical fitness for work and the changes of the functional condition of the cardiovascular system during the different stages of the training cycles were investigated N B

A83-41133
IMPAIRED MEMORY REGISTRATION AND SPEED OF REASONING CAUSED BY LOW BODY TEMPERATURE
S R K COLESHAW, R N. M VAN SOMEREN, A. H WOLFF, H M DAVIS, and W R KEATINGE (London Hospital, London, England) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, July 1983, p 27-31 Research supported by the Science and Engineering Research Council refs

Volunteers' body core temperatures were lowered by immersion in water at 15 deg C Aspects of cognitive function were subsequently tested after rewarming had been started in water at 41 deg C when their skin was warm and they felt comfortable but their body core temperature remained low. Memory registration was found to be impaired progressively when core temperature fell from about 36 7 deg C, at core temperatures of 34-35 deg C the impairment caused loss of approximately 70 percent of data that could normally be retained However, recall of previously learned data was not impaired at these core temperatures On a two-digit calculation test, speed of performance was impaired by about 50 percent at a core temperature of 34-35 deg C, but provided enough time was available, accuracy of performance was not reduced Author

A83-41137
OXYGEN DEFICIT AND STORES AT ONSET OF MUSCULAR EXERCISE IN HUMANS
P E DI PRAMPERO, U BOUTELLIER, and P PIETSCH (Geneve, Universite, Geneva, Zuerich, Universitaet, Zurich, Switzerland) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, July 1983, p. 146-153 Sponsorship Swiss National Science Foundation refs (Contract SNSF PROJECT 3,383,0,78)

Five human subjects performed cycloergometer trials at four different power levels from 50-150 W in trials designed to assess the effects of a reduction of the whole-body O2 stores of the O2 deficit and the single-breath O2 (VO2) consumption at the onset of the exercise Monitoring was performed on the O2 uptake at the mouth during exercise, at rest, and during recovery, heart rate, blood lactate levels, and VO2 uptake. The subjects breathed either air or a hypoxic mixture The total body stores of O2 were lower when breathing hypoxic air mixtures during exercise, however, the comparative deficit was lower during the onset of exercise than in later stages of the trials The breathing rate increased at a quicker rate when the subject breathed the hypoxic mixture before beginning the trials, then switched to normal air for exercise M S K

A83-41140
POWER OUTPUT AND FATIGUE OF HUMAN MUSCLE IN MAXIMAL CYCLING EXERCISE
N. MCCARTNEY, J F HEIGENHAUSER, and N L JONES (McMaster University, Hamilton, Ontario, Canada) Journal of Applied Physiology· Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, July 1983, p 218-224 Research supported by the Ontario Heart Foundation and Medical Research Council of Canada refs

The relationships of maximum torque and fatigue to crank velocity were investigated in 13 male subjects using a constant-velocity cycle ergometer in 30-sec maximal-exercise tests The thigh-muscle volume of the subjects was determined by tomography and plasma lactate concentration 3 min after the test was measured by a fluorometric enzymatic method Tests were performed at 60, 80, 100, 120, 140, and 160 rpm Maximum torque is found to vary directly with velocity and with thigh-muscle volume, while peak power varies parabolically with velocity and was achieved at different velocities in different subjects Comparison of peak and average power output at 60, 100, and 140 rpm reveals that the higher peak values obtained at the higher velocities in the first 3 sec of the trials are compensated by more rapid fatigue, so that average-power values over the 30-sec test, like the plasma-lactate and work values, were not significantly different at the three velocities Preliminary results from needle biopsies of muscle tissue indicate that individual differences in short versus long-term performance are related to the proportion of type-II fibers in the thigh muscle T K

A83-41141
CARBOHYDRATE FEEDING DURING PROLONGED STRENUOUS EXERCISE CAN DELAY FATIGUE
E F COYLE, J M HAGBERG, B. F HURLEY, W H MARTIN, A A EHSANI, and J O HOLLOSZY (Washington University, St Louis, MO) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, July 1983, p 230-235 Research supported by Ross Laboratories refs

A83-41425
AGE-RELATED CHARACTERISTICS OF THE VESTIBULAR RESPONSE ACCORDING TO CUPULOMETRY DATA [VOZRASTNYE OSOBENNOSTI VESTIBULIARNOI REAKTSII PO DANNYM KUPULOMETRII]
L A LUCHIKHIN and A F PATRIN (II Moskovskii Meditsinskii Institut, Moscow, USSR) Vestnik Otorinolaringologii (ISSN 0042-4668), July-Aug 1983, p 32-38 In Russian refs

The cupulograms of 176 healthy individuals 14-92 years of age were analyzed to determine the patterns of the changes of the parameters of the rotatory and postrotatory nystagmus An increase of the threshold of the nystagmic reaction with age was found, particularly for the oldest age groups A synchronous change of the size of various nystagmic parameters was observed with slight increases in individuals 40-50 years of age and a more pronounced change after 70 years of age, followed by a sharp decrease in these values, especially after 75 years of age The index of labyrinth asymmetry calculated from the speed of the slow component was normal for middle-aged individuals, with higher values for teenagers and individuals 71 years of age and older N B

A83-41426
HEMODYNAMIC INTERRELATIONS OF THE SYSTEMIC AND PULMONARY BLOOD CIRCULATION IN THE CASE OF HYPERTENSION [GEMODINAMICHESKIE VZAIMOOTNOSHENIIA BOL'SHOGO I MALOGO KRUGA KROVOOBRASHCHENIIA PRI GIPERTONICHESKOI BOLEZNI]
A V TUEV and L A NEKRUTENKO (Permskii Meditsinskii Institut, Perm, USSR) Kardiologiia (ISSN 0022-9040), vol 23, April 1983, p 79-84 In Russian refs

A83-41427
THE CHARACTER OF WATER-SODIUM CHANGES IN THE BODIES OF PATIENTS WITH HYPERTENSION UNDER THE INFLUENCE OF VARIOUS TYPES OF HYPOTENSIVE THERAPIES [KHARAKTER VODNO-NATRIEVYKH IZMENENII V ORGANIZME BOL'NYKH GIPERTONICHESKOI BOLEZN'IU POD VLIIANIEM RAZLICHNYKH VIDOV GIPOTENZIVNOI TERAPII]
V A LIUSOV, V I KHARCHENKO, I A ISTOMINA, M A RIFAI, and E M EVSIKOV (II Moskovskii Meditsinskii Institut, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol 23, April 1983, p 59-65 In Russian refs

A83-41428
THE THERAPEUTIC EFFECT OF THE CARDIOSELECTIVE BETA-BLOCKER TENORMIN AND ITS EFFECT ON PARAMETERS OF THE CENTRAL, INTRACARDIAC, AND REGIONAL HEMODYNAMICS IN PATIENTS WITH HYPERTENSION [LECHEBNYI EFFEKT KARDIOSELEKTIVNOGO BETA-BLOKATORA TENORMINA I EGO VLIIANIE NA POKAZATELI TSENTRAL'NOI, VNUTRISERDECHNOI I REGIONARNOI GEMODINAMIKI U BOL'NYKH GIPERTONICHESKOI BOLEZN'IU]
E V ERINA, KH E CHARYEV, and E V OSHCHEPKOVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol 23, April 1983, p 53-59 In Russian refs

A83-41429
SYSTEMIC AND RENAL HEMODYNAMICS IN HYPERTENSION [SISTEMNAIA I POCHECHNAIA GEMODINAMIKA PRI GIPERTONICHESKOI BOLEZNI]
N A PARASHCHENKO (Ukrainskii Nauchno-Issledovatel'skii Institut Kardiologii, Kiev, Ukrainian SSR) Kardiologiia (ISSN 0022-9040), vol 23, April 1983, p 49-53 In Russian refs

The condition of renal hemodynamics was studied in 170 hypertensive patients with hyperkinetic, eukinetic, and hypokinetic variants of systemic blood circulation in stages I, II, and III of the disease. Each hemodynamic variant of hypertension at any stage of the disease was found to evoke similar changes in the renal hemodynamics with a tendency for the worsening of the parameters from the hyperkinetic to the hypokinetic types The worsening of the renal hemodynamics in general is determined by the early increase in the resistance of renal vessels and the decrease in the minute volume of the blood In the hypokinetic variant, renal ischemia develops in the early period of the disease (stage I), while glomerular filtration decreases during the stablization period (stage II) in the presence of insufficiencies of renal blood circulation. N B

A83-41430
THE DEVELOPMENT OF HYPERTROPHY OF THE HEART IN THE CASE OF HYPERTENSION [RAZVITIE GIPERTROFII SERDTSA PRI GIPERTONICHESKOI BOLEZNI]
S. V. GURGENIAN, K. G ADAMIAN, E. S MIKAELIAN, T Z GRIGORIAN, and A. S. BABAIAN (Ministerstvo Zdravookhraneniia Armianskoi SSR, Institut Kardiologii, Yerevan, Armenian SSR) Kardiologiia (ISSN 0022-9040), vol 23, April 1983, p 45-49 In Russian refs

A83-41431
DIFFERENCES IN THE RESPONSE OF SYSTEMIC BLOOD CIRCULATION TO LOADING TESTS DEPENDING ON THE SEX AND AGE OF THE SUBJECT [RAZLICHIIA V REAKTSIIA SISTEMY KROVOOBRASCHENIIA NA PROBY S NAGRUZKOI V ZAVISIMOSTI OT POLA I VOZRASTA OBSLEDUEMYKH]
G A GLEZER, N P MOSKALENKO, M G GLEZER, and S M MEILER (Nauchno-Issledovatel'skii Institut po Biologicheskim Ispytaniiam Khimicheskikh Soedinenii, Staraya Kupavna, USSR) Kardiologiia (ISSN 0022-9040), vol 23, April 1983, p. 41-45 In Russian. refs

The differences in the response of the systemic blood circulation to orthostatic tests and tests with graded physical loading using a bycycle ergometer are investigated in studies on 59 healthy males and 34 healthy females (18-58 years of age). No differences were observed between the changes of arterial pressure and heart rate during orthostatic tests for males and for females. During physical loading, a less pronounced increase in the systolic arterial pressure and a sharper increase in diastolic arterial pressure were exhibited by females in comparison with males. The cardiac and beat indices during loading were lower for females than for males Parameters of physical work capacity were higher for males than for females Tolerance for physical loading was found to decrease with age for both males and females, although the decline with age was sharper for males N.B

A83-41432
THE CONDITION OF HEMODYNAMICS IN PULMONARY BLOOD CIRCULATION IN PATIENTS WITH HYPERTENSION COMBINED WITH CHRONIC HEART DISEASE [SOSTOIANIE GEMODINAMIKI V MALOM KRUGE KROVOOBRASHCHENIIA U BOL'NYKH GIPERTONICHESKOI BOLEZN'IU V SOCHETANII S KHRONICHESKOI ISHEMICHESKOI BOLEZN'IU SERDTSA]
G KH LAZIDI, A. A KRISHCHUK, and I V CHULAEVSKAIA (Ukrainskii Nauchno-Issledovatel'skii Institut Kardiologii, Kiev, Ukrainian SSR) Kardiologiia (ISSN 0022-9040), vol. 23, April 1983, p. 37-41 In Russian refs

A83-41433
PULMONARY BLOOD CIRCULATION IN PATIENTS WITH VARIOUS TYPES OF HYPERTENSIVE HEARTS [MALYI KRUG KROVOOBRASHCHENIIA U BOL'NYKH S RAZLICHNYMI TIPAMI 'GIPERTONICHESKOGO SERDTSA']
L. I OLBINSKAIA and A. I SINOPALNIKOV (I Moskovskii Meditsinskii Institut, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol. 23, April 1983, p 33-37. In Russian. refs

A83-41434
PARAMETERS OF THE VEGETATIVE REGULATION OF THE CARDIOVASCULAR SYSTEM DURING THE EARLY DEVELOPMENT OF HYPERTENSION [POKAZATELEI VEGETATIVNOI REGULIATSII SERDECHNO-SOSUDISTOI SISTEMY V PERIOD STANOVLENIIA GIPERTONICHESKOI BOLEZNI]
V. R. VEBER and IU. G. GAEVSKII (Semipalatinskii Meditsinskii Institut, Semipalatinsk, Kazakh SSR) Kardiologiia (ISSN 0022-9040), vol 23, April 1983, p. 30-33. In Russian refs

The parameters of the vegetative regulation of the cardiovascular system were analyzed in a comparative study of 98 patients with hypertension stages 1B and 2A and of 32 patieents with renal hypertension Patients with hypertension stage 1B were found to exhibit an elevated tonus of the parasympathetic nervous system, the predominance of trophotropic influences in the vegetative provisioning of the orthostatic position, and an increase in vegetative reactivity. In stage 2A, the tonus of the sympathetic nervous system and ergotropic influences in the orthostatic position predominated These patients differed from those with renal hypertension by the sharp decrease in the vegetative reactivity and the change of the circadian rhythm of vegetative regulation, which were manifested in the predominance of sympathetic influences during the evening and night hours The formation of hypertension in males was accompanied by the simultaneous activation of the parasympathetic section of the vegetative nervous system and the hormonal link of the sympathetic-adrenal system In females, the formation of hypertension was accompanied by a significant increase in sympathetic neurogenic influences. N.B

A83-41435
THE RELATIONSHIP OF HORMONAL AND HEMODYNAMIC PARAMETERS DURING EMOTIONAL STRESS IN HEALTHY INDIVIDUALS AND PATIENTS WITH HYPERTENSION [VZAIMOSVIAZ' GORMONAL'NYKH I GEMODINAMICHESKIKH POKAZATELEI PRI EMOTSIONAL'NOM NAPARIAZHENII U ZDOROVYKH LITS I BOL'NYKH GIPERTONICHESKOI BOLEZN'IU]
E V BELOVA, V. P EMTSEVA, I. E SOFIEVA, T P KHOVANSKAIA, and V. I. TRUBNIKOV (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR; Nauchno-Issledovatel'skii Institut Normal'noi Fiziologii, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol 23, April 1983, p 26-30 In Russian refs

A83-41436
THE MATHEMATICAL SELECTION OF INFORMATION CRITERIA FOR THE DIFFERENTIAL DIAGNOSIS OF RENOVASCULAR HYPERTONIA AND HYPERTENSION [MATEMATICHESKOE VYDELENIE INFORMATIUNYKH KRITERIEV DLIA DIFFERENTSIAL'NOI DIAGNOSTIKI RENOVASCULIARNOI GIPERTONII I GIPERTONICHESKOI BOLEZNI]
F M PALEEVA, S. A IUREV, S S. ARABIDZE, V. K STEPANOVA, N L LORDKIPANIDZE, S M. ZHDANOVA, and A. Z EVENTOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol. 23, April 1983, p. 22-26. In Russian refs

A83-41437
PROSTAGLANDINS OF THE RENAL VASCULAR BED DURING ARTERIAL HYPERTENSION OF VARIOUS ETIOLOGIES [PROSTAGLANDINY SOSUDISTOGO RUSLA POCHEK PRI ARTERIAL'NOI GIPERTONII RAZLICHNOI ETIOLOGII]
A A NEKRASOVA, A A. KLEMBOVSKII, I. A UCHITEL, L. S. MATVEEVA, and V.M SHPILKIN (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol 23, April 1983, p 16-21. In Russian refs

A83-41439
A LOW-RENIN FORM OF HYPERTENSION - CHARACTERISTICS OF THE FUNCTIONAL RELATIONSHIPS OF THE RENIN-ALDOSTERONE PRESSOR SYSTEM [NIZKORENINOVAIA FORMA GIPERTONICHESKOI BOLEZNI - OSOBENNOSTI FUNTSIONAL'NYKH SOOTOSHENII PRESSORNOI SISTEMY RENIN-AL'DOSTERON]
I. K SHKHVATSABAIA, S E USTINOVA, I A. UCHITEL, N M. CHIKHLADZE, and I F PATRUSHEVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol. 23, April 1983, p 5-10. In Russian refs

The functional condition of the renin-aldosterone pressor system was studied in 23 patients with a low-renin form of hypertension (LRH) during resting and stimulated conditions. The results were compared with those of patients with primary aldosteronism and hypertension in which the renin activity is stimulated in conditions of a similar sodium balance. It was found that the test of choice for the diagnosis of renin suppression is intravenous or prolonged furosemide administration Several characteristics of the renin-aldosterone system were identified in patients with LRH,

including a subnormal activity of renin and a normal concentration of aldosterone in the blood plasma at basal conditions, the absence of renin stimulation, and a decreased level of aldosterone stimulation following functional loading An analysis of the changes in diuresis, natriuresis, and the pattern of the Na/K coefficient indicated the large diuretic and natriuretic effects of furosemide in patients with LRH N.B

A83-41440
SCINTIGRAPHY WITH (TC-99)-PYROPHOSPHATE AND COMPUTER TOMOGRAPHY IN THE DIAGNOSIS OF TUMORS OF THE CRANIAL BONE [STSINTIGRAFIIA S /TC-99/-PIROFOSFATOM I KOMP'IUTERNAIA TOMOGRAFIIA V DIAGNOSTIKE OPUKHOLEVOGO PORAZHENIIA KOSTEI CHEREPA]
R. I GABUNIIA, A L. PRIKHODKO, IU I. VOROBEV, and L B TUMANOV (Akademiia Meditsinskikh Nauk SSSR, Moskovskii Meditsinskikh Stomatologicheskii Institut, Moscow, USSR) Vestnik Otorinolaringologii (ISSN 0042-4668), May-June 1983, p. 59-65 In Russian refs

A83-41441
THE DIAGNOSTIC VALUE OF THE OTOLITHIC REFLEX IN PATIENTS WITH CHRONIC SUPPURATIVE INFLAMMATION OF THE MIDDLE EAR [DIAGNOSTICHESKOE ZNACHENIE OTOLITOVOGO REFLEKSA U BOL'NYKH KHRONICHESKIM GNOINYM SREDNIM OTITOM]
A A DAINIAK (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Vestnik Otorinolaringologii (ISSN 0042-4668), May-June 1983, p 31-35 In Russian refs

A83-41444
A TEST OF THE LATERALIZATION OF ULTRASOUND IN THE DIAGNOSIS OF EARLY FORMS OF NEUROSENSORY AMBLYACOUSIA [TEST LATERALIZATSII UL'TRAZVUKA V DIAGNOSTIKE RANNIKH FORM NEIROSENSORNOI TUGOUKHOSTI]
L I KOLESOVA (Ministerstvo Zdravookhraneniia RSFSR, Nauchno-Issledovatel'skii Institut Tuberculeza, Moscow, USSR) Vestnik Otorinolaringologii (ISSN 0042-4668), May-June 1983, p 20-23 In Russian refs

A83-41445
MASKING DURING SPEECH AUDIOMETRY AND ITS DIAGNOSTIC VALUE [MASKIROVKA PRI RECHEVOI AUDIOMETRII I EE DIAGNOSTICHESKOE ZNACHENIE]
R M KHANAMIRIAN (Ministerstvo Zdravookhraneniia SSSR, Erevanskii Institut Usovershenstvovanii Vrachei, Yerevan, Armenian SSR) Vestnik Otorinolaringologii (ISSN 0042-4668), May-June 1983, p 17-20. In Russian refs

Speech audiometry in conditions of masking (noise interference, speech, and music) was investigated in 60 otologically normal individuals and in 260 patients with conductive and neurosensory hearing impairments Results show that in patients with conductive hearing impairments, as well as in individuals with normal hearing, rhythmic music and foreign speech provided a greater masking effect than white noise However, in every case, including patients with cochlear forms of otoschlerosis, a 100 percent discrimination of speech could be achieved. No decline in the speech discrimination was observed with an increase in the intensity of all forms of masking by 10-20 dB or greater above the threshold of the 100 percent discrimination threshold for a given subject These forms of masking evoked a 30-40 percent decline in speech discrimination in patients with early forms of neurosensory hearing impairments, while for patients with developed forms of neurosensory hearing impairments masking was observed to cause a near disappearance of speech discrimination N B

A83-41446
ELECTROSTIMULATION FOR RECEPTOR LESIONS OF THE EAR [OB ELEKTROSTIMULIATSII PRI RETSEPTORNOM NARUSHENII ORGANA SLUKHA]
B LATKOWSKI, P ZALESKI, K BUCHILKO, and I CHIZHEVSKI (Wojskowa Akademia Medyczna, Lodz, Poland) Vestnik Otorinolaringologii (ISSN 0042-4668), May-June 1983, p. 13-16 In Russian. refs

A83-41447
THE CHARACTERISTICS OF HEART RHYTHM DISORDERS IN ATHLETES WITH VARIOUS TYPES OF VEGETATIVE REGULATION [OSOBENNOSTI NARUSHENII RITMA SERDTSA U SPORTSMENOV S RAZLICHNYMI TIPAMI VEGETATIVNOI REGULIATSII]
T N. SHESTAKOVA and N. I OSIPCHIK (Minskii Radiotekhnicheskii Institut, Minsk, Belorussian SSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), April 1983, p. 26-28 In Russian refs

The correlation of heart rhythm disorders with the type of vegetative regulation and the quality of the adaptation of the cardiovascular system to physical loading is investigated for 826 athletes (17-30 years of age) of various specialties and qualifications The evaluation of the functional condition and the athletic working capacity of athletes based on parameters of the heart rhythm disorders is also studied Results show that during prolonged EKG measurements, 25 7 percent of the athletes examined exhibited heart rhythm disorders The heart rhythm disorders were found to correlate directly with the type of vegetative regulation Heart rhythm disorders which arise on a background of vagotonia and sympatheticotonia were found to be accompanied by decreases in the adaptive quality of the heart to physical loading. N B

A83-41449
PHYSIOTHERAPY IN THE MULTIPLE THERAPY TREATMENT OF PATIENTS WITH VASCULAR DISEASES OF THE BRAIN [FIZIOTERAPIIA V KOMPLEKSNOM LECHENII BOL'NYKH S SOSUDISTYMI ZABOLEVANIIAMI MOZGA]
A A USHAKOV and V. S ZAIKIN Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), April 1983, p 58-60 In Russian

A83-41450
THE DIAGNOSTIC VALUE OF AMBULATORY ELECTROCARDIOGRAPHIC MONITORING [DIAGNOSTICHESKOE ZNACHENIE AMBULATORNOGO ELEKTROKARDIOGRAFICHESKOGO MONITORIROVANIIA]
E V GEMBITSKII and IU N KARNAUKHOV Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), April 1983, p 30-34 In Russian

A83-41451
THE KINETICS OF HEMOPOIESIS AND ITS CLINICAL SIGNIFICANCE [KINETIKA GEMOPOEZA I EE KLINICHESKOE ZNACHENIE]
G. I KOZINETS and V. M KOTELNIKOV (Ministerstvo Zdravookhraneniia SSSR, Tsentral'nyi Nauchno-Issledovatel'skii Institut Gematologii i Perelivaniia Krovi, Moscow, USSR) Sovetskaia Meditsina, no. 4, 1983, p 73-77 In Russian

A discussion is presented concerning the kinetics of hemopoiesis, a feedback system whose displacement from the condition of dynamic equality can lead to severe consequences for the organism The characteristics of hemopoietic cells are examined, including their development and mititic cycle It is noted that an understanding of the kinetics of hemopoiesis includes the study of the kinetics of the proliferation of the precursor cells in the bone marrow, the temporal parameters for the development of the cells in the bone marrow and their movement into the blood, the duration of the circulation of mature cell elements in the peripheral blood, and the path of the migration of blood cells The importance of these characteristics for clinical evaluations is examined N B

A83-41452
THE EKG AND PHYSICAL WORK CAPACITY IN PATIENTS WITH HYPERTENSION [EKG I FIZICHESKAIA RABOTOSPOSOBNOST' U BOL'NYKH GIPERTONICHESKOI BOLEZN'IU]
IU. A VASIUK (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR) Sovetskaia Meditsina, no 4, 1983, p 11-16 In Russian. refs

The hemodynamic characteristics, physical work capacity, and functional myocardial reserves were studied in patients with hypertension, depending on the presence and degree of the expression of EKG signs of left ventricle hypertrophy Results show that the primary reason for the limited physical work capacity in patients with hypertension in the absence or early stages of left ventricle hypertrophy is the excessive pressor reaction with an increased hemodynamic loading on the myocardium With increasing hypertrophy, the decrease in the contractile function with the signs of the hyposystolic type acquires the primary value In patients with expressed left ventricle hypertrophy, the cardiac output increases at the expense of the heart rate in the case of a moderate increase in the beat volume at initial loading levels with a subsequent decrease. This character of the increase in cardiac output is energetically unfavorable and signifies the decrease of the contractile capability of the hypertrophied myocardium N B

A83-41453
THE SYSTEM OF THE REGULATION OF THE AGGREGATION CONDITION OF THE BLOOD IN PATIENTS WITH ISCHEMIC HEART DISEASE [SISTEMA REGULIATSII AGREGATNOGO SOSTOIANIIA KROVI U BOL'NYKH ISHEMICHESKOI BOLEZN'IU SERDTSA]
N IA LAGUTINA, F E OSTAPIUK, S S SOKOLOV, A I CHIZHOVA, T. A LABINSKAIA, IU I BOBKOV, and A O GAVRILOV (MZ SSSR, Tsentral'nyi Nauchno-Issledovatel'skii Institut Gematologii i Perelivaniia Krovi, Tsentral'nyi Institut Usovershenstvovaniia Vrachei, Nauchno-Issledovatel'skii Institut Transplantatsii i Peresadki Organov, Moscow, USSR) Sovetskaia Meditsina, no. 4, 1983, p 7-10 In Russian

Several parameters of the hemostatic potentials in various parts of the heart during ischemic heart disease were studied in 12 patients (45-70 years of age) with ischemic heart disease. Results show a mosaic character of the hemostatic potentials in various regions of the heart in patients with ischemic heart disease Intravascular coagulation with the activation of fibrinolysis occurred in the right section of the heart In the pulmonary arteries this was caused by coagulation factors which were formed at the level of the coronary blood flow The hemostatic potential decreased in the left ventricle of the heart The condition of the hemodynamics is an important factor which exerts a considerable effect on the system of the regulation of the aggregation condition of the blood Changes of the hemostatic potentials in the cavities of the heart are not reflected in the peripheral blood N B.

A83-41454
THE CONDITION OF THE PHYSIOLOGICAL FUNCTIONS OF FEMALE WORKERS OCCUPIED WITH VISUALLY STRESSFUL TYPES OF WORK AT A LOW LEVEL OF MOTOR ACTIVITY [SOSTOIANIE FIZIOLOGICHESKIKH FUNKTSII U RABOTNITS, ZANIATYKH ZRITEL'NO-NAPRIAZHENNYMI VIDAMI RABOT PRI NEVYSOKOM UROVNE DVIGATEL'NOI AKTIVNOSTI]
G. IA KLIMENKO, M A. KOZLOV, A I LIUTOV, A B. MIROSHNICHENKO, and N. E SAVENKOVA (Meditsinskii Institut, Voronezh, USSR) Gigiena Truda i Professional'nye Zabolevaniia, April 1983, p 40, 41 In Russian

The physiological changes during the work shift are studied for 30 female workers (30 years of age or less) engaged in visually stressful types of work at low levels of motor activity (the quality control of microcircuits) The workers examine the microcircuits through a microscope while sitting, and there are no breaks for relaxation during the shift It is found that this type of work is characterized by hypokinesia and monotony, and it induces significant functional shifts in the workers' bodies and psychological activity The most important criteria for the physiological evaluation of this type of work are the heart rate, systolic arterial pressure, latent period of visual-motor reaction, concentration, and stability of attention. It is suggested that fatigue and visual stress can be minimized by introducing a series of small breaks for relaxation into the work schedule which would include gymnastics and special exercises for the eyes N B

A83-41455
THE FUNCTIONAL CONDITION OF THE BODY AND SEVERAL SPECIFIC FUNCTIONS OF WOMEN CONSTRUCTION WORKERS ENGAGED IN FINISHING WORK IN HOT CLIMATIC CONDITIONS [FUNKTSIONAL'NOE SOSTOIANIE ORGANIZMA I NEKOTORYE SPETSIFICHESKIE FUNKTSII ZHENSHCHIN, ZANIATYKH NA OTDELOCHNYKH RABOTAKH V STROITEL'STVE V USLOVIIAKH ZHARKOGO KLIMATA]
G I SHISHLIANNIKOVA, L N. DEMENTEVA, and N. A. POPOVA (Vsesoiuznyi Nauchno-Issledovatel'skii i Proektnyi Institut Truda v Stroitel'stve, Tashkent, Uzbek SSR) Gigiena Truda i Professional'nye Zabolevaniia, April 1983, p. 22-26. In Russian.

A83-41458
THE FITNESS FOR WORK OF HUMANS AND THE PROBLEMS OF ITS INCREASE [RABOTOSPOSOBNOST' CHELOVEKA I PROBLEMY EE POVYSHENIIA]
V V ROZENBLAT (Ural'skii Lesotekhnicheskii Institut, Sverdlovsk, USSR) Gigiena Truda i Professional'nye Zabolevaniia, April 1983, p 1-4 In Russian refs

A discussion is presented concerning the fitness for work of humans which is comprised by the size of the functional possibilities of the body and the effect of the maximum exertion An evaluation of the physical fitness for work comprises the determination of the limiting level of physiological expenditures by measuring the oxygen demand and the determination of the efficiency of the physiological expenditures using the PWC-170 test The major types and manifestations of the fitness for work can be classified into three aspects the object of application, the stability of the manifestations of the fitness for work, and qualitative parameters (amplitude and time) Possible trends in the further development of studies of the mechanisms, the evaluation, and the elevation of the fitness for work are discussed N B.

A83-41459
OPTOELECTRONIC METHODS FOR INCREASING THE INFORMATION CONTENT OF ULTRASONIC OCULAR SCANOGRAMS [OPTIKO-ELEKTRONNYE METODY POVYSHENIIA KLINICHESKOI INFORMATIVNOSTI UL'TRAZVUKOVYKH SKANOGRAMM GLAZA]
G. D. MALIUTA (Nauchno-Issledovatel'skii Institut Glaznykh Boleznei, Moscow, USSR) Vestnik Oftal'mologii (ISSN 0042-465X), Mar.-Apr. 1983, p 47-49 In Russian refs

The clinical information content of acoustic (ultrasonic) scanograms of the eye was evaluated in 30 patients with various types of eye pathologies using optoelectronic methods of image transformation such as color synthesis and isometric projection Results show that these methods can be used to increase the information content of two-dimensional echograms by color synthesized initial images and the summed scanograms in isometric projection These methods can be used for the differential diagnosis of filmy opacities of the vitreous body and amotio retinae, as well as for specifying the topography and form of the intraocular pathological focus. N.B

A83-41463
COMPUTER TOMOGRAPHY OF THE BRAIN DURING MIGRAINE (REVIEW) [KOMP'IUTERNAIA TOMOGRAFIIA MOZGA PRI MIGRENI /OBZOR/]
M IU DOROFEEVA Zhurnal Nevropatologii i Psikhiatrii im S S. Korsakova (ISSN 0044-4588), vol. 83, no 4, 1983, p. 604-606 In Russian refs

A83-41826
THE CONTENT OF IMMUNOGLOBULINS IN THE BLOOD SERUM OF PATIENTS WITH VARIOUS FORMS OF CHRONIC INFLAMMATION OF THE MIDDLE EAR [O SODERZHANII IMMUNOGLOBULINOV V SYVOROTKE KROVI U BOL'NYKH S RAZNYMI FORMAMI KHRONICHESKOGO VOSPALENIIA SREDNEGO UKHA]
V P GRIGOREV, ZH S SUNDETOV, and G. F. LASHINA (Aktiubinskii Meditsinskii Institut, Aktyubinsk, Kazakh SSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), Mar -Apr. 1983, p. 18-20 In Russian refs

A83-41828
THE DIAGNOSTIC INFORMATIVITY OF DRUGS USED FOR REVEALING INTRALABYRINTHINE HYDROPS ACCORDING TO DATA OF AUDIOLOGICAL AND BIOCHEMICAL INVESTIGATIONS [DIAGNOSTICHESKAIA INFORMATIVNOST' PREPARATOV, ISPOL'ZUEMYKH DLIA VYIAVLENIIA VNUTRILABIRINTNOGO GIDROPSA, PO DANNYM AUDIOLOGICHESKOGO I BIOKHIMICHESKOGO ISSLEDOVANII]
V T PALCHUN, O A BUIANOVSKAIA, V I ASLAMAZOVA, and T S POLIAKOVA (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezнei (ISSN 0044-4650), Mar -Apr 1983, p 27-31 In Russian refs

The dehydrating capability of glycerol, glucose, furosemide, and xylit was evaluated in 96 patients (23-42 years of age) with Meniere's disease, based on the changes in auditory thresholds Results show that the diagnostic informativity of glycerol and xylit is significantly higher than that of furosemide and glucose Xylit at a concentration of 1 5 g/kg induces changes in the auditory thresholds in the low and medium frequency ranges which are comparable to glycerol, but xylit does not produce the contraindications and side effects characteristic of glycerol Glucose can also be used for the diagnosis of hydrops in patients who are tolerant to this drug and when no degenerating substances are present N.B

A83-41829
BONE SOUND CONDUCTION IN A WIDENED FREQUENCY RANGE ACCORDING TO DATA OF THE MOESSBAUER EFFECT [KOSTNOE ZVUKOPROVEDENIE V RASSHIRENNOM DIAPAZONE CHASTOT PO DANNYM EFFEKTA MESSBAUERA]
R M KHANAMIRIAN, B I DUNAIVITSER, and G N KHACHATRIAN (Erevanskii Institut Usovershenstvovaniia Vrachei, Yerevan, Armenian SSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezнei (ISSN 0044-4650), Mar -Apr 1983, p 31-35 In Russian refs

A method is developed for studying the sound conduction by the bones of the skull in the frequency range of 250 Hz-70 kHz using gamma-resonance spectroscopy (the Moessbauer effect) It is determined that the resonance of the skull bones lies in the region of 800 Hz The acoustic impedance of the temporal bone is found to be almost absent during stimulations with sounds in the range of 20-70 kHz This finding indicates that the temporal bone is acoustically transparent at ultrasound frequencies N B

A83-41830
AN INVESTIGATION OF THE PROTEINASE ACTIVITY IN THE PERILYMPH OF PATIENTS WITH OTOSCLEROSIS [ISSLEDOVANIE AKTIVNOSTI PROTEINAZ V PERILIMFE U BOL'NYKH OTOSKLEROZOM]
K N VEREMEENKO, L. I VOLOKHONSKAIA, V A GUKOVICH, Z G IASHVILI, and V V SHCHUROVSKII (Kievskii Nauchno-Issledovatel'skii Institut Otolaringologii, Kiev,Ukrainian SSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezнei (ISSN 0044-4650), Mar -Apr 1983, p 35-39 In Russian refs

The proteinase activity was studied in samples of perilymph obtained from 31 patients with otosclerosis during stapedoplasty, 3 patients with middle ear abnormalities, and 11 cadavers A microtest using protamine sulfate was employed to measure the activity of proteinases which were functioning in the weakly alkaline medium of the human perilymph The perilymph of patients with otosclerosis was found to contain a significantly higher activity of proteinases compared with perilymph obtained from patients with middle ear abnormalities and from the cadavers. The level of proteolytic activity in the perilymph was found to significantly exceed that of the cerebrospinal fluid The possible mechanisms for the increased proteolytic activity in the perilymph of patients with otosclerosis are examined N B

A83-41831
THE PREVALENCE OF PATHOLOGIES OF THE VESTIBULAR APPARATUS AMONG PATIENTS REFERRED TO A CONSULTATION CLINIC [RASPROSTRANENNOST' PATOLOGII VESTIBULIARNOGO APPARATA SREDI BOL'NYKH, OBRASHCHAIUSHCHIKHSIA V KONSUL'TATIVNUIU POLIKLINIKU]
V G BAZAROV and L A SAVCHUK (Kievskii Nauchno-Issledovatel'skii Institut Otolaringologii, Kiev, Ukrainian SSR) *Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezнei* (ISSN 0044-4650), Mar -Apr 1983, p 40-43 In Russian. refs

The prevalence of vestibular pathologies was determined based on data collected for patients referred to the consultation clinic at the Kiev Research Institute of Otolaryngology over a six year period (1976-1981) It is found that of the 433,460 patients examined, pathologies of the ear were exhibited by 48,240 (11 1 percent). Among this group were 1850 patients with disorders of vestibular function who comprised 0 42 percent of the total number of patients and 3 8 percent of the patients with ear pathologies The presence of various ear pathologies were observed in 86 percent of the cases of vestibular function disorders, while evidences of hypertension, cranial injury, cervical osteochondrosis, and various pathologies of the central nervous system were observed in the remaining 14 percent of the cases N B

A83-41832
THE CERVICAL TEST IN VERTEBRAL-BASILAR INSUFFICIENCY [SHEINAIA PROBA PRI VERTEBRO-BAZILIARNOI NEDOSTATOCHNOSTI]
S N KHECHINASHVILI, L N TRUSHINA, and G M GIGINEISHVILI (Tbilisskii Institut Usovershenstvovaniia Vrachei, Tbilisi, Georgian SSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezнei (ISSN 0044-4650), Mar.-Apr 1983, p 43-46 In Russian refs

The vestibular nystagmus during prolonged (4 min) forced turnings of the head was studied in 50 patients suffering from cervical osteochondrosis and in patients suffering from pain during movements of the head Changes in the parameters of spontaneous nystagmus were observed in 40 percent of the patients examined, including faster nystagmus rhythms and increases in the amplitude and rate of the slow component. In the majority of cases the changes of the nystagmus parameters were manifested in the first minute following the forced turning of the head (14 cases), while these changes were manifested less frequently after the third minute (6 cases) N B

A83-41834
THE CLASSIFICATION OF POSITIONAL NYSTAGMUS AND THE POSITIONAL VESTIBULAR SYNDROME [O KLASSIFIKATSII POZITSIONNOGO NISTAGMA I POZITSIONNOGO VESTIBULIARNOGO SINDROMA]
K S TANCHEV Zhurnal Ushnykh, Nosovykh i Gorlovykh Bolezнei (ISSN 0044-4650), Mar -Apr. 1983, p 71-74 In Russian refs

A discussion is presented of the different methods employed to classify the vestibular disorders of positional nystagmus and the positional vestibular syndrome The various types of positional nystagmus, one of the important objective symptoms of the positional vestibular syndrome, are examined. The determination of the origin of positional nystagmus (peripheral or central) is considered, focusing on the methods of diagnosis Attention is given to the differential diagnostic characteristics of central and peripheral positional nystagmus, such as the fact that central positional nystagmus is often horizontal in form and is only rarely

rotatory, vertical, or horizontal-rotatory directed to the healthy side, while peripheral positional nystagmus is often rotatory and rarely horizontal-rotatory directed to the side of the diseased labyrinth
N B.

A83-41835
THE CONDITIONS CONTRIBUTING TO THE SENSORIMOTOR ADAPTATION OF THE EYE MOVEMENT SYSTEM IN HUMANS [USLOVIIA, SODEISTVUIUSHCHIE SENSOMOTORNOI ADAPTATSII GLAZODVIGATEL'NOI SISTEMY CHELOVEKA]
V. A BARABANSHCHIKOV (Akademiia Nauk SSSR, Institut Psikhologii, Moscow, USSR) Psikhologicheskii Zhurnal, vol. 4, Mar -Apr. 1983, p 15-27 In Russian. refs

The character and primary tendencies for the adaptation of the human eye movement system are investigated in conditions which contribute to the recovery of the disordered functional system. Three possible conditions are evaluated the narrowing of the area of the optic stimuli, the discrete presentation of optic stimuli, and the active contact of the human with the subject and the possibility of its free displacement in space Results show that the contraction of the area of optic stimuli into a dot and the active interaction of a human with the testing objects act to promote the adaptive transformation of the oculomotor system The stroboscopic lighting of objects does not produce an adaptive response. N B

A83-41840
THE USE OF FOCUSED ULTRASOUND IN THE MEGAHERTZ RANGE IN OTOLOGY [ISPOL'ZOVANIE FOKUSIROVANNOGO UL'TRAZVUKA MEGAGERTSEVOGO DIAPAZONA V OTOLOGII]
L R. GAVRILOV, G. V GERSHUNI, V I PUDOV, A. S. ROZENBLIUM, and E. M TSIRULNIKOV (Leningradskii Nauchno-Issledovatel'skii Institut po Bolezniam Ukha, Gorla, Nosa i Rechi, Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii and Akusticheskii Institut, Leningrad, USSR) Vestnik Otorinolaringologii (ISSN 0042-4668), Mar -Apr 1983, p. 3-8 In Russian refs

The use of focused ultrasound in the megahertz range in otological diagnosis is examined for 350 patients with various forms of hearing disorders and in individuals with normal hearing Results show that using amplitude-modulated focused ultrasound the subject can distinguish the signal corresponding to the modulation frequency, which allows measurements to be collected over a wide range of frequencies It is suggested that this method could be employed to measure the thresholds of short duration, which is not possible using classical methods of measurement The critical summation time is examined using this method in individuals with normal hearing and in patients with various hearing disorders In addition, it is shown that this method can be used to distinguish various forms of amblyacousia N B

A83-41842
AGE-RELATED CHANGES OF THE AUDITORY PERCEPTION OF ULTRASOUND [O VOZRASTNYKH IZMENENIIAKH SLUKHOVOGO VOSPRIIATIIA UL'TRAZVUKA]
M A. ONANOVA and I. I. MSHVENIERADZE (Tbilisskii Institut Usovershenstvovaniia Vrachei, Tbilisi, Georgian SSR) Vestnik Otorinolaringologii (ISSN 0042-4668), Mar -Apr 1983, p 12-15 In Russian refs

The auditory perception of ultrasound at frequencies of 45-80 kHz was studied in individuals with normal hearing and in patients with various types of pathologies of the inner ear (10-80 years of age) The results of this study were compared with the results of tonal audiograms and morphological criteria of the atrophy of intracochlear fibers of the choclear nerve in the mediolus It was found that the threshold of the perception of ultrasound rises slowly with age, but remains significantly lower than in the audible range of frequencies for the same age group. The increase in the threshold to 50-60 dB corresponds to the increase of the threshold of the perception of ultrasound to 17.7 and 15 dB. The divergence in the results of normal and ultrasonic audiometry indicates that the stimuli applied might be perceived by different parts of the receptor elements N B

A83-41843
THE CONDITION OF THE VESTIBULAR APPARATUS IN CHILDREN WITH HEREDITARY HEARING DEFECTS [SOSTOIANIE VESTIBULIARNOGO APPARATA U DETEI S NASLEDSTVENNYMI DEFEKTAMI SLUKHA]
M M. MILMAN, R K. MIRAZIZOV, L. V DUBINCHIK, and IU N ERSHOVA (Uzbekskii Nauchno-Issledovatel'skii Institut Ekspertizy i Vosstanovleniia Trudosposobnosti Invalidov, Uzbek SSR) Vestnik Otorinolaringologii (ISSN 0042-4668), Mar -Apr. 1983, p. 16, 17 In Russian

The functional condition of the vestibular apparatus was examined in 123 children with hereditary hearing impairments Vestibulometric investigations showed that these individuals exhibited variations in auditory responses (hyporeflexia, normoreflexia, and areflexia). These results indicate that among children with hereditary hearing defects the vestibular function depends on the type of hereditary pathology. N B.

A83-42023
THE APPLICATION OF A METHOD OF THE VARIABILITY OF THE HEART RATE FOR THE EVALUATION OF AN OPERATOR'S ACTIVITY [PRIMENENIE METODA VARIATIVNOSTI CHASTOTY SERDECHNYKH SOKRASHCHENII DLIA OTSENKI DEIATEL'NOSTI OPERATOROV]
V V ROMANOV, N I LEVINSKII, and I N. CHERNOVA Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), May 1983, p 47-49. In Russian.

The reliability of using changes in the heart rate for an evaluation of the amount of stress on an operator is studied in 15 individuals using two types of mental work and two different levels of physical activity Results show that the standard deviation of the heart rate is an informative parameter of the stress on an operator during mental work The standard deviation of the heart rate during mental work is reduced by almost 50 percent even during work at an optimal tempo and a practically unchanged pulse rate. In evaluating the stress on an operator by means of the heart rate changes it is necessary to consider the amount of physical loading which can evoke analogous changes in the rhythmicity of the pulse N B

A83-42024
THE CHARACTERISTICS OF AEROSPACE MEDICAL EXPERTISE FOR DISEASES OF THE EYE [OSOBENNOSTI VRACHEBNO-LETNOI EKSPERTIZY PRI ZABOLEVANIIAKH ORGANA ZRENIIA]
L M. ASYEV Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), May 1983, p. 50, 51 In Russian

A discussion is presented of the evaluation procedures to be followed by aerospace medical personnel in examining the eyesight and condition of the eyes of military personnel, especially flight personnel Attention is given to the differing standards of eyesight required by the various types of flight personnel. Eye conditions considered include myopia, anomalous refraction, and night vision disorders. N B

A83-42025
THE CLINICAL PICTURE OF COVERED PERFORATED GASTRIC AND DUODENAL ULCERS IN YOUNG INDIVIDUALS [KLINIKA PRIKRYTOI PROBODNOI IAZVY ZHELUDKA I DVENADTSATIPERSTNOI KISHKI U LITS MOLODOGO VOZRASTA]
A. V. SHABUNIN Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), May 1983, p 57, 58 In Russian.

A83-42048
HYPERTENSION AND ORTHOSTATIC HYPOTENSION IN APPLICANTS FOR SPACEFLIGHT TRAINING AND SPACECREWS - A REVIEW OF MEDICAL STANDARDS
H. S FUCHS (Giessen, Universitaet, Giessen, West Germany) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 199-204 refs

The maximum-allowable-blood-pressure standards for astronauts and spacecraft crew are reviewed The historical development of aviation and astronautic standards is traced from 1912 to the present, and the relationship of age and mean systolic/diastolic blood pressure is discussed Skylab and Salyut findings on the effects of weightlessness are surveyed increased systolic, pulse, and venous pressure, decreased diastolic and mean arterial pressure, decreased orthostatic tolerance While the present relatively strict standards are considered appropriate for career astronauts, it is recommended that payload specialists and space-station crew, who perform more routine duties on a limited number of missions, be evaluated individually and accepted if labile or essential hypertension (up to 180/120 mm Hg in the 40-50-year-old applicants) does not impair physical, mental, or psychic performance and if the response to orthostatic-stress testing is satisfactory (not lower than 100/60 mm Hg) T K

A83-42049
GRAVITATIONAL EFFECTS ON HUMAN CARDIOVASCULAR RESPONSES TO ISOMETRIC MUSCLE CONTRACTIONS
F BONDE-PETERSEN (Copenhagen, University, Copenhagen, Denmark), Y SUZUKI (Nippon College of Physical Education, Tokyo, Japan), and T SADAMOTO (Tokyo, University, Tokyo, Japan) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 205-208 Research supported by the Danish Space Board and Danish Medical Research Foundation refs

The physiological responses, particularly cardiovascular adaptations, caused by handgrip isometric exercises in positive and negative gravity conditions were examined experimentally Measurements were made of the cardiac output, forearm blood flow, systolic, mean, and diastolic arterial pressures, heart rate (HR), and the calculated total peripheral, resistance, stroke volume, and forearm vascular resistance of five subjects partially submerged in water and in and out of different orientations of bedrest The exercise performed comprised a sustained handgrip It was found that barorecptaor mediated cardiovascular changes induced during the exercises was not modified by low pressure baroreceptors. The arterial baroreceptors triggered the reflexes in the CG system, a conclusion reached by solving the time derivative of the aortic pulse wave pressure amplitude induced by the change in stroke volume M S K.

A83-42078*# National Aeronautics and Space Administration, Washington, D C
SPACE STATION AND THE LIFE SCIENCES
R J WHITE, J I. LEONARD (GE Management and Technical Services Co , Arlington, VA, GE Management and Technical Services Co , Houston, TX), D B CRAMER, and W P BISHOP (NASA, Washington, DC, GE Management and Technical Services Co , Arlington, VA, GE Management and Technical Services Co , Houston, TX) American Institute of Aeronautics and Astronautics and NASA, Symposium on the Space Station, Arlington, VA, July 18-20, 1983 14 p refs
(Contract NASW-3685)
(AIAA PAPER 83-7089)

Previous fundamental research in space life sciences is examined, and consideration is devoted to studies relevant to Space Station activities Microgravity causes weight loss, hemoconcentration, and orthostatic intolerance when astronauts returns to earth Losses in bone density, bone calcium, and muscle nitrogen have also been observed, together with cardiovascular deconditioning, fluid-electrolyte metabolism alteration, and space sickness. Experiments have been performed with plants, bacteria, fungi, protozoa, tissue cultures, invertebrate species, and with nonhuman vertebrates, showing little effect on simple cell functions The Spacelab first flight will feature seven life science experiments and the second flight, two. Further studies will be performed on later flights Continued life science studies to optimize human performance in space are necessary for the efficient operation of a Space Station and the assembly of large space structures, particularly in interaction with automated machinery. M S K

A83-42372* Technology, Inc , Houston, Tex.
AN APPRAISAL OF THE VALUE OF VITAMIN B12 IN THE PREVENTION OF MOTION SICKNESS
R. L KOHL, C. L LACEY (Technology, Inc., Houston, TX), and J. L HOMICK (NASA, Johnson Space Center, Houston, TX) Acta Astronautica (ISSN 0094-5765), vol 10, April 1983, p 219-224 refs

It has been suggested that vitamin B12 given by intramuscular injection can significantly reduce the occurrence of motion sickness in susceptible individuals (Banks, 1980). Since it is known that B12 influences the metabolism of histidine and choline, dietary precursors to neurotransmitters with established roles in motion sickness, an experimental evaluation has been undertaken of the efficacy of B12 in the prevention of motion sickness induced by controlled coriolis simulation. Subjects executed standardized head movements at successively higher rpm until a malaise III endpoint was reached Following two baseline tests with this motion stressor, subjects received a B12 injection, a second injection two weeks later, and a final motion sickness test three weeks later. No significant differences in the susceptibility to motion sickness were noted after B12 V L

A83-43125
TEMPORAL DETERMINANTS OF SPATIAL SINE-WAVE MASKING
A. J PANTLE (Miami University, Oxford, OH) Vision Research (ISSN 0042-6989), vol 23, no 8, 1983, p. 749-757 refs
(Contract F33615-77-C-0528)

The contrast detection threshold for steady or flickering sinusoidal test gratings superimposed on steady or flickering sinusoidal masking gratings was measured as a function (tvc) of the spatial contrast of the mask A temporal-forced-choice procedure was employed, and the stimuli were generated on a P31-green-phosphor oscilloscope screen The spatial frequency of the mask was three times that of the test grating, flickering frequency was 5 Hz, and both gratings were made to drift at 0 005 deg/sec to minimize local retinal adaptation Results of four experiments using two or three observers are reported Log-log plots of threshold versus background contrast show that the slope of the tvc function is affected by the change from steady to flickering test grating, the lines crossed in two cases These findings are seen as strong evidence in support of the sustained/transient psychophysical response model proposed by Kulikowski and Tolhurst (1973) Further experiments to determine the differences in discriminability of steady and flickering test gratings are suggested T.K.

A83-43477
EFFECT OF EXERCISE ON LEFT VENTRICULAR DIASTOLIC FILLING IN ATHLETES AND NONATHLETES
M MATSUDA, Y SUGISHITA, S KOSEKI, I ITO, T. AKATSUKA, and K TAKAMATSU (Tsukuba University, Ibaraki, Japan) Journal of Applied Physiology· Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Aug 1983, p 323-328 refs

A83-43479
LACTATE IN HUMAN SKELETAL MUSCLE AFTER 10 AND 30 S OF SUPRAMAXIMAL EXERCISE
I JACOBS, P. A TESCH, O BAR-OR, J KARLSSON, and R DOTAN (Wingate Institute, Israel, Karolinska Hospital, Stockholm, Sweden) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Aug. 1983, p 365-367 Research supported by the Swedish Sports Research Council, Karolinska Institutet, and Swedish Society for Medical Research. refs

The extent of anaerobic glycogenolysis, as indicated by intramuscular lactate concentration, after 10 and 30 s of supramaximal exercise was investigated in male and female subjects The subjects performed two exercise bouts against a resistance which was standardized so that one pedal revolution resulted in 4.90 J work/kg body weight. Lactate concentration in muscle biopsies averaged 36 and 61 mmol/kg dry weight after the 10 and 30 s bouts, respectively The results are interpreted as suggesting that anaerobic glycogenolysis commences with a very short time delay after the onset of muscular contraction in high-intensity exercise The notion that short bursts of supermaximal exercise can be performed solely at the expense of endogenous adenosine triphosphate and creatine phosphate stores must be reconsidered. Female subjects may accumulate less lactate intramuscularly than males during short-term high-intensity exercise C D

A83-43480
FACTORS DETERMINING THE FREQUENCY CONTENT OF THE ELECTROMYOGRAM
H KRANZ, A M WILLIAMS, J CASSELL, D J CADDY, and R B SILBERSTEIN (Alfred Hospital, Melbourne, Australia) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 55, Aug 1983, p. 392-399 Research supported by Alfred Hospital refs

The contribution of central and peripheral factors to the frequency content of the surface electromyogram and to its shift during contraction is investigated Thenar muscle recordings were made in 10 subjects aged 22-50 yr, and voluntary muscle electrical activity was compared with stimulated activity. The median frequencies of surface-recorded electromyograms and compound action potentials were similar early and late in the contractions The median frequency of electromyograms increased 11 percent in only the first second of contraction as force was raised from 25 to 100 percent of maximum There was no evidence that delay or dispersion of action potential propagation in terminal nerve fibers or at the neuromuscular junction had a significant effect on frequency content. The findings point to the electrical changes being of intrinsic muscular origin and are consistent with the hypothesis that these changes reflect slowing in muscle action potential conduction velocity. C.D

A83-43481
FLUID AND ELECTROLYTE HOMEOSTASIS DURING PROLONGED EXERCISE AT ALTITUDE
W R WITHEY, J S. MILLEDGE, E. S WILLIAMS, B D. MINTY, E I. BRYSON, N P LUFF, M W J OLDER, and J M BEELEY (Army Personnel Research Establishment, Farnborough, Royal Naval Hospital, Gosport, Hants ; Northwick Park Hospital, Harrow, Middx , Middlesex Hospital, London, Royal Surrey County Hospital, Guildford, Surrey, England) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Aug 1983, p 409-412 Research supported by the Mount Everest Foundation refs

The combined effect of exercise and altitude on fluid and electrolyte homeostasis was studied over 13 days on six male subjects eating a diet with constant sodium and potassium content During the first 4 and last 4 days subjects were semisedentary at an altitude of 900 m In the middle 5 days subjects exercised by hill walking for about 7 h daily at altitudes between 2,678 and 3,629 m There was a retention of sodium (mean of 202 mM by the end of the exercise-altitude period) and a small retention of water (mean of 0 49 liters). Plasma volume increased by 0 76 liters and packed cell volume fell from a mean of 44 5 to 41 8 percent There was no change in plasma sodium concentration The retention of sodium implies an expansion in the extracellular space of 1.44 liters at the expense of the intracellular space, which decreased by a calculated 1 05 liters These changes are similar to those resulting from comparable exercise at sea level and opposite to the effect of altitude on resting subjects Author

A83-43482
EFFECT OF PROLONGED EXERCISE AT ALTITUDE ON THE RENIN-ALDOSTERONE SYSTEM
J S MILLEDGE, D M CATLEY, E S WILLIAMS, W R WITHEY, and B D MINTY (Northwick Park Hospital, Harrow, Middx., Middlesex Hospital, London, Army Personnel Research Establishment, Farnborough, Hants., England) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Aug. 1983, p. 413-418. Research supported by the Mount Everest Foundation refs

The combined effect of exercise and altitude on the renin-aldosterone system was studied in six male subjects on a fixed diet After 4 control days at rest and at low altitude, subjects ascended to 3,100 m and took about 7 h exercise daily for 5 days There followed a 4-day recovery period at low altitude Daily blood samples were taken for estimation of plasma renin activity (PRA), plasma aldosterone concentration (PAC), and angiotensin converting-enzyme (ACE) activity. Results showed a maximal rise in PRA and PAC with exercise at altitude maximal on the first 2 days ACE activity fell by 23 percent at altitude Compared with similar exercise at sea level, the rise in PAC was comparable but the rise in PRA was four times greater, indicating a marked decrease in PAC response to PRA It is suggested that this loss of sensitivity of PAC to PRA is mediated by the measured reduction in ACE activity Author

A83-43483
BREATHING PATTERNS DURING SUBMAXIMAL AND MAXIMAL EXERCISE IN ELITE OARSMEN
J. M CLARK, F C. HAGERMAN, and R GELFAND (Pennsylvania, University, Philadelphia, PA) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Aug 1983, p. 440-446 refs
(Contract NIH-HL-08899, N00014-76-C-0248)

Continuous breath-by-brath measurements of ventilatory parameters were performed during submaximal and maximal treadmill exercise in 21 highly conditioned oarsmen. The exercise protocol, ventilatory measurements, data, and calculations are described Results are presented for ventilation and gas exchange, breathing patterns, mean inspiratory flow and the ratio of inspiratory to total cycle duration, and the influence of work rhythm on breathing frequency The breathing patterns during maximal exercise and recovery, inspiratory drive and timing, entrainment of breathing frequency by work rhythm, and the integration of influences that affect breathing patterns during exercise are discussed The data are consistent with the conclusion that exercise breathing patterns are determined by many interacting factors that vary at different work loads in different individuals, and are probably also influenced by physical conditioning and previous experience C.D

A83-43484
EFFECTS OF ACUTE MODERATE-INTENSITY EXERCISE ON CARNITINE METABOLISM IN MEN AND WOMEN
D L F. LENNON, F. W STRATMAN, E. SHRAGO, F J NAGLE, M. MADDEN, P. HANSON, and A L CARTER (Wisconsin, University, Madison, WI) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Aug. 1983, p. 489-495 refs
(Contract NIH-AM-10334, PHS-P30-AM-26659)

Carnitine dynamics and carnitine palmitoyl transferase (CPT) activity at rest and during exercise in well-trained and moderately trained men and women have been investigated Twenty-eight subjects exercised for 40 min on a bicycle ergometer at 55 percent of their maximal aerobic capacities Blood samples were obtained

at rest, after 10, 20, 30, and 40 min of exercise, and 15 min postexercise. Muscle biopsies of the vastus lateralis were obtained before and after exercise. The assay methods and statistical analysis are described The results suggest that some form(s) of acylated carnitine are lost to plasma during acute exercise After cessation of exercise there is a rapid rate of decline in oxidation of substrates for energy, and there may be large amounts of acylated carnitine derivatives concentrated in muscle CPT activity also declined significantly across all subjects after exercise. C D

A83-43485
EFFECTS OF EXERCISE AND LACK OF EXERCISE ON GLUCOSE TOLERANCE AND INSULIN SENSITIVITY
G W HEATH, J R GAVIN, III, J M HINDERLITER, J. M HAGBERG, S A BLOOMFIELD, and J O HOLLOSZY (Washington University, St Louis, MO) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Aug 1983, p. 512-517. refs
(Contract NIH-AM-18986, NIH-AM-20579)

The possibility that, in highly trained individuals, the residual effects of the last bout of exercise could contribute to the altered response to a glucose load in the trained state is experimentally investigated The concept that the blunted insulin response to a glucose load and the enhanced insulin sensitivity seen in trained individuals are entirely due to long-term adaptations in training is reevaluated Eight well-trained subjects stopped training for ten days There were no significant changes in maximal oxygen uptake, estimated percent body fat, or body weight The maximum rise in plasma insulin concentration in response to a 100 g oral glucose load was 100 percent higher after ten days without exercise than when the subjects were exercising regularly Blood glucose concentrations were higher and insulin binding to monocytes decreased One bout of exercise after eleven days without exercise returned insulin binding and the insulin and glucose responses to an oral 100 g glucose load almost to the initial 'trained' value C D

A83-43558
VISUAL MOTION AND CORTICAL VELOCITY
A JOHNSTON and M J WRIGHT (Brunel University, Uxbridge, Middx, England) Nature (ISSN 0028-0836), vol. 304, Aug 4, 1983, p 436-438 Sponsorship Medical Research Council of England refs
(Contract UKMRC-G979/1106/N)

Subjects were tested in trials to determine the rate of movement at which a moving grate can be distinguished from a stationary grating as a function of spatial frequency, four retinal eccentricities, fixation points, and viewing distances Relations were determined between the lower motion perception threshold (LTM) and the spatial frequency, as well as the cortical spatial frequency LTM was found to be independent of spatial frequency, but dependent on eccentricity because of decreases in cell density of the perceiving region with higher eccentricity Further examinations were made of the motions an observer would initiate in the grating to compensate for reverse aftereffect motion perceived in a stationary grating after prolonged viewing of a grating moving in the opposite direction The velocities of the motion aftereffect were significantly higher than LTM and constant at a given retinal eccentricity The near periphery is concluded to be fairly similar to foveal motion in the perception of visual motion M S K

N83-30449# Joint Publications Research Service, Arlington, Va
FURTHER COMMENTARY ON BIOMEDICAL STUDIES BY SOYUZ T-6 CREW
B KONOVALOV *In its* USSR Rept Space, No 19 (JPRS-82771) p 10-12 31 Jan 1983 Transl into ENGLISH from Izv (Moscow), 29 Jun 1982 p 2
Avail: NTIS HC A06

The interactions between the cosmonaut's sensory organs and his motor system during conditions of weightlessness were studied by a series of intravehicular activities B G

N83-30714# Birmingham Polytechnic, Perry Barr (England) Dept of Mechanical and Production Engineering
BIO-DYNAMIC RESPONSE OF HUMAN HEAD DURING WHOLE-BODY VIBRATION CONDITIONS
B K N RAO *In* Shock and Vibration Inform Center The Shock and Vibration Bull, No 52 Part 3 p 89-99 May 1982 refs Sponsored in part by SERC
Avail NTIS HC A12/MF A01 CSCL 06P

Studies have shown that many commercial and military vehicles transmit high acceleration levels to the occupants in the frequency regions of 1 to 30 Hz, wherein lies the major body resonances These bodily resonances influence the performance and psychology of drivers and passengers in various ways depending upon the magnitude of vibration input, posture, nature of task, attitude, etc In the vehicle ride application area, it is now realized that the transmission of these vibrations to the head of occupants may significantly effect their dynamic visual acuity, resulting in "tunneling" and/or "blurring" of vision Very few studies have been cited in the literature concerning the transmission of vibration from feet-to-head, or/and from seat-to-head Owing to a limited number of subjects employed, limited postures, different facilities and experimental techniques, the results of these studies were interpreted in different ways Also, most of the data refers to military personnel and its application to civilian population raises some doubts Clearly, a need exists for accurate information on the head transmissibility characteristic of the human head, by exposing subjects from the civilian population to low frequency sinusoidal and random vibrations in the frequency range of 1 to 30 Hz This paper covers the results obtained for various postures and different conditions Author

N83-30759# New Mexico State Univ, Las Cruces Physical Science Lab
ANGULAR ACCELERATION MEASUREMENT ERRORS INDUCED BY LINEAR ACCELEROMETER CROSS-AXIS COUPLING
A S HU *In* Shock and Vibration Information Center The Shock and Vibration Bull, no 50, part 2 p 11-16 Sep 1980 refs 4 Vol
Avail NTIS HC A12/MF A01 CSCL 06B

In biomechanical experiments, the head angular impact responses of the test subject are usually calculated from the data of linear accelerometers because of their small size and light weight As many as nine linear accelerometers are sometimes used for a complete three dimensional head kinematic measurement One major error source of this type of measurement is the cross-axis coupling of the accelerometers The mathematical model of the instrument, the cross-axis sensitivity, the angular measurement errors caused by the linear accelerometers, and the physical meaning of each error term under various impact motions are discussed Insight into the limitations of the measurement technique are revealed M G

N83-31227 Southwest Research Inst., San Antonio, Tex
DEVELOPMENT OF A HUMAN ELECTROSTATIC DISCHARGE MODEL IN RELATION TO ELECTRONIC SYSTEMS
W W BYRNE *In* FAA Eighth Intern Aerospace and Ground Conf on Lightning and Static Elec 20 p Jun 1983 refs
Avail IALC-8, FAA Technical Center, ACT-340, Atlantic City, N J $25 00

Electrostatic Discharge (ESD) is discussed as it pertains to understanding the processes of electrical charge buildup on a human being or other conductive shape, followed by a discharge into another conductor such as an electronic device Several megawatts of peak power may be involved In order to design and test for ESD, it is necessary to establish the electrical characteristics of the electrostatic buildup and discharge circuit Crude models of a human being/electronic equipment system for ESD were developed The modeling process was further developed to include a large metallic ground plane, under the facility floor covering, connected to Earth Also, the effects of hand-held sharp radii metallic objects are examined From the circuit parameters,

approximate wave shapes of the discharge are computed for various cases R J.F

N83-31293# Toulouse Univ (France) Faculte de Medecine
STUDY OF ANTIBACTERIAL ACTIVITY OF ANTIBIOTICS IN SPACE CONDITIONS
R. TIXADOR, G. RICHOILLEY, G GASSET, N. MOATTI, L LAPCHINE, and J RAFFIN (CNES, Toulouse) *In* ESA Space Biol with Emphasis on Cell and Develop. Biol p 37-39 May 1983 refs
Avail NTIS HC A07/MF A01

A spaceborne experiment to study the influence of space factors on the growth of E coli cultivated with and without antibiotics is outlined Cultures are placed in 0g conditions, 1g centrifuge and Earth control laboratory After innoculation of cultures by breaking glass ampules filled with bacterial suspension, the cultures grow for 24 hr at 37 C. After this period the cultures are stocked at 4 C until recovery Author (ESA)

N83-31298# Eidgenoessische Technische Hochschule, Zurich (Switzerland). Lab. fuer Biochemie
EXPERIMENT A08/32/CH: EFFECT OF SPACE FLIGHT ON LYMPHOCYTE ACTIVATION
A COGOLI and A TSCHOPP *In* ESA Space Biol. with Emphasis on Cell and Develop Biol p 57-61 May 1983 refs Sponsored by Solco Basel AG and GIBCO
(Contract SNSF-3.034-0.81)
Avail NTIS HC A07/MF A01

A Spacelab Biorack investigation of lymphocyte activation is outlined Lymphocytes in blood samples withdrawn from the flight crew prior, during, and after flight are exposed to the mitogen Con A and cultured in vitro. Cell proliferation, protein biosynthesis, and ultrastructure are determined. The adaptation of the immune response to the stress of spaceflight, the differentiation of cells cultured at low-g, and methods for bioprocessing in space are tested. The hypothesis that low-g depresses lymphocyte activation whereas high-g has a stimulatory effect is challenged
Author (ESA)

N83-31314 Royal Signals and Radar Establishment, Malvern (England)
EYE MOVEMENTS AND VISUAL SEARCH: A BIBLIOGRAPHY
K. T. CARR, E. D MEGAW, and P J GOILLAU Jan. 1983 88 p refs
(RSRE-MEMO-3543, BR87847) Avail Issuing Activity

Over 700 references concerning work related to eye movements and visual search are listed and qualified using a keyword system. The bibliography is intended for research on visual search for military targets viewed through electro-optical imaging systems
Author (ESA)

N83-31315# Research Inst of National Defence, Stockholm (Sweden)
REPORT BY A PARTICIPANT IN THE SEVENTH ANNUAL CONGRESS OF THE EUROPEAN UNDERSEA BIOMEDICAL SOCIETY AND SYMPOSIUM ON DECOMPRESSION SICKNESS
H. OERNHAGEN Sep. 1981 26 p In SWEDISH Symp. held in Cambridge, England, 21-24 Jul 1981
(FOA-C-58009-H1) Avail NTIS HC A03/MF A01

Subjects discussed at the biomedical conference on decompression sickness are reported Some of the presented topics include safety training and accident analysis of aquatic scientists, relationships between chest dimensions and pulmonary barotrauma, physiological effects on divers, biochemical and hematological responses; schedules for saturation decomposition to establish principles; deep heliox dive decompression, low frequency hearing loss, effects of repetitive diving, biochemical and hematological findings in decompression sickness, compression/decompression project; pulsed Doppler method to study hemodynamic changes and bubbles Transl by E A.K.

N83-31316*# National Aeronautics and Space Administration, Washington, D. C
EFFECT OF LOW TEMPERATURES ON OSSEROUS AND CARTILAGINOUS TISSUES
Y Y. PANKOV, G A BABIYCHUK, S V. MALYSHKINA, and A I ZHIGUN Mar. 1983 14 p refs Transl. into ENGLISH from "Vozdeystviye Nizkikh Temperatur na Kostnuyu i Khryashchevuyu Tkani" (USSR), Ortopediya, Travmatol i Protezirovaniye, no 4, Apr 1981 p 75-78 Transl by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prepared by Kharkov Inst. of Orthopedics and Traumatology
(Contract NASW-3541)
(NASA-TM-77201, NAS 1.15:77201) Avail NTIS HC A02/MF A01 CSCL 06P

The use of extreme cold to treat tumoral afflictions of the extremities is discussed Cryogenic methods and instruments are discussed, and the levels of accumulated knowledge in this area (as well as the areas still in question) are evaluated The overall promise for cryogenic methods of treatment is acknowledged, and areas which need further development are noted Author

N83-31317# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md
A STUDY OF LOW LEVEL LASER RETINAL DAMAGE Annual Progress Report, 1 May 1981 - 31 Dec. 1982
B F HOCHHEIMER 15 Mar 1983 141 p refs
(Contract N00024-83-C-5301)
(AD-A127340, RC-RCS-030) Avail NTIS HC A07/MF A01 CSCL 20E

The general objective of this program is to document changes in the retina due to very low laser irradiation We have two primary aims. One is to develop and improve methods that can be used, in vivo, to objectively determine changes that occur in the retina from laser irradiation. The second is to determine the mechanisms that causes these retinal changes During this past year we have: Modified our equipment to do small retinal area reflectivity, measurements, Measured the internal light scatter in the eye for wavelengths from 450 to 850 mm; Measured many fluorescence parameters after a single injection of fluorescence, Accurate measurements of spectral reflectivities of small areas of a laser damaged monkey retina and they have been proven to be feasible; Perfected a photographic technique to improve the resolution and contrast of fluorescence angiograms; and Recommended several dyes for use as dyed tear films for retinal protection from laser radiation. GRA

N83-31318# Massachusetts Inst. of Tech , Cambridge. Artificial Intelligence Lab.
TACTILE RECOGNITION AND LOCALIZATION USING OBJECT MODELS: THE CASE OF POLYHEDRA ON A PLANE
P C. GASTON and T LOZANO-PEREZ Mar 1983 23 p refs
(Contract N00014-81-K-0494; N00014-80-C-0505, N00014-82-K-0334)
(AD-A127228; AI-M-705) Avail NTIS HC A02/MF A01 CSCL 14B

This paper discusses how data from multiple tactile sensors may be used to identify and locate one object, from among a set of known objects The authors use only local information from sensors· the position of contact points, and ranges of surface normals at the contact points. The recognition and localization process is structured as the development and pruning of tree of consistent hypotheses about pairings between contact points and object surfaces In this paper, they deal with polyhedral objects constrained to lie on a known plane, i e , having three degrees of positioning freedom relative to the sensors. Author (GRA)

N83-31319# Naval Air Development Center, Warminster, Pa Aircraft and Crew Systems Technology Directorate

REAL-TIME DETECTION OF STEADY-STATE EVOKED POTENTIALS Interim Report

J G NELSON and L HREBIEN Jul 1982 15 p refs Presented at the COMPED 82, Philadelphia, 22 Sep 1982

(Contract WR04101001)

(AD-A126896, NADC-82206-60) Avail NTIS HC A02/MF A01 CSCL 06S

In order to use the visual evoked potential as a real-time monitor of the state of the visual system, a monitoring technique was developed to maximize the signal-to-noise (S/N) ratio. System response parameters (co-power, phase angle, and coherence) are estimated for each subject from an ensemble of FFT's during a pre-testing period. These parameters are then used to calculate a weighting function which is used in real-time to perform amplitude normalization, coordinate rotation, and optimal weighting of the terms of individual FFT's These terms, when summed, produce a simple real variable with maximal S/N and an expected value of 100 for normal vision and zero for no vision or blackout This technique has been implemented with an FFT signal analyzer and a desk-top computer Experimental results for six subjects indicate that a useable measure may be achieved While improvements in the method are required if we are to have an effective real-time monitor for visual functioning, such improvements are not only possible, but feasible Optimization of variables such as lead placement and stimulus timing promise the required improvement Author (GRA)

N83-31320# Army Research Inst of Environmental Medicine, Natick, Mass

STRENGTH AND CYCLE TIME OF VENTILATORY OSCILLATIONS IN UNACCLIMATIZED HUMANS AT HIGH ALTITUDE

T B. WAGGENER, P. J BRUSIL, R E KRONAUER, R A GABEL, and G F INBAR 4 Mar. 1983 27 p refs

(Contract PHS-2-R01-HL1635-02, PHS-1-F22-01254-02)

(AD-A126288, USARIEM-M-11/83) Avail NTIS HC A03/MF A01 CSCL 06S

Respiration was monitored with magnetometers in 12 healthy supine young adults at sea level, and in an altitude chamber at simulated high altitudes ooof 8,000, 9,000, 11,000 and 14,000 feet Periodic breathing which was strong enough to include apnea at the time of minimum ventilation was seen in all subjects at high altitude. The cycle time of periodic breathing ranged from 12 to 34 seconds On average across the population the incidence of periodic breathing increased with altitude The cycle time of the periodic pattern increased as the strength of the pattern increased After normalizing to a standard pattern strength, cycle time decreased as altitude increased The study was repeated 3 weeks later on 7 of the subjects The standard cycle time at 14,000 feet of each subject in the second series was the same as in the first series to within, on the average, 6% Each subject studied at 11,000 feet in both series reproduced his cycle time to within, on the average, 9% The variation of standard cycle time for a given subject is less than the variation across the population, indicating characteristic cycle times for some individuals (one-way ANOVA, P less than 0 025) GRA

N83-31321# Army Research Inst of Environmental Medicine, Natick, Mass

HYDRATION AND VASCULAR FLUID SHIFTS DURING EXERCISE IN THE HEAT

M. N SAWKA, R. P FRANCESCONI, N. A PIMENTAL, and K B PANDOLF Mar 1983 22 p refs

(Contract DA PROJ 3E1-62777-A-879)

(AD-A126287, USARIEM-M-12/83) Avail NTIS HC A02/MF A01 CSCL 06S

This study examined the effects of hypohydration on plasma volume and red cell volume during rest in a comfortable (20 C, 40% rh) and exercise in a hot-dry (49 C, 20% rh) environment. Twelve subjects completed two test sessions following a 10-day heat acclimation program One test session was completed when subjects were euhydrated and the other when hypohydrated (-5% from baseline body weight) The test sessions consisted of rest for 30 min in a 20 C antechamber, followed by two 25-min bouts of treadmill walking in the heat, interceded by 10 min of rest At rest, hypohydration elicited a 5% decrease in plasma volume with less than 1% change in red cell volume During exercise, plasma volume increased by 4% when subjects were euhydrated and decreased by 4% when hypohydrated While red cell volume remained fairly constant during the euhydration test, these values were lower when hypohydrated during exercise. We conclude that hydration level alters vasculars fluid shifts during exercise in a hot environment hemodilution occurs when euhydrated and homo-concentration hypohydrated GRA

N83-31322# Army Research Inst. of Environmental Medicine, Natick, Mass

OVERUSE INJURIES OF THE LOWER EXTREMITIES ASSOCIATED WITH MARCHING, JOGGING AND RUNNING

B H. JONES 29 Nov 1982 21 p refs

(Contract DA PROJ 3E1-62777-A-879)

(AD-A126278; USARIEM-M-9/83) Avail NTIS HC A02/MF A01 CSCL 06E

While no large definitive studies have been done, the available literature suggests that overuse injuries are a significant problem for the military Several approaches to this problem are suggested These include progressive increases in weight-bearing physical training, taking into account initial fitness levels, and wearing adequately supportive footwear, such as a well designed running shoe Adequately supportive, lightweight footwear may be even more crucial during the early phases of training while the foundations of strength and stamina are being established Every other day running or marching during the early phases of physical training, to insure adequate physiologic recovery would also seem advisable This is important because without adequate recovery training effects will be diminished, while the risk of injury will increase Furthermore, it seems clear that women are more likely to be injured than men Whether the large discrepancy injuries between males and females is secondary to inherent anatomic and physiologic differences or some other factor, such as lower level of initial fitness, is not yet established For this reason no special remedial program can be prescribed for women at this time, except to initiate physical training at modest levels and build-up gradually Author (GRA)

N83-31323# Naval Biodynamics Lab , New Orleans, La Bureau of Medicine and Surgery

PROBLEMS OF MEASUREMENT IN HUMAN ANALOG RESEARCH

L S LUSTICK, H G WILLIAMSON, M R. SEEMAN, and J M BARTHOLOMEW May 1982 42 p refs Presented at the 8th Ann Intern Workshop on Human Subjects for Biomed Res , Troy, Mich , 14 Oct 1980

(AD-A126145, NBDL-82R012) Avail NTIS HC A03/MF A01 CSCL 06S

The Naval Biodynamics Laboratory in New Orleans is involved in a continuing effort to describe the kinematic and physiological response of anatomical segments of human volunteers to acceleration environments The scope of this presentation is to discuss some of the problems that arise in the measurement of the three dimensional dynamic response of human volunteers to relatively short duration (250 millisecond) acceleration profiles. With pre-selection of accelerometers and careful calibration procedures six accelerometer configurations can provide results which agree well with photo-derived results at the velocity level in the time window of interest (250 milliseconds) for the acceleration profiles With pre-selection of accelerometers and careful calibration procedures six accelerometer configurations can provide results which agree well with photo-derived results of the velocity level in the time window of interest (250 milliseconds) for the acceleration profiles investigated at the NBDL Accelerometer-derived kinematic variables are best at the acceleration level and photo-derived variables are best at the displacement level and thought should be given to combining results of these two measuring systems

into one consistent set of kinematic variables from the acceleration to the displacement level. Author (GRA)

N83-31324# Harvard Univ., Cambridge, Mass. Energy and Environmental Policy Center
ANALYSIS OF HEALTH EFFECTS RESULTING FROM POPULATION EXPOSURES TO AMBIENT PARTICULATE MATTER, APPENDICES Annual Progress Report, 16 Jul. 1982 - 15 Mar. 1983
14 Mar. 1983 163 p
(Contract DE-AC02-81EV-10731)
(DE83-008538, DOE/EV-10731/T1) Avail NTIS HC A08/MF A01

The health effects from exposure to ambient particulate matter are studied Solvent effects on the evaluation of the mutagenic activity of airborne particulates, an evaluation of the health effects of particles based on occupational data, and the results of a time-series analysis of daily mortality in New York are among the topics discussed DOE

N83-31325# CGR Koch und Sterzel G m b H Co , Essen (West Germany).
DEVELOPMENT OF A COMPUTERIZED ULTRASONIC SECTOR SCAN SYSTEM FOR INTRACRANIAL DIAGNOSIS Final Report, Dec. 1981
R HAUKE, D DEMUTH, and F LUZ Bonn Bundesministerium fuer Forschung und Technologie Mar 1983 147 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie Prepared in cooperation with Dusseldorf Univ
(BMFT-FB-T-83-012, ISSN-0340-7608) Avail. NTIS HC A07/MF A01, Fachinformationszentrum, Karlsruhe, West Germany DM 31

Ultrasound and computed tomographic adult brain imaging are compared. First clinical results in vitro and in vivo of a computerized neurosonograph prove that multimode linear array systems are capable of intracranial imaging through the limited aperture in skull and that the resolution compares very well with X-ray scanners Author (ESA)

N83-31326# Bonn Univ (West Germany) Inst fuer Klinische und Experimentelle Nuklearmedizin.
DEVELOPMENT OF A MOBILE GAMMA CAMERA COMPUTER SYSTEM FOR NONINVASIVE VENTRICULAR FUNCTION DETERMINATION Final Report, Dec. 1981
R KNOPP, S N RESKE, and C WINKLER Bonn Bundesministerium fuer Forschung und Technologie Mar 1983 19 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-017, ISSN-0340-7608) Avail NTIS HC A02/MF A01, Fachinformationszentrum, Karlsruhe, West Gemany DM 4

A compact scintigraphic system consisting of a mobile gamma camera with a conductive built-in minicomputer (16 bit, 128 kB) is described. It renders possible a combined investigation of ventricular volume and pressure The volume curve is acquired by sequential scintigraphy whereas the pressure is simultaneously measured manometrically by a heart catheter A pressure-volume loop is plotted, the enclosed area of which represents the cardiac work performance. Functional parameters such a compliance (dV/dp) and stiffness (dp/dV) can be derived from the loop diagram The mobile system can also be used for detection of acute infarctions Author (ESA)

N83-32286*# Bionetics Corp , Cocoa Beach, Fla. Biomedical and Environmental Lab
SPACE TRANSPORTATION SYSTEM BIOMEDICAL OPERATIONS SUPPORT STUDY
S C WHITE 30 Apr 1983 380 p refs
(Contract NAS10-10285)
(NASA-CR-166834; NAS 1.26 166834, BIO-1) Avail NTIS HC A17/MF A01 CSCL 06P

The shift of the Space Transportation System (STS) flight tests of the orbiter vehicle to the preparation and flight of the payloads is discussed. Part of this change is the transition of the medical and life sciences aspects of the STS flight operations to reflect the new state The medical operations, the life sciences flight experiments support requirements and the intramural research program expected to be at KSC during the operational flight period of the STS and a future space station are analyzed The adequacy of available facilities, plans, and resources against these future needs are compared, revisions and/or alternatives where appropriate are proposed E A.K

N83-32287# Royal Aircraft Establishment, Farnborough (England)
THE PROBLEMS OF PROTECTION AGAINST OPTICAL RADIATION
M DIPOFI and E RIGHI Jan 1983 38 p refs Transl into ENGLISH from Ann 1st Super Sanita (Italy), v. 16, p 443-476
(BR88714, RAE-TRANS-2104) Avail: NTIS HC A03/MF A01

The damaging effects on man of electro-magnetic radiation in the visual and near-visual parts of the spectrum are considered There are two main danger areas, first with regard to the burning effects on the unprotected skin and secondly with regard to effects on the unprotected eye, leading to retinal burns and even blindness The damaging effects are considered for ultra-violet, visible, infrared and laser radiation, particularly for the latter in view of the widespread use of lasers at the present time The questions discussed are protective measures for operatives who may be subjected to damaging radiation, and that of periodic medical checks for them From this it is concluded that more stringent safety levels must be defined for the amounts of radiation of each kind to which operatives may be subjected, safely, during their working periods Casual users of such equipment need to be made aware of its potentially dangerous nature and the necessary safety measures to be taken Author

N83-32288# Duke Univ Beaufort, N C Dept. of Ophthalmology
DETECTION OF RETINAL ISCHEMIA PRIOR TO BLACKOUT BY ELECTRICAL EVOKED CORTICAL RESPONSES Final Report
M L WOLBARSHT Warmister, Pa NADC Nov. 1982 21 p refs
(Contract N62269-81-C-0742)
(AD-A126855, NADC-82263-60) Avail NTIS HC A02/MF A01 CSCL 06E

Loss of function in the peripheral retina due to ischemia has been successfully monitored by retinal ganglion cell responses to external electrical stimulation of the eye which evokes cortical responses detectable by scalp electrodes. The retinal ischemia has been produced by increased intraocular pressure Cessation of both the retinal ganglion cell impulses and cortical evoked potentials is observed when the retinal blood flow is halted, although the choroidal blood flow is continued as shown by persistence of the electroretinogram (ERG) a-wave and the disappearance of all other ERG components GRA

N83-32289# Army Medical Research Inst. of Infectious Diseases, Frederick, Md.
CIRCADIAN GROWTH HORMONE AND PROLACTIN BLOOD CONCENTRATION DURING A SELF-LIMITED VIRAL INFECTION AND ARTIFICIAL HYPERTHERMIA IN MAN Interim Report
D L BUNNER, E MORRIS, and R C. SMALLRIDGE 14 Apr 1983 25 p refs
(AD-A127501) Avail. NTIS HC A02/MF A01 CSCL 06A

Growth hormone and prolactin blood concentrations were measured in five human volunteers over 28-hour periods including 24 hourly samples (0800 h to 0800 h) followed by an oral glucose tolerance test (0800 h1100 h) both preexposure and during the peak febrile phase of a self limited viral infection, Sandfly fever Several months after recovery, three of the subjects were studied for 24 hour periods while they sat in a tub of water at 41 C for 2 hours from 1300 to 1500 hours During all studies, meal times (0800 h, 1130 h, 1630 h) and dark phase (2300 h-0700 h) were fixed Growth hormone concentrations were strikingly elevated throughout the 24 hours study done during the febrile period of

Sandfly fever infection ($P < 01$) except for the period of normal nocturnal release when they were not significantly different from the baseline study. No additional nocturnal surge was noted above the already elevated growth hormone values during the viral induced fever Growth hormone values tended to decline slowly during the night but increased considerably during the glucose tolerance test the following morning These changes were similar to responses previously reported in patients with cases of malnutrition A clear cut increase in growth hormone concentrations ($P < .001$) was also seen during a brief 2 hour period of artificial hyperthermia, suggesting that elevated body temperature alone may explain part of the increase in growth hormone values seen during the fever of infection GRA

N83-32290# Naval Aerospace Medical Inst , Pensacola, Fla
TWO EXPERIMENTS ON LABORATORY-INDUCED MOTION SICKNESS. PART 1: ACUPRESSURE. PART 2: REPEATED EXPOSURE Interim Report
J M LENTZ 10 Dec 1982 13 p refs
(Contract MF58524005)
(AD-A127327, NAMRL-1288) Avail NTIS HC A02/MF A01 CSCL 06S

These experiments were part of a continuing effort to find motion sickness preventatives and explore methods for predicting individual adaptive capabilities Experiment 1 is a pilot study investigating the effectiveness of an acupressure method to prevent laboratory induced motion sickness Experiment 2 is a pilot study investigating consecutive day adaptation to a laboratory induced motion sickness test The results from Experiment 1 indicated that the acupressure treatment as applied in this study to a group of airsick referrals was not effective in altering the signs and symptoms of motion sickness produced by a brief laboratory provocative test This group of subjects did not show a reduction in motion sickness scores from the first to the second day of testing Data from Experiment 2 indicate a statistically significant reduction in rater and self-rate scores across consecutive day exposure to this nauseogenic laboratory test Further testing will be necessary to determine why consecutive day adaptation was not evident in Experiment 1 It is possible that a characteristic of airsick referrals like those in Experiment 1 is a slow rate of adaptation to early exposures Author (GRA)

N83-32291# Florida Univ , Gainesville
SLEEP DEPRIVATION AND PERFORMANCE: THE OPTIMUM USE OF LIMITED SLEEP PERIODS Final Report, Apr. 1980 - Mar. 1981
W B WEBB Apr 1983 51 p refs
(Contract DAMD17-80-C-0058, DA PROJ 3E1-62771-A-804)
(AD-A126934) Avail NTIS HC A04/MF A01 CSCL 05T

The performance of three groups of young adult subjects has been measured across a 72 hour period A computer programmed battery of tests was used which included test established as sensitive to sleep loss (auditory vigilance, addition and subjective scales), and a cognitive battery (memory tasks, anagrams, word detection, visual search, line judgements with various feedbacks, object usage, reasoning, digit symbols) The experimental variable was the placement of four hours of sleep opportunities The control group had no sleep, one experimental group slept from 10-12 PM prior to 'night' two and three (preparatory sleep) and one slept from 8 to 10 AM after 'nights' two and three (recovery sleep) This report presents preliminary analysis of the date as well as data analysis completed on earlier continuous performance measures Author (GRA)

N83-32292# Army Aeromedical Research Unit, Fort Rucker, Ala
ANNOTATED BIBLIOGRAPHY OF USAARL (UNITED STATES ARMY AEROMEDICAL RESEARCH LABORATORY) TECHNICAL AND LETTER REPORTS, 1 JUNE 1963 - 30 APRIL 1983
Apr 1983 179 p
(AD-A127451) Avail NTIS HC A09/MF A01 CSCL 05B

Technical and Letter Reports published at the U S Army Aeromedical Research laboratory, Ft Rucker, Alabama from 1 Jun 1963 to 30 April 1983 are included in this annotated bibliography Subject areas covered include aviation medicine bioengineering, bio-optics, acoustics, and aviation psychology. Arrangement is in chronlogical sequence with subject, author, and a cross-index of joint reports Author (GRA)

N83-32293# SRI International Corp , Menlo Park, Calif
BIOEFFECTS OF RADIOFREQUENCY RADIATION: A REVIEW PERTINENT TO AIR FORCE OPERATIONS Final Report, Nov. 1981 - Mar. 1983
L N HEYNICK and P POLSON Mar. 1983 186 p refs
(Contract F33615-82-C-0604)
(AD-A128515, SAM-TR-83-1) Avail: NTIS HC A09/MF A01 CSCL 06R

The primary purpose of this review is to present analyses of research results and other pertinent information on the biological effects of radiofrequency radiation (RFR) to serve as a basis for determining whether the health of people exposed briefly or continuously to the RFR transmitted by proposed or currently operating Air Force RFR-emitting systems is likely to be affected adversely Representative research results were selected from the large body of literature on the bioeffects of RFR and analyzed The selection included those most significant scientifically and most pertinent to RFR frequencies and intensities likely to be encountered in regions, around such systems, that are accessible occupationally or to the general public Discussed first as background information are the increasing use of RFR emitters by the public, private, and governmental sectors, measurements by the Environmental Protection Agency of environmental levels of RFR in selected U S cities, problems of risk assessment, and current and proposed exposure standards in various countries. The review of RFR bioeffects proper is in two major parts In the first, physical effects are discussed, including postulated mechanisms of interaction of continuous-wave and modulated (including pulsed) RFR for both thermal and nonthermal effects The concept of specific absorption rate is described GRA

N83-32294# Army Research Inst of Environmental Medicine, Natick, Mass
HYPOHYDRATION AND ACCLIMATION: PLASMA RENIN ACTIVITY AND ALDOSTERONE DURING HEAT/EXERCISE STRESS
R P FRANCESCONI, M N SAWKA, and K. B. PANDOLF 10 Mar 1983 22 p refs
(AD-A128154, USARIEM-M15/83) Avail NTIS HC A02/MF A01 CSCL 06S

This study was designed to assess the effects of hydration, acclimation, and environment on the response of fluid regulatory hormones to exercise Sixteen subjects exercised (1.34 m/sec), both pre- and post-acclimation, when euhydrated or hypohydrated (-5% of body weight) in a comfortable (20 C, rh = 40%), hot-wet (35 C, rh = 79%), or hot-dry (49 C, rh = 20%) environment While light exercise in a thermoneutral environment had no effects on plasma levels of renin activity (PRA) or aldosterone (ALD), exercise in both hot environments resulted in significantly increased levels of these hormones. Increments in both PRA and ALD were greater when hypohydrated, and PRA effects were significantly moderated by heat acclimation in both the euhydration and hypohydration experiments While PRA and ALD responses were generally correlated, acclimation did not consistently attenuate ALD increments We concluded that hydration state, acclimation level, and environmental conditions all affected the responses of these hormones to light exercise Author (GRA)

N83-32295# Army Military Personnel Center, Alexandria, Va
COMPARISON OF WEIGHT TRAINING AND CALISTHENTIC EXERCISE PROGRAMS IN DEVELOPING STRENGTH AND MUSCULAR ENDURANCE IN UNITED STATES ARMY RECRUITS M.S. Thesis. Final Report
R G BOYKO May 1983 93 p refs
(AD-A128067) Avail NTIS HC A05/MF A01 CSCL 06N

This investigation attempted to find the most effective program for developing upper body strength and muscular endurance by

comparing the effectiveness of the current Army physical training program used in Initial Entry training with four other supplemental programs The subjects for this investigation were 214 Army recruits. The subjects were divided into five groups: the current Army training program group, an alternate day calisthenics group, a daily calisthenics group, an alternate day weight training group, and a daily weight training group The soldiers in all five groups were tested on the pushup test, the one-repetition maximum bench press test, and the 75 percent of one repetition maximum bench press test The tests were given on three occasions· before the start of training, in the middle of the training period, and at the conclusion of the seven-week training period. The results of the investigation showed that there were no significant differences between the five groups on the pushup test at the end of the seven-week training period. There were significant differences between both weight training groups and the alternate day calisthenic group on the bench press tests There were no significant differences between the daily and alternate day training groups on any of the three tests at the end of the seven-week training period. GRA

N83-32296# Army Research Inst. of Environmental Medicine, Natick, Mass

METABOLIC AND VASCOMOTOR INSULATIVE RESPONSES OCCURRING ON IMMERSION IN COLD WATER

L H STRONG, G K. GEE, and R F. GOLDMAN Apr. 1983 39 p refs

(Contract DA PROJ 3E1-62777-A-879)

(AD-A128021, USARIEM-M-20/83) Avail. NTIS HC A03/MF A01 CSCL 06S

The metabolic heat production of twenty male subjects undergoing total immersion in water between 36 C and 20 C was measured as functions of time and water temperature These were converted to explicit linear functions of core (Tre) and mean skin (Tsk) temperatures for each individual immersion. The functions were used to define planes of thermogenic activity which allowed comparison of the threshold and magnitude of shivering between individuals of any morphological group. The thermogenic planes showed a much steeper slope with respect to the Tsk axis for small. Thin men than for large, fat men, while men of average weight and fat composition exhibited an intermediate slope Small, lean men also exhibited thermogenic planes having steeper slopes with respect to the Tre axis than did average men. Whole body, insulation was evaluated for each individual immersion Analysis showed that small, lean men maximally vasoconstrict at higher bath temperatures than did large, fat men and that small, lean men were unable to maintain their maximum whole body insulation before the latter attain their maximum insulation. The decline in insulation, seen above a certain critical metabolic level, reflects the increasing muscle blood flow necessary to support active shivering; this critical level appears to be 150 W in small to average size subjects GRA

N83-32297# Smith-Kettlewell Inst of Visual Sciences, San Francisco, Calif Medical Research Inst.

VELOCITY DISCRIMINATION IN THE PERIPHERAL VISUAL FIELD Research Progress and Forecast Report

S. P MCKEE 25 Apr. 1983 6 p refs

(Contract AF-AFOSR-0345-82; AF PROJ. 2313)

(AD-A127949; AFOSR-83-0371TR) Avail NTIS HC A02/MF A01 CSCL 05J

Human obervers can discriminate differences in velocity of about 6% everywhere in the visual field In the periphery the optimum velocity is faster than the optimum range in the fovea The basis of velocity discrimination is the angular velocity of the target, not the temporal frequency of the stimulus. Author (GRA)

N83-32298# Army Research Inst of Environmental Medicine, Natick, Mass

THERMOREGULATORY RESPONSES TO UPPER BODY EXERCISE

M N. SAWKA, N A. PIMENTAL, and K B. PANDOLF May 1983 19 p refs

(Contract DA PROJ 3E1-62777-A-879)

(AD-A127884; USARIEM-M21/83) Avail NTIS HC A02/MF A01 CSCL 06S

The purpose of this study was to compare thermoregulatory responses between upper body and lower body exercise. Nine male subjects performed 60 minutes of arm crank (AC) and cycle (CY) exercise at the same absolute intensity (oxygen uptake = 1 6 1/min-1) and at the same relative intensity (60% of ergometer specific peak oxygen uptake) in a temperature (24 C, 20% rh) environment During the absolute intensity experiments, rectal temperature and sweating rate responses were essentially the same for both modes of exercise In addition, differences were not found for chest, back, arm or thigh skin temperatures, but calf skin temperature was significantly ($P<0$ 05) lower during arm crank than cycle exercise. During the relative intensity experiments, thermoregulatory responses were lower during arm crank than cycle exercise These results indicated that the examined thermoregulatory responses are independent of the skeletal muscle mass employed and dependent upon the absolute metabolic intensity Author (GRA)

N83-32299# Army Research Inst of Environmental Medicine, Natick, Mass. Heat Research Div.

HYPOHYDRATION AND ACCLIMATION: EFFECTS ON HORMONE RESPONSES TO EXERCISE/HEAT STRESS

R. P FRANCESCONI, M N. SAWKA, and K. B. PANDOLF 15 Mar 1983 24 p refs

(Contract DA PROJ 3M1-61101-BS-10)

(AD-A127855; USARIEM-M-16/83) Avail NTIS HC A02/MF A01 CSCL 06S

This study was designed to assess the effects of hypohydration (-5% body weight) and heat acclimation on plasma cortisol and growth hormone responses to exercise (1 34 m/sec -1) in a thermoneutral (20 C, 40% rh), hot-wet (35 C, 79% rh), or hot-dry (49 degrees C, 20% rh) environment Exercise in a thermoneutral environment while euhydrated resulted in significant ($p<.05$) decrements in plasma cortisol (PC), however, when hypohydrated, PC levels were significantly ($p<.02$) elevated Acclimation attenuated the PC elevations elicited by hypohydration. Hypohydration also effected significant ($p<.02$) increases in growth hormone (GH) in the thermoneutral environment Exercise in a hot-wet or hot-dry environment resulted in significant ($p<.05$) increments in both hormones when hypohydrated; these effects were, in several instances, attenuated ($p<.05$) by acclimation, particularly in the hot-wet environment We concluded that the PC and GH responses were amplified when subjects were hypohydrated and, in several instances, these responses were attenuated by heat acclimation Additionally, our data indicated that gender does not affect the direction or intensity of these hormonal responses GRA

N83-32300# Army Research Inst of Environmental Medicine, Natick, Mass

A MODEL OF HEAT LOSS AND THERMOREGULATION FOR IMMERSION IN COLD WATER

L H STRONG and R. F. GOLDMAN Apr 1983 32 p refs

(Contract DA PROJ. 3E1-62777-A-879)

(AD-A127854, USARIEM-M-19/83) Avail NTIS HC A03/MF A01 CSCL 06S

Twenty male subjects (17 to 28 yrs of age) exhibiting a range of body weights (60 kg < or - Wt < or - 95 kg) and body fat (7% < or - BF < or - 23%) underwent total immersion while at rest in water between 36 C and 20 C. The time course of mean skin (T sub sk) and rectal (T sub re) temperatures as well as surface heat flow was simulated for each individual immersion with the aid of a time dependent system of differential, heat balance equations coupling different body compartments and the epithelium

to the water bath Metabolic heat production for each immersion (supplied as functions of T sub re and T sub sk minus 8% of the instantaneous value to account for respiratory losses) were used as heat source terms. This formulation permitted the evaluation of internal and external conductances as a function of water temperature. Analysis showed that cardiovascular compensation occurs at higher bath temperatures for small, lean men compared to large, fatter men. It also showed that body size (expressed as the ratio of mass to surface area) in addition to fat content controls the maximal internal insulation as well as the rate of decline of T sub re GRA

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BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior, crew training and evaluation, and psychiatric research

A83-40749
TEMPORAL INTEGRATION FOLLOWING INTENSIFICATION OF LONG-LASTING VISUAL DISPLAYS
V DI LOLLO and C M BOURASSA (Alberta, University, Edmonton, Canada) Vision Research (ISSN 0042-6989), vol 23, no 7, 1983, p. 677-687 Sponsorship Natural Sciences and Engineering Research Council of Canada refs
(Contract NSERC-A-6592)

Duration of visible persistence is known to be inversely related to the duration of the inducing stimulus, within a critical interval estimated at between 100 and 150 msec Stimuli longer than the critical interval yield little or no persistence Six experiments investigated whether a brief period of intensification at the end of a stimulus longer than the critical interval could restore visible persistence In the first experiment, a punctate stimulus ceased to give rise to visible persistence at exposure durations longer than the critical interval. The second experiment showed that persistence could be restored to a long display by briefly intensifying the component dots just before the end of the display The remaining four experiments explored the limits and the distinguishing characteristics of this effect Two alternative explanations of the results are described and evaluated Author

A83-41225
SHADOWS OF THOUGHT - SHIFTING LATERALIZATION OF HUMAN BRAIN ELECTRICAL PATTERNS DURING BRIEF VISUOMOTOR TASK
A S GEVINS, R E SCHAFFER, J C DOYLE, B A CUTILLO, R S TANNEHILL, and S L BRESSLER (EEG Systems Laboratory, San Francisco, CA) Science (ISSN 0036-8075), vol 220, April 1, 1983, p 97-99 USAF-supported research refs

Dynamic spatial patterns of correlation of electrical potentials recorded from the human brain were shown in diagrams generated by mathematical pattern recognition The patterns for 'move' and 'no-move' variants of a brief visuospatial task were compared In the interval spanning the P300 peak of the evoked potential, higher correlations of the right parietal electrode with occipital and central electrodes distinguished the no-move task from the move task In the next interval, spanning the readiness potential in the move task, higher correlations of the left central electrode with occipital and frontal electrodes characterized the move task These results conform to neuropsychological expectations of localized processing and their temporal sequence The rapid change in the side and site of localized processes may account for conflicting reports of lateralization in studies which lacked adequate spatial and temporal resolution Author

A83-41448
THE DEPENDENCE OF THE PATTERN OF EMOTIONAL CONDITION ON THE CHARACTERISTICS OF THE TRAINING LOAD OF HEAVY ATHLETES [ZAVISIMOST' DINAMIKI EMOTSIONAL'NOGO SOSTOIANIIA OT OSOBENNOSTEI TRENIROVOCHNOI NAGRUZKI TIAZHELOATELTOV]
V S KOPYSOV (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), April 1983, p. 28, 29 In Russian

A83-41457
ENVIRONMENTAL MONOTONY AS A FACTOR OF THE PRODUCTION ENVIRONMENT AT AUTOMATED INDUSTRIAL ENTERPRISES [OBSTANOVOCHNAIA MONOTONNOST' KAK FAKTOR PROIZVODSTVENNOI SREDY NA AVTOMATIZIROVANNYKH PROMYSHLENNYKH PROIZVODSTVAKH]
M. A GRITSEVSKII, L. S BASHKIROVA, ZH I ZAITSEVA, IU V EGOROVA, T. N DOLGOLENKO, N. A KRYZHANOVSKAIA, A N PISHCHIK, I N KUZNETSOVA, and G A ERMAKOVA (Institut Gigieny Truda i Profzabolevanii, Gorki, USSR) Gigiena Truda i Professional'nye Zabolevaniia, April 1983, p 5-7 In Russian. refs

The connections between parameters of monotonous environment (PME) and the degree of monotony were investigated in experiments modeling the activity of an operator in a holding pattern regime The number of tasks of various complexities and the corresponding length of action for fulfilling these tasks yielded an activity to observation ratio corresponding to a PME value of 0 8 and 0 5 during an 8 hr experiment Results show that the functional condition of the body of an operator working in conditions of monotony (PME = 0 8) is characterized by a decreased tonus of the sympathetic-adrenal system in combination with increases in the EEG activity in the theta and beta bands. N B

A83-41711#
EXTENDED PILOT-VEHICLE-TASK MODELS FOR NAVY MISSIONS
R K HEFFLEY (Manudyne Systems, Inc , Los Altos, CA) IN Guidance and Control Conference, Gatlinburg, TN, August 15-17, 1983, Collection of Technical Papers New York, American Institute of Aeronautics and Astronautics, 1983, p. 509-515. refs
(Contract N62269-82-R-0712)
(AIAA PAPER 83-2233)

This paper presents the methodology for constructing comprehensive math models of the pilot-vehicle-task system in terms of perceptualmotor activity Examples are given for a crucial Navy mission segment, the carrier landing Modeling procedures are summarized along with techniques for extracting model parameters from pilot commentary and available flight data Implications are drawn for time and mental effort aspects of pilot workload Author

A83-41838
THE SEMANTIC STRUCTURE OF INTERPERSONAL EVALUATIONS AND SELF-EVALUATIONS IN INDIVIDUALS WITH NORMAL AND ELEVATED ARTERIAL PRESSURE [SEMANTICHESKAIA STRUKTURA MEZHLICHNOSTNOI OTSENKI I SAMOOTSENKI U LITS S NORMAL'NYM I POVYSHENNYM ARTERIAL'NYM DAVLENIEM]
A S KONDRATEVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) and A G. SHMELEV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Psikhologicheskii Zhurnal, vol 4, Mar -Apr 1983, p 87-93. In Russian refs

The psychological bases of hypertension are evaluated using a system for categorizing the responses of subjects to questions concerning interpersonal evaluations and self-evaluations Three groups of subjects were examined individuals with normal arterial pressure (below 140 and 90 mm Hg), individuals with transition arterial pressure (140-165 and 90-95 mm Hg), and individuals with hypertension (at least one of the parameters above 165 or 95 mm Hg) It is determined that individuals with hypertension exhibit lower self-evaluations (more 'dislike of self'), give a lower evaluation

to other individuals, and expect a lower evaluation from other individuals It is argued that the lower self-evaluations and interpersonal evaluations of individuals with hypertension are a consequence of a peculiar structure of their category system, which differs from that of normal individuals by the combination of normally independent aspects of evaluation N B

A83-41839
THE SO-CALLED 'INFORMATION THEORY OF EMOTIONS' [O TAK NAZYVAEMOI 'INFORMATSIONNOI TEORII EMOTSII']
B I. DODONOV (Simferopol'skii Gosudarstvennyi Universitet, Simferopol, Ukrainian SSR) Psikhologicheskii Zhurnal, vol 4, Mar -Apr. 1983, p. 104-116. In Russian refs

A83-43507
EXPERIMENTAL ANALYSIS OF METHODS FOR DETERMINING PSYCHOLOGICAL FACTORS OF THE COMPLEXITY OF SOLUTION OF CONTROL PROBLEMS [EKSPERIMENTAL'NYI ANALIZ METODIK VYIALENIIA PSIKHOLOGICHESKIKH FAKTOROV SLOZHNOSTI RESHENIIA ZADACH UPRAVLENIIA]
E. P ERMOLAEVA Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no 57, 1982, p 68-72. In Russian

A83-43544
PERCEPTUAL ORGANIZATION IN MOVING PATTERNS
V. S. RAMACHANDRAN (California, University, La Jolla, CA) and S M ANSTIS (York University, Downsview, Ontario, Canada) Nature (ISSN 0028-0836), vol 304, Aug 11, 1983, p 529-531 Research supported by the Sloan Foundation, Natural Sciences and Engineering Research Council refs
(Contract NSERC-A-0260)

The question whether human motion perception is based on a local piecemeal analysis of the image is considered, along with the possibility that it is global effects that play an important role Metastable apparent motion displays are used in attempting an answer. Two spots are flashed simultaneously on diagonally opposite corners of a square and then switched off and replaced by two spots appearing on the remaining corners Either vertical or horizontal oscillation of the spots can be seen, and the display is bistable in the same way as a Necker cube It is found that if several such bistable figures are randomly scattered on the screen and presented simultaneously, then the same motion-axis is always seen in all of them. This is thought to suggest the presence of global field-like effects for resolving ambiguity in apparent motion Surprisingly, the appearance of these displays cannot be influenced by voluntary effort unless the speed of alternation is very slow (less than three frames per second) It is considered possible that if the events in the module that computes apparent motion are too rapid, then it cannot be coupled with the 'will' mechanism, which may have a long time constant C R

A83-43546
TASK VARIABLES DETERMINE WHICH BIOLOGICAL CLOCK CONTROLS CIRCADIAN RHYTHMS IN HUMAN PERFORMANCE
T H MONK, E D WEITZMAN, J. E FOOKSON, M. L MOLINE (New York Hospital-Cornell Medical Center, White Plains, NY), R E. KRONAUER (Harvard University, Cambridge, MA), and P H. GANDER (Harvard University, Boston, MA) Nature (ISSN 0028-0836), vol 304, Aug 11, 1983, p 543-545 refs
(Contract NIH-MH-28460-05; NIH-AG-00792-05)

Circadian rhythms are self-sustaining in conditions of temperal isolation, suggesting that internal oscillators (or biological clocks) control them. It is noted that recent research has proposed an endogenous two-oscillator model of the human circadian system, with one oscillator indicated by the core body temperature rhythm and a second oscillator responsible for the daily cycle of sleep and wakefulness. The study presented here is designed to produce a desynchronization in period between the two oscillators in order to assess directly the behavior of the rhythm of different performance tasks. The results suggest that a simple manual dexterity task is almost entirely under the control of the temperature rhythm oscillator, whereas a more complex cognitive task demonstrates a periodicity which appears to be influenced by those oscillators controlling temperature and the sleep/wake cycle C R

N83-31327# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div
FIRM MINIMUM
I MAXIMOV 15 Feb 1983 13 p Transl. into ENGLISH from Krasnaya Zvezda (USSR), no 80, 1968 p 2
(AD-A126971, FTD-ID(RS)T-1642-82) Avail NTIS HC A02/MF A01 CSCL 05I

Marxist-Leninist ideology at a Soviet air academy is discussed Author

N83-31328# Human Performance Technologies, Inc , Thousand Oaks, Calif
PEER-REVIEW STUDY OF THE DRAFT HANDBOOK FOR HUMAN-RELIABILITY ANALYSIS WITH EMPHASIS ON NUCLEAR-PLANT APPLICATIONS, NUREG/CR-1278
R L BRUNE, M. WEINSTEIN, and M E FITZWATER Jan 1983 231 p
(Contract DE-AC04-76DP-00789)
(DE83-007377, SAND-82-7056) Avail NTIS HC A11/MF A01

The extent peers agree with the human behavior models and estimates of human error probabilities are determined Twenty-nine human factors experts participated in the study Twenty of the participants were Americans, nine were from other countries The peers performed human reliability analyses of a variety of human performance scenarios describing operator activities in nuclear power plant settings They also answered questionnaires pertaining to the contents and application of the Handbook An analysis of peer solutions to the human reliability analysis problems and peer responses to the questionnaire was performed Recommendations regarding the format and contents of the Handbook were developed from the study findings DOE

N83-32301*# San Jose State Univ., Calif Dept of Chemistry.
THE EFFECTS OF CO AND HCN ON POLE-JUMP AVOIDANCE-ESCAPE BEHAVIOR
W WINSLOW Aug 1981 120 p refs
(Contract NCC2-4)
(NASA-CR-166512; NAS 1 26 166512) Avail NTIS HC A06/MF A01 CSCL 06C

The effects of carbon monoxide and mixtures of carbon monoxide and hydrogen cyanide at different concentrations and times of exposure were studied in a pole-jump apparatus The time to loose the avoidance and escape response for mice exposed to these atmospheres was obtained Correlations to predict the loss as a function of dosage are presented. Author

N83-32302*# San Jose State Univ , Calif Dept of Chemistry
RISK ESTIMATES FOR CO EXPOSURE IN MAN BASED ON BEHAVIORAL AND PHYSIOLOGICAL RESPONSES IN RODENTS
M K GROSS Dec 1983 136 p refs
(Contract NCC2-4)
(NASA-CR-166513; NAS 1 26 166513) Avail NTIS HC A07/MF A01 CSCL 06C

An examination of animal response to CO is studied along with potential models for extrapolating animal test data to humans The best models for extrapolating data were found to be the Probit and Weibull models Author

N83-32303# Seville Research Corp., Pensacola, Fla.
PRIVATE PILOT FLIGHT SKILL RETENTION 8, 16 AND 24 MONTHS FOLLOWING CERTIFICATION Final Report, Jan. 1981 - Jun. 1983
J M CHILDS, W D SPEARS, and W W PROPHET Atlantic City, N J FAA Jul 1983 116 p refs
(Contract DOT-FA79NA-6040)
(DOT/FAA/CT-83/34; SEVILLE-TR-83-17) Avail NTIS HC A06/MF A01

Results are summarized for flight skill retention checks conducted 8, 16, and 24 months following private pilot certification Proficiency loss was documented for all subjects and for each flight task studies, and the losses were statistically significant in nearly all cases Tasks that were relatively high, low, and more rapid in skill loss were identified, and the effects of interpolated training on skill loss patterns were assessed Pilots' ability to predict and evaluate their own skill retention levels for specific flight tasks was negligible The present findings suggest that effective continuation training program and media are needed, especially to address cognitive types of flight skills Several such potential media are described. Author

N83-32304# Naval Aerospace Medical Research Lab , Pensacola, Fla
PRELIMINARY EVALUATION OF TWO DICHOTIC LISTENING TASKS AS PREDICTORS OF PERFORMANCE IN NAVAL AVIATION UNDERGRADUATE PILOT TRAINING
G R GRIFFIN and J D. MOSKO 23 Jul 1982 22 p refs
(Contract ZF51524002, M0096PN001)
(AD-A127337, NAMRL-1287) Avail NTIS HC A02/MF A01 CSCL 05J

Aircraft pilots must divide their attention among a wide range of auditory inputs Dichotic listening tasks (DLTs) have been proposed to assess selective attention performance and to predict the probability of success of aviation candidates in flight training programs. A preliminary evaluation has been conducted of two dichotic listening tasks on a subject population about to enter the Naval Aviation Undergraduate Pilot Training Program. This report presents the results of that evaluation, describes the statistical properties of the two DLTs, and presents estimates of their utility as predictors of human performance in Naval Aviation Undergraduate Pilot Training. Results indicate that both DLTs are reliable and are unrelated to present selection tests One DLT was significantly related to the successful completion of Naval Aviation Undergraduate Pilot Training Future research should investigate the behavioral constructs being measured by the DLTs Is selective attention, auditory vigilance, motivation, or speech intelligibility being measured? In addition, a comparison of DLTs utilizing both natural and synthetic speech should be undertaken to determine the effect of vocal quality on DLT performance.
Author (GRA)

N83-32305# Arizona Univ , Tucson Dept. of Psychology
THE ROLE OF A MENTAL MODEL IN LEARNING TO OPERATE A DEVICE
D E KIERAS and S BOVAIR 1 Mar 1983 59 p
(Contract N00014-81-C-0699, RR0420602)
(AD-A127281, UARZ/DP/TR-83/ONR-13) Avail NTIS HC A04/MF A01 CSCL 05J

This report presents two studies concerned with learning how to operate a simple control panel device, and how this learning is affected by understanding the internal structure of the device, which is a device model for the device The first experiment compared two groups, one of which learned a set of operating procedures for the device by rote, and the other learned the device model before receiving the identical procedure training The model group learned the procedures faster, and even after one week, retrained them better and executed them faster, a typical effect size is a 20% improvement Furthermore, the model group could simplify, or make more efficient, the procedures far more often then the rote group The second study examined the hypothesis that the improvement is due to the model group being able to infer the procedures, which would lead to more rapid learning and better recall performance The same group manipulation was used, but subjects inferred the procedures rather than learning them, and thought out loud while doing so The model group based their reasoning on direct inferences from the device model, and inferred the correct procedures in almost the minimum amount of time. GRA

N83-32306# Johns Hopkins Univ , Baltimore, Md Div of Behavioral Biology.
SMALL GROUPS PROGRAMMED ENVIRONMENTS: BEHAVIORAL AND BIOLOGICAL INTERACTIONS
H H. EMURIAN and J V BRADY 1 Apr 1983 43 p refs
(Contract NGR-21-001-111, N00014-80-C-0467)
(NASA-CR-172853, NAS 1.26 172853, AD-A127172, ONR-TR-8)
Avail: NTIS HC A03/MF A01 CSCL 05J

This report reviews a research program undertaken within a laboratory environment that was designed and constructed to support behavior analyses of individual and group performance effectiveness viewed conceptually within the context of a small-scale human microsociety Summarized are previous research emphases and findings in relationship to. (1) conditions that sustain group cohesion and productivity and that prevent social fragmentation and performance deterioration; (2) motivational effects resulting from the programmed consequences of individual and group performance requirements, and (3) behavioral and biological effects resulting from a change in group size. A more detailed description is presented of the results of a recent series of experiments that were conducted to assess performance and hormonal effects of replacing an established group participant with a novitiate member The significance of these investigative undertakings is to be understood in terms of emergent environmental, motivational, and behavioral-biological principles having practical relevance for the establishment and maintenance of small-scale human social systems. GRA

N83-32307# Carnegie-Mellon Univ., Pittsburgh, Pa Dept. of Psychology
EXCEPTIONAL MEMORY
K A ERICSSON and W G CHASE Nov. 1982 22 p refs
(Contract N00014-81-C-0335)
(AD-A126977, TR-8-ONR) Avail NTIS HC A02/MF A01 CSCL 05J

There are scientific records of memory feats that deviate so markedly from the normal that they are called exceptional and are assumed to reflect a memory system structurally different from that of most people Some recent research involving memory training of normal people has led us to question this distinction. We will first describe the empirical evidence reported in support of the idea that exceptional memory is different from normal memory Then we will present our research in support of the assertion that normal memory structure is sufficient to explain exceptional memory feats, if we take into account differences in practice and prior experience GRA

N83-32308# Advanced Information and Decision Systems, Mountain View, Calif
OPTION GENERATION TECHNIQUES FOR COMMAND AND CONTROL Final Technical Report, 15 May 1981 - 9 Aug. 1982
R. M. TONG, A ARBEL, S. O. CIOFFI, C M KELLEY, and J. R PAYNE Jan. 1983 190 p refs
(Contract F30602-81-C-0178)
(AD-A127715, RADC-TR-83-6) Avail NTIS HC A09/MF A01 CSCL 05J

The research described in this report explores the problem of option generation for open decision problems. Part of the effort has been to define the problem of option generation and what it means to aid the decision maker in this task, and part has been to define and use procedures for experimentally evaluating our ideas The result of the effort is a generic model of option generation with specific recommendations for option aiding tools
Author (GRA)

N83-32309# Naval Health Research Center, San Diego, Calif
PSYCHOPHARMACOLOGICAL TECHNIQUES FOR OPTIMIZING HUMAN PERFORMANCES Interim Report, Aug. 1978 - Mar. 1983
C L SPINWEBER and L C JOHNSON 22 Mar. 1983 18 p refs
(Contract MR0000101; MR04101003)
(AD-A128529, NAVHLTHRSCHC-83-11) Avail NTIS HC A02/MF A01 CSCL 06O

In operational environments, administration of psychopharmacological agents could be employed to optimize and maintain human performance. One technique of considerable military importance is use of sleeping aids to promote rapid sleep onset and permit efficient utilization of rest periods. A methodology for evaluation of sleeping aids for military use is described In laboratory study of the triazolobenzodiazepine triazolam 0/5 mg, sleep latency was reduced and morning performance was unimpaired, although a clear performance decrement was present up to 5 hours post-administration Triazolam also produced anterograde amnesia and elevated auditory threshold for arousal from sleep. In operational use, triazolam could be effectively administered when rest periods of 8 hours duration are scheduled. The dietary amino acid 1-tryptophan 4 g was effective in reducing daytime sleep latency in normal sleepers, suggesting its usefulness in alleviating sleep disturbances associated with jet lag and altered work-rest schedules. In nighttime administration to chronic poor sleepers, 1-tryptophan 3 g reduced sleep latency after three nights of administration and had no adverse performance effects. The suitability of both triazolam and 1-tryptophan for military use will be further evaluated in field research and tested in operational environments. Another psychopharmacological approach is administration of carefully-chosen stimulants to maintain alertness and performance effectiveness when there is no opportunity for sleep. The techniques developed in this on-going research program in behavioral psychopharmacology will be employed to evaluate stimulants for operational use GRA

N83-32310# Purdue Univ , Lafayette, Ind Dept of Psychological Sciences
EFFECTS OF STANDARD EXTREMITY ON MIXED STANDARD SCALE PERFORMANCE RATINGS Interim Report
J L. BARNES-FARRELL and H M WEISS Mar 1983 38 p refs
(Contract N00014-82-K-0449, NR PROJ. 170-940, RR0420801)
(AD-A128645; REPT-83-2) Avail NTIS HC A03/MF A01 CSCL 05J

It was suggested that the extremity of the scale values associated with standards used to represent effective and ineffective performance in Mixed Standard Scales may affect the nature of performance ratings derived from MSS responses and decisions based on MSS ratings When the extremity of standards was experimentally manipulated, it was found that standard extremity affects both the level of performance ratings and the proportion of logically inconsistent response patterns observed In addition, standard extremity appears to affect the rankings on performance of ratees The implications of these observations for the development of Mixed Standard Scales were discussed Author (GRA)

N83-32311# Purdue Univ , Lafayette, Ind. Dept. of Psychological Sciences
METHODOLOGICAL CONTRIBUTIONS OF PERSON PERCEPTION TO PERFORMANCE APPRAISAL Interim Report
D R ILGEN and J. L. FAVERO Mar 1983 42 p refs
(Contract N00014-82-K-0449, NR PROJ 170-940, RR0420801)
(AD-A128638; REPT-83-4) Avail. NTIS HC A03/MF A01 CSCL 05I

A process focus on performance appraisal represents the application of knowledge about the information processing capabilities of individuals to the problem of appraising the work performance of employees Much of our attempt to understand the appraisal process has borrowed from social psychology in general and person perception in particular Although the theoretical constructs of person perception have appeared to be very relevant to performance appraisal, the experimental methods from which the data related to the theoretical constructs have been generated may be less well suited for studying particular issues in performance appraisal. In this paper, we outline several of the methods used in person perception and then discuss the relevance of these methods for studying performance appraisal. In order to accomplish this final critique of the methods, we first outline the nature of the performance appraisal process with its conditions and constraints that affect the relevance of data collected with respect to the process. Author (GRA)

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MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering, biotechnology, and space suits and protective clothing

A83-40844
RADIATION SAFETY STANDARDS - SPACE HAZARDS VS. TERRESTRIAL HAZARDS
W. K SINCLAIR (National Council on Radiation Protection and Measurements, Bethesda, MD) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 8, 1983, p. 151-159 refs

Policies regarding the setting of standards for radiation exposure for astronauts and other workers in space are discussed The first recommendations for dose limitation and the underlying philosophy of these recommendations, which were put out in 1970, are examined, and consequences for the standards if the same philosophy of allowing a doubling in overall cancer risk for males aged 30-35 over a 20-year period were applied to more recent risk estimates are calculated, leading to values about a factor of 4 below the 1970 recommendation Standards set since 1930 for terrestrial occupational exposures, which lead to a maximum lifetime risk of about 2.3 percent, are then considered, and the space and terrestrial exposure risks for fatal cancers at maximum lifetime dose are compared with industrial accidental death rates. Attention is also given to the question of the potential effects of HZE particles in space and to the possibility that HZE particle effects, rather than radiation carcinogenesis, might be the limiting factor A L W

A83-41139
A CONSTANT-VELOCITY CYCLE ERGOMETER FOR THE STUDY OF DYNAMIC MUSCLE FUNCTION
N. MCCARTNEY, G J F HEIGENHAUSER, A J SARGEANT, and N. L. JONES (McMaster University, Hamilton, Ontario, Canada) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, July 1983, p 212-217 Research supported by the Ontario Heart Foundation and Medical Research Council of Canada refs

A83-41456
A HYGIENIC AND PHYSIOLOGICAL EVALUATION OF THE MAIN ERGONOMIC CHARACTERISTICS OF METAL-CUTTING MACHINE TOOLS [GIGIENO-FIZIOLOGICHESKAIA OTSENKA OSNOVNYKH ERGONOMICHESKIKH KHARAKTERISTIK METALLOREZHUSHCHIKH STANKOV]
V. I GONCHARENKO, L. A. KOROTKAIA, and V. P. KONDRATIUK (Institut Gigieny Truda i Profzabolevanii, Kharkov, Ukrainian SSR) Gigiena Truda i Professional'nye Zabolevaniia, April 1983, p 12-14. In Russian.

A83-41836
THE 'HUMAN FACTOR' AND PRODUCTION ORGANIZATION ['CHELOVECHESKII FAKTOR' I PROIZVODSTVENNAIA ORGANIZATSIIA]
L D KIZIMENKO (L'vovskii Pedagogicheskii Institut, Lvov, Ukrainian SSR) Psikhologicheskii Zhurnal, vol 4, Mar.-Apr 1983, p. 34-44 In Russian. refs

Methods are examined for increasing industrial productivity by influencing the human factor in production organizations An industrial enterprise is considered as a complex system including human and technical links, called a sociotechnical system It is shown that the use of this two-component structure simplifies the analysis and synthesis of an optimal system and permits the formulation of human factor conditions at various hierarchical levels A scheme is presented for the regulation of industrial activity which simplifies the understanding of the processes of human control and includes both social and physical actions During the development of methods for the control of human factors it is necesary to consider the defective evaluations and human properties with the possibility of their use during the synthesis of metaphorical models of a sociotechnical system N.B.

A83-41837
AUTOMATED PROCESSES FOR THE EVALUATION OF THE EFFICIENCY OF 'MAN-MACHINE' SYSTEMS [AVTOMATIZATSIIA PROTSESSOV OTSENKI EFFEKTIVNOSTI SISTEMY 'CHELOVEK-MASHINA']
A A BEZBOGOV (Akademiia Nauk SSSR, Institut Psikhologii, Moscow, USSR) Psikhologicheskii Zhurnal, vol 4, Mar -Apr. 1983, p 45-50 In Russian. refs

A general structure for the automated evaluation of the efficiency of a man-machine system is presented. An analysis of the processes of the functioning of a system for evaluating the effectiveness of a man-machine system and the activity of a human operator in ergatic systems shows that an ideal evaluation system should be similar to a human who carries out the control of the work of this man-machine system. At the same time, the automated system for the evaluation of the efficiency of the functioning of the man-machine system needs to be free of deficiencies such as subjectiveness, perception of information, and a low capacity, which are characteristic of humans N B

A83-42553#
THE FIRST CORTICAL IMPLANT OF A MULTIPLEXED MULTI-ELECTRODE SEMICONDUCTOR BRAIN ELECTRODE
M KABRISKY, J M BORKY, D C DENTON, R. W HENSLEY, J A. TATMUN, G H FITZGERALD, G W GERMAN (USAF, Institute of Technology, Wright-Patterson AFB, OH), and J G. GOLDEN (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH) IN Annual Mini-Symposium on Aerospace Science and Technology, 9th, Wright-Patterson AFB, OH, March 22, 1983, Proceedings New York, American Institute of Aeronautics and Astronautics, 1983, p. 9-4-1 to 9-4-3 refs

On October 25, 1982 an X-Y addressable, 16 electrode (4 x 4 array) multiplexed switching electrode based on contemporary silicon computer chip technology was implanted on the brain of a laboratory beagle (Canis familiaris) The chip functioned for fifteen days during which time electroencephalograph (EEG) and visual evoked response (VER) data (response to a flash) were collected The chip was then removed for examination and found to be in basically good condition, visual examination of the beagle's brain showed no obvious damage or morbid processes, and in fact the animal has recovered from this procedure with apparently unimpaired brain function The implant site was primary visual cortex Author

A83-43501
CHOICE OF PARAMETERS FOR ERGATIC STABILIZATION SYSTEMS [K VYBORU PARAMETROV ERGATICHESKIKH SISTEM STABILIZATSII]
O S. IAKOVLEV (Akademiia Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no 57, 1982, p. 19-26 In Russian

A method of choosing feedback-law parameters is proposed for the case when the closed-loop system is stable for large initial perturbations and is optimal with respect to the quadratic potential under small perturbations Indices of the stabilizability, stability, and nonstationarity of multidimensional nonlinear systems are introduced which can be used in the control synthesis. It is found that the application of nonlinear feedback laws in aircraft control systems instead of linear ones enhances the reliability with which the human operator executes set tasks in the case of large initial perturbations and reduces his work load. B J.

A83-43502
DETERMINATION OF PHYSICALLY ACHIEVABLE ACCELERATIONS IN THE PROBLEM OF THE SPATIAL CONVERGENCE OF A MATERIAL POINT [OPREDELENIE FIZICHESKI REALIZUEMYKH USKORENII V ZADACHE PROSTRANSTVENNOGO SBLIZHENIIA MATERIAL'NOI TOCHKI]
V A SHMAT (Akademiia Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no. 57, 1982, p. 26-28 In Russian.

The present study considers the formation of a limiting system of equations for the synthesis of terminal control in the problem of the spatial convergence of a material point An algorithm is proposed for determining a physically achievable law for the control of accelerations is the aforementioned problem The results obtained can be used for the synthesis of ergatic control systems by the method of nonlinear integral invariance. B J.

A83-43503
INFORMATIONAL EVALUATION OF OPERATOR ACTIVITY IN AN ERGATIC SYSTEM WITH A LEARNING MODEL [INFORMATSIONNAIA OTSENKA OPERATORSKOI DEIATEL'NOSTI V ERGATICHESKOI SISTEME S OBUCHAEMOI MODEL'IU]
V S KHOMINICH (Akademiia Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no 57, 1982, p 28-32 In Russian refs

An informational evaluation of human-operator activity is proposed on the basis of an organismic approach to the development and analysis of ergatic control systems This evaluation is performed on the basis of a modular grammar, making it possible to obtain 'crudeness' rules for ergatic systems, as well as on the basis of an integral filtering method with finite observation time. The cost of information identified by the operator is used as the criterion for evaluating operator activity in an ergatic system with a learning model An expression for this cost makes it possible to evaluate the operator work load B.J

A83-43504
ON THE PROBLEM OF MANUAL CONTROL. I [O ZADACHE RUCHNOGO UPRAVLENIIA. I]
A E RADIEVSKII (Kievskii Institut Avtomatiki, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no. 57, 1982, p 38-41 In Russian. refs

Aspects of manual control are investigated for a class of ergatic control systems in the compensatory-tracking mode. It is shown that the performance of the human operator in such systems can be enhanced by improving the informational support of the control process This can be done by the use of control-action diagrams. graphs which represent the value and sign of the control action as a function of the technical state of the control system and the situation. The construction of such diagrams is considered B.J

A83-43505
CONDITIONS OF THE GENERALIZED SIMILARITY OF SIMULATORS TO AIRCRAFT [USLOVIIA OBOBSHCHENNOGO PODOBIIA TRENAZHEROV SAMOLETAM]
N. A KIRSENKO (Kievskii Institut Inzhenerov Grazhdanskoi Aviatsii, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no. 57, 1982, p. 54-58. In Russian

Dynamic and informational similarities are examined as the necessary and sufficient conditions for the generalized similarity of flight simulators to aircraft It is shown that a breakdown in the informational similarity is perceived by the pilot as a breakdown in the dynamic similarity Under certain conditions the integral curves at the simulator output will diverge from the integral curves at the aircraft output, i e , generalized similarity will not exist B.J

A83-43506
MATHEMATICAL MODEL OF PSYCHOPHYSIOLOGICAL STRESS ON A PILOT, BASED ON WILDER'S BIOLOGICAL LAW [MATEMATICHESKAIA MODEL' PSIKHOFIZIOLOGICHESKOI NAPRIAZHENNOSTI PILOTA, OSNOVANNAIA NA BIOLOGICHESKOM ZAKONE UAILDERA]
A A TERESHKIN (Kievskii Institut Inzhenerov Grazhdanskoi Aviatsii, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no 57, 1982, p 59-67. In Russian. refs

An attempt is made to develop a scientifically valid mathematical model of stress which can be used to evaluate the efficiency of pilot-aircraft systems Factors affecting the relation between cardiac arrhythmia and mental load are examined Experimental investigations confirm the validity of Wilder's law of initial value, and an improved formulation of this law is given for variable work loads of a human operator during information processing A method for determining the stress on a pilot in flight is proposed which is based on the standardization of mental load B J

A83-43508
APPLICATION OF FACTOR-ANALYSIS METHODS TO EVALUATE THE QUALITY OF ERGATIC CONTROL SYSTEMS [PRIMENENIE METODOV FAKTORNOGO ANALIZA DLIA OTSENKI KACHESTVA ERGATICHESKIKH SISTEM UPRAVLENIIA]
I S MAZURENKO (Akademiia Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no 57, 1982, p. 78-85 In Russian

The necessity of applying methods of factor analysis to evaluate the efficiency and quality of complex control systems is substantiated. As an example, the method of principal components is used to analyze the effect of the statistical properties of human-operator activity on the quality of an aircraft landing control system. An interpretation of the factor-analysis solution is given B.J

A83-43509
ON THE DESIGN OF ERGATIC SYSTEMS FOR THE SOLUTION OF A TWO-GOAL GAME-THEORETICAL PROBLEM OF CONTROL [K VOPROSU POSTROENIIA ERGATICHESKIKH SISTEM DLIA RESHENIIA DVUKHTSELEVOI IGRIVOI ZADACHI UPRAVLENIIA]
IU V TSURKAN (Akademiia Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no 57, 1982, p 85-91. In Russian

The paper examines the synthesis of the homeostatic structure of a two-goal ergatic system of control, functioning in a game situation. In this situation, the ergatic system for the control of a given object must fulfill two tasks it must reach a prescribed terminal set and it must avoid collision with another object An example of the experimental investigation of such a system is considered. B.J

N83-30451# Joint Publications Research Service, Arlington, Va
NEW FOOD SELECTION SYSTEM FOR COSMONAUTS IN SALYUT-7
B KONOVALOV *In its* USSR Rept : Space, No 19 (JPRS-82771) p 15-16 31 Jan 1983 Transl. into ENGLISH from Izv (Moscow), 3 Jun 1982 p 6
Avail: NTIS HC A06

The first test of an experiment system of food selection aboard the Salyut Space Station The cosmonaut selects his meals within a caloric framework, sending the results for medical monitoring Also a small refrigerator is now onboard, allowing leftovers to be eaten later, and cold liquids to be kept on hand. B.G

N83-31329 Royal Signals and Radar Establishment, Malvern (England).
THE PROCESSES OF VISUAL PERCEPTION AND THE IMPLICATIONS FOR OPTIMISATION OF DISPLAYS
R HOME Feb 1983 81 p refs
(RSRE-83001, BR87645) Avail Issuing Activity

Performance data on the human visual system are summarized Measurement of visual acuity, contrast sensitivity, form perception, color vision, dynamic effects (single pulse, flickering, moving stimuli) and visual noise is outlined Parametric requirements for display design are listed Author (ESA)

N83-31330# Research Inst of National Defence, Stockholm (Sweden)
WILD PLANTS AS FOOD DURING A 250 KM SURVIVAL MARCH
S KAELLMAN Jan. 1983 32 p refs In SWEDISH, ENGLISH summary
(FOA-C-54044-H1) Avail NTIS HC A03/MF A01

A 250 km long survival march was performed with a minimum of equipment and with wild plants as food Samples were collected five times and glucose and free fatty acids in the blood and ketone bodies in the urine were determined. Author

N83-31331# Air Force Inst of Tech , Wright-Patterson AFB, Ohio Dept. of Electrical Engineering
AN ANDROID RESEARCH AND DEVELOPMENT PROGRAM M.S. Thesis
R. J. TAYLOR Mar. 1983 149 p refs
(AD-A127359, AFIT/GE/EE/83M-3) Avail NTIS HC A07/MF A01 CSCL 15E

This report identifies areas requiring further research to develop a detailed research and development plan for an aircraft maintenance android The general user requirements are defined and the desired android capabilities are addressed to meet the defined user requirements The user requirements are defined independently of aircraft type Structured analysis diagrams are used to describe the functional requirements Specific recommendations are made Author (GRA)

N83-31332# Naval Submarine Medical Research Lab , Groton, Conn.
COLD WEATHER GOGGLES. PART 4: OPTIMAL DENSITY Interim Report
S. M LURIA 3 Mar. 1983 17 p refs
(AD-A127427; NSMRL-996) Avail NTIS HC A02/MF A01 CSCL 06Q

Light- and dark-eyed observers, ranging in age from 17 to 67, compared six pairs of sunglasses whose neutral density filters transmitted either 0.8, 2 5, 4 8, 8 9, 15 8, or 91.2% of the light. The sunglasses were worn in bright sunlight both in summer and winter and rated for comfort as to the light-level which they admitted to the eyes In addition, the observers took a test of resolution acuity with each pair of filters. Observers of both eye-colors and of every age-group preferred, on the average, sunglasses which reduced the light-level to 300-400 footcandles These preferred filters are much denser than typical commercial sunglasses Resolution acuity declined significantly for the older observers with filters denser than the preferred ones Author (GRA)

N83-31333# Sandia Labs, Albuquerque, N. Mex
NRC HUMAN-RELIABILITY RESEARCH PROGRAM
R R PRAIRIE and A D SWAIN 1982 7 p refs Presented at the 10th Water Reactor Safety Res Information Conf, Gaithersburg, Md, 12 Oct. 1982
(Contract DE-AC04-76DP-00789)
(DE83-001284; SAND-82-2252C, CONF-821037-4) Avail: NTIS HC A02/MF A01

The human reliability research program supported by the Division of facility Operations is described and very briefly mentions other work supported by the NRC All of the work for NRC is related directly or indirectly to the safety assessment of light water reactors. DOE

N83-31334# Steinbock G m b.H, Moosburg (West Germany)
REDUCTION OF NOISE AND VIBRATION ON FORK LIFT TRUCKS Final Report, Dec. 1980
P BARTELS, H DUPUIS, P JENIK, and G TRONICH Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 136 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-HA-83-010; ISSN-0171-7618) Avail NTIS HC A07/MF A01, Fachinformationszentrum, Karlsruhe, West Germany DM 28,50

A prototype 2 5 t diesel fork lift truck is described. A reduction of the medium noise level as per DIN 45635, T 36 (70% of the nominal rotation speed) at the driver's ear of 10,0 dB (A) to 77 5 dB (A), and reduction of vibration of 50% to 65% measured at the driver's seat are achieved Author (ESA)

N83-32312# General Accounting Office, Washington, D. C National Productivity Group
AUTOMATION IN THE WORKPLACE, ITS IMPACT ON THE LABOR FORCE, AND THE ROLE OF LABOR MARKET PLANNING FOR POLICYMAKING
B L USILANER 6 Aug. 1983 18 p refs
Avail: NTIS HC A02/MF A01

The importance of automation of productivity and the economy, barriers, and stimulators of automation, potential impact on the work force, and difficulties in accurate labor market planning are discussed. Author

N83-32313# Massachusetts Inst. of Tech, Cambridge Artificial Intelligence Lab
DYNAMIC SCALING OF MANIPULATOR TRAJECTORIES
J M HOLLERBACH Jan 1983 14 p refs
(Contract N00014-80-C-0505; N00014-82-K-0334)
(AD-A127074, AI-M-700) Avail NTIS HC A02/MF A01 CSCL 12A

A fundamental time-scaling property of manipulator dynamics has been identified that allows modification of movement speed without complete dynamics recalculation By exploiting this property, it can be determined whether a planned trajectory is dynamically realizable given actuator torque limits, and if not, how to modify the trajectory to bring it within dynamic and actuating constraints Author (GRA)

N83-32314# Naval Postgraduate School, Monterey, Calif Dept. of Operations Research.
INTEGRATION ANALYSIS: A PROPOSED INTEGRATION OF TEST AND EVALUATION TECHNIQUES FOR EARLY ON DETECTION OF HUMAN FACTORS ENGINEERING DISCREPANCIES M.S. Thesis
D. L. CARLSON Mar 1983 83 p refs
(AD-A127611) Avail NTIS HC A05/MF A01 CSCL 05E

The objective of this thesis is to address the idea of implementing a viable T&E technique at the early stages of DT&E in order to reduce design discrepancies and minimize acquisition costs and time This technique involves integration of Task Analysis, Operator Interviews and Link Analysis to evaluate a system's Functional Mock-up The technique will, therefore, be referred to as Integration Analysis throughout the paper In order to provide a measure of its contribution, it will be implemented on a recently procured system that experienced numerous HFE design discrepancies at its OT&E stage The system in question, the Recovery Assist, Securing, and Traversing (RAST) System associated with the LAMPS MK III Acquisition, revealed HFE problems in relation to its LSO Control Station The use of the subject technique could have discovered a majority of those problems much earlier in the Acquisition Process GRA

N83-32315# Naval Submarine Medical Research Lab, Groton, Conn
COLD WEATHER GOGGLES. PART 5: ACCEPTABLE LIMITS OF OPTICAL DISTORTION Interim Report
S M. LURIA and R RODRIGUEZ 11 Apr 1983 18 p refs
(Contract MO095001)
(AD-A127657, NSMRL-998) Avail NTIS HC A02/MF A01 CSCL 06Q

Contrast sensitivity, acuity through binoculars, depth perception, and riflery were measured as subjects looked through goggles with various degrees of optical distortion The amount of distortion necessary to produce a statistically significant degradation of performance was determined for each task in order to specify the maximum allowable optical distortion in goggles The degree of distortion was quantified by projecting a Snellen chart through the goggles and determining the Snellen line which could then be read By this criterion, the maximum permissible distortion is that which degrades acuity from 20/20 to the 20/30 line
Author (GRA)

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PLANETARY BIOLOGY

Includes exobiology, and extraterrestrial life

A83-40830* Colorado State Univ, Fort Collins
A QUARANTINE PROTOCOL FOR ANALYSIS OF RETURNED EXTRATERRESTRIAL SAMPLES
J R BAGBY (Colorado State University, Fort Collins, CO), H C. SWEET (Central Florida, University, Orlando, FL), and D. L DEVINCENZI (NASA, Life Sciences Div, Washington, DC) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no. 8, 1983, p. 27-34 refs

A protocol is presented for the analysis at an earth-orbiting quarantine facility of return samples of extraterrestrial material that might contain (nonterrestrial) life forms The protocol consists of a series of tests designed to determine whether the sample, conceptualized as a 1-kg sample of Martian soil, is free from nonterrestrial biologically active agents and so may safely be sent to a terrestrial containment facility, or it exhibits biological activity requiring further (second-order) testing outside the biosphere. The first-order testing procedure seeks to detect the presence of any replicating organisms or toxic substances through a series of experiments including gas sampling, analysis of radioactivity, stereomicroscopic inspection, chemical analysis, microscopic examination, the search for metabolic products under growth conditions, microbiologicl assays, and the challenge of cultured cells with any agents found or with the extraterrestrial material as is Detailed plans for the second-order testing would be developed in response to the actual data received from primary testing
A L W

A83-40831* Massachusetts Univ , Amherst
MARS - A CONTAMINATION POTENTIAL?
R. L HUGUENIN, K J. MILLER, and S. B. LESCHINE (Massachusetts, University, Amherst, MA) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no. 8, 1983, p 35-38 refs
(Contract NSG-7397)

Three regions on Mars, Solis Lacus, Noachis-Hellespontus, and the Syrtis Major border areas, would appear to have generally less hostile environments than at the Viking lander sites. Significant soil moisture may extend to within about 1 cm of the surface. Water vapor pressures within the pore spaces may be near saturation, and brines may be physically segregated from pockets of relatively pure H2O Temperatures reach above 0 C during southern spring and summer, with peak temperatures reaching +22 C. These regions should contain fewer oxidants, and primary synthesis of organics may occur The potential for contamination of these sites by microbes transported from existing spacecraft should be assessed The adequacy of proposed new planetary protection procedures for possible future United States Mars Surface Sample Return missions should also be assessed in light of these findings. Author

A83-40832
AN EXTRATERRESTRIAL HABITAT ON EARTH - THE ALGAL MAT OF DON JUAN POND
B Z SIEGEL, S M. SIEGEL, J CHEN (Hawaii, University, Honolulu, HI), and P LAROCK (Florida State University, Tallahassee, FL) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 8, 1983, p 39-42 refs
(Contract NSF DPP-77-21507)

Studies are reported of the life forms found to inhabit the mat on the surface of Don Juan Pond in the Wright Valley of Antarctica, long considered as a near sterile model of the Martian environment. The mat was found to consist mainly of evaporites and mineral fines cemented by organic matter, associated with a more hydrated algal mud containing less organic matter Among the organic constituents detected were chitin, cellulose, starch, protein, pentose, ATP and freely diffusible enzymes. Despite a CaCl2 concentration of about 33 percent (w/v), Oscillatoria and other species of blue-green algae, green algae, diatoms and even a few species of stalked bacteria and tardigrades were observed, indicative of trophically complete and taxonomically diverse ecosystem. A.L W.

A83-40833
CHARACTERIZATION OF A HALOTOLERANT-PSYCHROLOTERANT BACTERIUM FROM DRY VALLEY ANTARCTIC SOIL
K J. MILLER, S. B. LESCHINE, and R. L. HUGUENIN (Massachusetts, University, Amherst, MA) (COSPAR, Workshops and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol. 3, no. 8, 1983, p 43-47 refs
(Contract NSF DPP-81-20605)

The saline soils of the ice free dry valleys of Victoria Land, Antarctica may provide the closest analog on earth to Martian conditions A study aimed at examining microbial adaptations to the harsh environment of these dry valley soils has been initiated In this report, the characterization of one bacterium, strain A4a, isolated from Taylor Valley soil, is described. Strain A4a was an obligately aerobic, orange-pigmented, Gram-positive coccus that grew over wide ranges of both temperature (0 C - 40 C) and sodium chloride concentration (0 - 2 0 M) The optimal temperature for growth at all NaCl concentrations was 25 C Phospholipid composition and guanine plus cytosine content of the DNA of the isolate indicate a close relation to the genus Planococcus. Author

A83-41510
PRIMORDIAL ORGANIC CHEMISTRY
C PONNAMPERUMA (Maryland, University, College Park, MD) IN Extraterrestrials - Where are they? Elmsford, NY, Pergamon Press, 1982, p 87-98, Discussion, p 98, 99 refs

Experimental data bearing on the formation of organic molecules and life in primitive planetary atmospheres is reviewed. The processes of organic synthesis and polymerization are discussed, together with the role of phosphorus in the enhancement of higher weight amino acids Life has been shown, by palaeontologists, to have been present on earth 3 8 billion years ago, with older rocks containing organic molecules Amino acids have also been found in carbonaceous chondrites and interstellar molecules have been observed to be those significant for chemical evolution Additionally, the chemistry of the Jupiter atmosphere has been found to contain organic molecules which recombine, in laboratory trials, to form more complex molecules when exposed to UV light. It is concluded that any study of primordial chemistry is also concerned with cosmic processes. M.S.K.

A83-41511
POSSIBLE FORMS OF LIFE IN ENVIRONMENTS VERY DIFFERENT FROM THE EARTH
R SHAPIRO (New York University, New York, NY) and G FEINBERG (Columbia University, New York, NY) IN. Extraterrestrials - Where are they? Elmsford, NY, Pergamon Press, 1982, p. 113-120; Discussion, p 120, 121 refs

The possibility that life elsewhere in the universe has evolved using molecules other than those based on carbon or has attained different forms is considered It is qualitatively shown that life does not necessarily require either carbon molecules or the complexity of carbon molecules observed on earth. Life's prerequisites include a flow of free energy, a matter system capable of interacting with the energy and using it to become more ordered, and enough time to build up some complexity. Life could evolve in NH3, hydrocarbon, or silicate-rich environments, factors which give rise to the possibility of creatures existing in the terrestrial magma, on Mars, Jupiter, or Titan, and beneath the crusts of Ganymede, Callisto, or Io Alternatively, plasmobes may live within the sun and radiobes might be based on the ordered patterns of radiation emitted by isolated atoms and molecules in dense interstellar clouds M S.K.

A83-41513
NUCLEOSYNTHESIS AND GALACTIC EVOLUTION - IMPLICATIONS FOR THE ORIGIN OF LIFE
V. TRIMBLE (California, University, Irvine, CA, Maryland, University, College Park, MD) IN: Extraterrestrials - Where are they? Elmsford, NY, Pergamon Press, 1982, p 135-141. refs

Estimates are made of the number of stars in existence with metal abundances by mass (Z) within a factor of three of those of the sun. Observational evidence from the more than 100 globular clusters in the Galaxy are cited to show that stars with Z close to that of the sun and with ages of at least 4.65 Gyr may be common, but have not observably formed in clusters. It is suggested that the oldest stars may be closer to the center of the Galaxy, with the metallicity increasing with the age of the star M S K

A83-41515
ATMOSPHERIC EVOLUTION, THE DRAKE EQUATION, AND DNA - SPARSE LIFE IN AN INFINITE UNIVERSE
M. H HART (Trinity University, San Antonio, TX) IN. Extraterrestrials - Where are they? Elmsford, NY, Pergamon Press, 1982, p. 154-164; Discussion, p. 164, 165. refs

The number of habitable stars in the Galaxy is estimated, based in part on the conditions and orbit which allowed the earth to form the atmosphere and climate currently present. It is shown that deviations of only 5 percent inward or outward in orbit from the present path would have resulted in a runaway greenhouse effect or permanent glaciation on earth The Drake equation for the probability of the total number of other planets that could support life is demonstrated to have inherent inaccuracies. The lack of concrete evidence that extraterrestrials have ever visited

earth is cited as evidence that the number of other stellar civilizations is small Likewise, the probability that DNA strands formed is found to be 10 to the -30th in 10 billion years. It is concluded that the infinite extent of space makes the probability of life encountering life from another star system infinitely small, unless life evolves from an abiotic process that has not yet been identified and which could increase the frequency that life occurs M.S.K

A83-42030
AMINO ACIDS IN METEORITES
J R CRONIN and S PIZZARELLO (Arizona State University, Tempe, AZ) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol. 3, no. 9, 1983, p 5-18. refs

Results are presented for an analysis of the amino acids of the Murchison meteorite (CM2) which has yielded the positive identification of 52 amino acids Thirty-three of these amino acids are found to be unknown in natural materials other than carbonaceous chondrites The Murchison amino acids are determined to comprise a mixture of C2 through C8 cyclic and acyclic monoamino alkanoic and alkandioic acids of nearly complete structural diversity The primary alpha-amino alpha-branched amino acids are shown to predominate within the acyclic monoamino alkanoic acid series It is determined that the concentrations of individual amino acids decline exponentially with increasing carbon number within homologous series In addition, amino acid enantiomers are found in approximately equal amounts Also found are eight of the terrestrial protein amino acids N B.

A83-42031
CHEMICAL EVOLUTION IN SPACE - A SOURCE OF PREBIOTIC MOLECULES
J M GREENBERG (Leiden, Rijksuniversiteit, Leiden, Netherlands) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no. 9, 1983, p 19-33 Research supported by the Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek refs

A laboratory analog for following the chemical evolution of interstellar dust in space is used to show that this dust contains the bulk of organic material in the universe. The photoprocessing of low temperature (10 K) mixtures of ices subjected to vacuum ultraviolet radiation is employed to simulate interstellar conditions The photoprocessing of grain material is found to yield a complex nonvolatile residue which is yellow in color and soluble in water and methanol The absorption spectra of this product indicates the presence of carboxylic acid and amino groups resembling those of other molecules of presumably prebiological significance produced by more classical methods. It is suggested that the deposit of prebiotic dust molecules occurred as many as 5 times in the first 500-700 million years on the primitive earth by accretion during the passage of the solar system through a dense interstellar cloud, yielding a total deposition of 10 to the 9th to 10 to the 10th metric tons of complex organic material per passage N.B.

A83-42032
THE ESCAPE OF MOLECULAR HYDROGEN AND THE SYNTHESIS OF ORGANIC NITRILES IN PLANETARY ATMOSPHERES
A. BOSSARD, D MOUREY, and F. RAULIN (Paris XII, Universite, Creteil, Val-de-Marne, France) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 39-43 Sponsorship Centre National de la Recherche Scientifique refs
(Contract CNRS-ATP-3721, CNRS-ATP-3754)

The influence of hydrogen escape from the atmosphere of small planetary bodies on the synthesis of organic molecules in the atmosphere is investigated based on studies of the evolution of different reducing model atmospheres submitted to electrical discharges, with and without the simulation of H2 escape An analysis of mixtures of nitrogen and methane indicate a very strong effect of H2 escape on the formation of organic nitriles, the only nitrogen containing organic compounds detected in the gas phase, such as HCN, (CN)2, CH3CN, and CH3CH2CN. It is determined that the yield of synthesis of most of these organic nitriles is increased, up to several orders of magnitude, when hydrogen escape is simulated It is concluded that the escape of H2 from the atmosphere of the primitive earth may have played a crucial role in the formation of reactive organic molecules such as HCCCN or (CN)2. These results may also explain data concerning the nature and relative abundance of organic molecules present in the atmosphere of Titan, a planetary satellite which may be an ideal model within the solar system for the study of organic cosmochemistry and exobiology. N B.

A83-42033* California Univ , La Jolla
THE ATMOSPHERE OF THE PRIMITIVE EARTH AND THE PREBIOTIC SYNTHESIS OF ORGANIC COMPOUNDS
S L. MILLER and G. SCHLESINGER (California, University, La Jolla, CA) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 47-53 refs
(Contract NAGW-20)

The prebiotic synthesis of organic compounds is investigated using a spark discharge on various simulated prebiotic atmospheres at 25 C. It is found that glycine is almost the only amino acid produced from the model atmospheres containing CO and CO2 These results show that the maximum yield is about the same for the three carbon sources (CO, CO2, and CH4) at high H2/carbon ratios, but that CH4 is superior at low H2/carbon ratios CH4 is found to yield a much greater variety of amino acids than either CO or CO2. If it is assumed that amino acids more complex than glycine were required for the origin of life, then these findings indicate the need for CH4 in the primitive atmosphere The yields of cyanide and formaldehyde are shown to parallel the amino acid results, with yields of HCN and H2CO as high as 13 percent based on carbon Ammonia is also found to be produced from N2 in experiments with no added NH3 in yields as high as 4.9 percent These results indicate that large amounts of NH3 would have been synthesized on the primitive earth by electric discharges. N B.

A83-42034* Houston Univ , Tex.
PREBIOTIC OLIGODEOXYNUCLEOTIDE SYNTHESIS IN A CYCLIC EVAPORATING SYSTEM AT LOW TEMPERATURES
D ODOM, T YAMROM, and J. ORO (Houston, University, Houston, TX) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 55-59 Research supported by the William and Flora Hewlett Founation. refs
(Contract NGR-44-005-002)

A83-42035* Rensselaer Polytechnic Inst., Troy, N Y.
PREBIOTIC SYNTHESIS AND REACTIONS OF NUCLEOSIDES AND NUCLEOTIDES
J. P FERRIS, H YANAGAWA, and W J HAGAN, JR. (Rensselaer Polytechnic Institute, Troy, NY) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol. 3, no 9, 1983, p 61-68 refs
(Contract NSF CHE-79-24364; NGR-30-018-148)

The potential of diiminosuccinonitrile (DISN) as a prebiotic phosphorylating agent is studied This compound is formed readily by the oxidation of diaminomaleonitrile, a tetramer of HCN DISN is shown to produce the cyclization of 3'-adenosine monophosphate to adenosine 2',3'-cyclic phosphate in up to 40 percent yield. The DISN-mediated phosphorylation of uridine to uridine monophosphate is determined not to proceed efficiently in aqueous solution The reaction of DISN and BrCN with uridine-5'-phosphate and uridine is found to result in the formation of 2,2'-anhydronucleotides and 2,2'-anhydronucleosides,

respectively, and other reaction products resulting from an initial reaction at the 2' and 3'-hydroxyl groups. Homoionic montmorillonites were employed to study the clay mineral catalysis of the cyclization of adenosine-3'-phosphate. N B.

A83-42036
A NOVEL WAY FOR THE FORMATION OF ALPHA-AMINO ACIDS AND THEIR DERIVATIVES IN AN AQUEOUS MEDIUM
H YANAGAWA, Y MAKINO, K SATO, M NISHIZAWA, and F EGAMI (Mitsubishi-Kasei Institute of Life Sciences, Tokyo, Japan) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol. 3, no. 9, 1983, p 69-74 refs

The formation of alpha-amino acids and N-acylamino acids from alpha-oxo and ammonia in an aqueous medium was observed during a study of a possible mechanism for chemical evolution in the primeval sea Glyoxylic acid was found to react with ammonia to form N-oxalyglycine, which gave glycine in a 5-39 percent yield after hydrolysis with 6 N HCl Glyoxylic acid treated with methylamine yielded N-oxalylsarcosine, which could be hydrolyzed to sarcosine with 17-25 percent yield upon hydrolysis. Pyruvic acid and ammonia were found to react to give N-acetylalanine, which formed alanine in a 3-7 percent overall yield upon hydrolysis The pH optima in these reactions were found to be pH 3-4. The formation of other amino acids were also obtained using this procedure, including glutamic acid, phenylalanine, and serine N B

A83-42037* Houston Univ , Tex
CHEMICAL EVOLUTION AND THE ORIGIN OF LIFE
J ORO (Houston, University, Houston, TX) (COSPAR, Workshop and Topical Meeting on Life Sciences and Space Research, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol 3, no 9, 1983, p 77-94 refs
(Contract NGR-44-005-002)

A review is presented of recent advances made in the understanding of the formation of carbon compounds in the universe and the occurrence of processes of chemical evolution Topics discussed include the principle of evolutionary continuity, evolution as a fundamental principle of the physical universe, the nuclear synthesis of biogenic elements, organic cosmochemistry and interstellar molecules, the solar nebula and the solar system in chemical evolution, the giant planets and Titan in chemical evolution, and comets and their interaction with the earth Also examined are carbonaceous chondrites, environment of the primitive earth, energy sources available on the primitive earth, the synthesis of biochemical monomers and oligomers, the abiotic transcription of nucleotides, unified prebiotic and enzymatic mechanisms, phospholipids and membranes, and protobiological evolution. N B

A83-42157
NONENZYMATIC PHOSPHORYLATION OF ACETATE BY CARBAMYL PHOSPHATE - A MODEL REACTION FOR PREBIOTIC ACTIVATION OF CARBOXYL GROUPS
O SAYGIN (Berlin, Technische Universitaet, Berlin, West Germany) Origins of Life (ISSN 0302-1688), vol 13, March 1983, p. 43-48 refs

A83-42158* Hawaii Univ , Honolulu
PHOTOCHEMICAL SYNTHESIS OF BIOMOLECULES UNDER ANOXIC CONDITIONS
C. FOLSOME, A BRITTAIN, and M ZELKO (Hawaii, University, Honolulu, HI) Origins of Life (ISSN 0302-1688), vol. 13, March 1983, p. 49-55 Research supported by the University of Hawaii. refs
(Contract NGR-12-001-109)

The long-wavelength UV anoxic photosynthesis of uracil, various sugars (including deoxyribose and glycoaldehyde), amino acids, and other organic photoproducts is reported The reactions were conducted in a mixture of water, calcium carbonate, hydrazine, and formaldehyde which were subjected to 24 hr or 72 hr radiation. Product yields were greatest when the hydrazine/formaldehyde ratio was one, and when the reactant concentrations were low These data suggest that organic products can be formed in variety from those amounts of formaldehyde and hydazine precursors which are themselves formed under anoxic UV photochemical conditions. C D

A83-42160* George Washington Univ , Washington, D C
CHEMICAL EVOLUTION AND THE ORIGIN OF LIFE - BIBLIOGRAPHY SUPPLEMENT 1981
L G. PLEASANT (George Washington University, Medical Center, Washington, DC) and C. PONNAMPERUMA (Maryland, University, College Park, MD) Origins of Life (ISSN 0302-1688), vol 13, March 1983, p. 61-80 refs
(Contract NASW-3165, NGR-21-0002-317)

A83-42398* Salk Institute for Biological Studies, San Diego, Calif.
THIOL-CATALYZED FORMATION OF LACTATE AND GLYCERATE FROM GLYCERALDEHYDE
A. L WEBER (Salk Institute for Biological Studies, San Diego, CA) Journal of Molecular Evolution (ISSN 0022-2844), vol 19, July 1983, p. 237-243. refs
(Contract NSG-7627)

The rate of lactate formation from glyceraldehyde, catalyzed by N-acetyl-cysteine at ambient temperature in aqueous sodium phosphate (pH 7 0), is more rapid at higher sodium phosphate concentrations and remains essentially the same in the presence and absence of oxygen The dramatic increase in the rate of glycerate formation that is brought about by this thiol, N-acetylcysteine, is accompanied by commensurate decreases in the rates of glycolate and formate production It is suggested that the thiol-dependent formation of lactate and glycerate occurs by way of their respective thioesters Attention is given to the significance of these reactions in the context of molecular evolution O C

A83-42847* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif
PHOTOCHEMICAL REACTIONS OF WATER AND CARBON MONOXIDE IN EARTH'S PRIMITIVE ATMOSPHERE
A BAR-NUN (NASA, Ames Research Center, Extraterrestrial Research Div., Moffett Field, CA, Tel Aviv University, Tel Aviv, Israel) and S CHANG (NASA, Ames Research Center, Extraterrestrial Research Div , Moffett Field, CA) Journal of Geophysical Research (ISSN 0148-0227), vol 88, Aug 20, 1983, p 6662-6672 refs

The gas-phase photolysis of H2O at 1849 A in the presence of CO yields mainly CO2 and H2 and a variety of organic compounds, including C1-C3 hydrocarbons, alcohols, aldehydes, acetone, and acetic acid. The overall quantum yield for conversion of CO to organic compounds varies between 0.23 and 0.03 as a function of the CO abundance These results indicate that even if primitive earth's atmosphere initially contained no molecular hydrogen and contained carbon only in the form of CO or a mixture of CO and CO2, the prebiotic environment would have become enriched with a variety of organic compounds produced by photochemical processes Author

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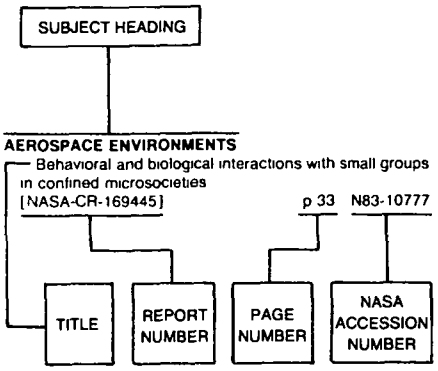

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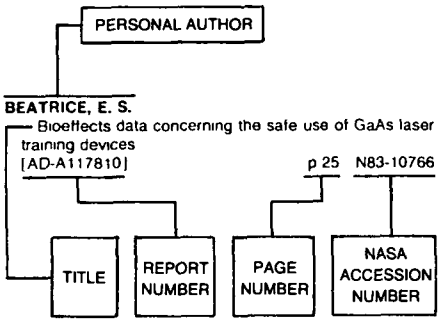

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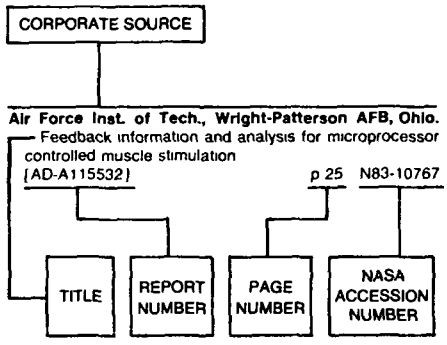

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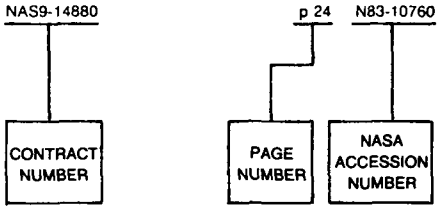

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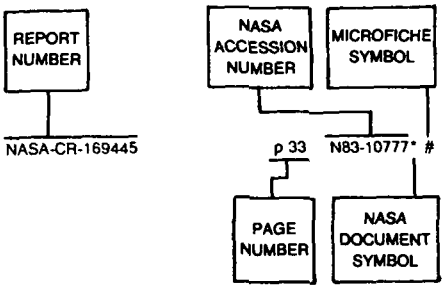

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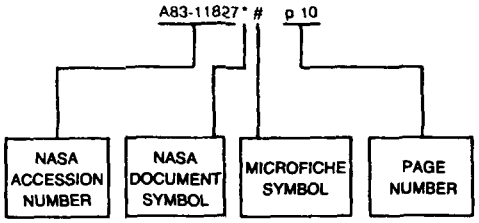

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