Molecular Characterization of Polymers: From Conventional Bulk Methods to Separation Procedures

by Dusan Berek

The **17th Bratislava International Conference on Macromolecules**, "Molecular Characterization of Polymers," was held 24–28 August 2003. The conference was jointly sponsored by the Macromolecular Division of IUPAC, the Federation of European Chemical Societies, the European Polymer Federation, the Slovak Chemical Society, and the Slovak Academy of Sciences' Polymer Institute.

The meeting attracted 71 participants from 27 countries. Overall, there were 38 oral presentations, complemented by over 40 posters, two open discussion sessions, and an IUPAC meeting on polymer round robin tests. Included were lectures of three generations of polymer scientists—from Ph.D. students who delivered their first talks at an international forum to Prof. H. Benoit (France), the "father" of the famous universal calibration for size exclusion chromatography.

Chromatographic methods and synthetic polymers dominated the conference program. Still, neutron scattering (J. Higgins, UK), mass spectrometric methods (L. Prokai, USA), temperature rising elution fractionation (TREF) and crystallization analysis fractionation (CRYSTAF) (S. de Goede, South Africa), ultracentrifugation (D. Hunkeler, Switzerland) and the monitoring of mechanical properties (M. Matsuo and S. Osaki, Japan) were discussed as well. Theoretical approaches to the solution of chromatographic problems were presented by G. J. Fleer (Netherlands), A. Skvortsov (Russia), T. Bleha and P. Cifra (Slovakia), M. Netopilik (Czech Republic), F. Dondi (Italy), and G. R. Meira (Argentina). Progress in the characterization of complex polymer systems, which exhibit more than one distribution in their molecular characteristics, was reviewed by P. Kratochvil (Czech Republic), P. Schoenmakers and A. van den Horst (Netherlands), A. Lederer (Germany), R. Tsiang (Taiwan), M. Strlic, and M. Zigon and E. Zagar (Slovenia). Innovative methods for separation and characterization of macromolecular substances were introduced by T. Chang (Korea), P. Jandera and S. Podzimek (Czech Republic), and R. Mendichi (Italy). Chromatographic instrumentation was discussed by D. Havlickova (Czech Republic), P. Kilz (Germany), and D. Heinzmann (UK). Studies of processes occurring part in the chromatographic columns were presented by C. Wandrey (Switzerland), S. Saunders and L. Creaser (UK), D. Berek (Slovakia), and T. Macko (Germany).

The scientific program was accompanied by a small exhibition of chromatographic equipment, materials, software and literature; representatives of three companies delivered the "Company Lectures."

Organized by Dusan Berek, the five-day event included a concert, as well as excursions to Devin castle at the confluence of the Danube and Moravia rivers, the Danube dam at Cunovo where participants could watch a water slalom competition, and to the Old Town of Bratislava.

For several young participants, especially for those from Central and East European countries, the conference provided their initial contact with the international scientific community. The 18th international conference in this series is planned for 2006.

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Medicinal Chemistry in Asia

by Tetsuo Nagano and Kazuya Kikuchi

The **AFMC International Medicinal Chemistry Symposium** (AIMECS) is a biannual international meeting of the Asian Federation for Medicinal Chemistry. The 5th AIMECS took place in Kyoto, Japan, 14–17 October 2003. Organized by the Asian Federation for Medicinal Chemistry (AFMC), the conference was managed by the Pharmaceutical Society of Japan's Division of Medicinal Chemistry, with the direction of an organizing committee, which compiled an up-to-date and attractive conference program. The event was co-sponsored by IUPAC and the Japanese Ministry of Health, Labour, and Welfare.

The term "medicinal chemistry," as used here, is very comprehensive, and includes the philosophy and technology related to drug discovery. Previous conferences were held in Tokyo, Japan (1995); Soeul, Korea (1997); Beijing, China (1999); and Brisbane, Australia (2001).

More than 650 participants from 24 nations attended the conference, which was held in th old capital of Japan during the beautiful autumn season. Through 6 plenary lectures, 37 invited lectures, and 243

poster presentations, attendees reported on and discussed the latest progress in sciences supporting drug discovery in. Highlighted lectures include the following:

Viruses and Killer T Cells, Peter C. Doherty, The University of Melbourne, Australia—Doherty's lecture was focused on the $CD8^+$ killer T cell, which is an essential component of the adaptive immune system. The $CD8^+$ T cell-mediated immunity targets to virus-producing cellular factors expressing virus-induced changes of self cell-surface gylcoproteins. Specific recognition operates via precisely configured T cell receptors that recognize non-self peptides bound in the tip of the class I MHC glycoproteins, which are very polymorphic. The $CD8^+$ killer T cell is a very effective molecular machine for finding and destroying abnormal cells. Doherty is trying to use the $CD8^+$ T cell mediated immune system proteins for preventative or therapeutic treatment.

Discovery and Development of Drugs on a Global Basis, Aoki Hatsuo, Fujisawa Pharmaceutical. Co., Ltd., Japan—Hatsuo discussed research and development activities at Fujisawa Pharmaceutical Co., Ltd. According to Hatsuo, the discovery and development of drugs requires far more time compared with other high-tech industrial products. Accordingly, the cost of drug development is quite high. To maximize the return on an investment, drug development requires well-organized and comprehensive management covering all the processes through discovery; pre-clinical and clinical developments; chemistry, manufacturing, and control; and even marketing planning. However, the speaker also emphasized that drug discovery and development processes are still highly dependent on the creativity and sometimes luck of the researchers involved.

The Chemistry of Drug Discovery: Short and Long Term Strategies, Robert W. Armstrong, Eli Lilly and Company, Indianapolis IN, USA—Armstrong focused on the short- and long-term approaches to small molecule drug discovery, utilizing practical technologies such as *in silico* evaluation and combinatorial chemistry. He discussed the use of chemogenetics in drug design and levels of target similarity, employing kinases as an example.

Mechanism of Intracellular Transport and Kinesin Superfamily Ptoreins (KIFs): Genes, Structure, Dynamics, Functions, and Diseases, Nobutaka Hirokawa, The University of Tokyo, Japan—Hirokawa talked about the mechanism of intracellular transports, focusing on kinesin superfamily proteins (KIFs), which were identified and characterized by his group. He showed many important functions of KIFs, such as neuronal survival, fundamental developmental events, and higher brain functions. In his research, Hirokawa actively used various technologies, including molecular cell biology, molecular genetics, biophysics, X-ray crystallography, and cryo-electron microscopy. He showed videos of some of these experiments.

Drug Delivery—What will be the Future?, Hans E. Junginger, Leiden University, Netherlands—As Junginger relayed in his lecture, most endogenous peptides are for the treatment of chronic diseases and are currently only administrated by repeated injection. The possibility to administer these drugs using alternative routes, especially the oral route, would strongly increase the safety of medication and additional patient compliance. In his lecture, the mucoadhesive delivery system (superporous hydrogel (SPH) and SPH composite (SPHC)), the chitosan derivative based delivery system, and the transdarmal delivery system (iontophoresis) were discussed. Novel delivery systems based on SPH and SPHC polymers were used to improve the intestinal absorption. Iontophoresis could enable direct control of the dose of drug for Parkinson's disease. This method can achieve optimal drug therapy (on-demand) with a minimum of toxic side effects.

Molecular Machines for Protein Degradation, Robert Huber, Max-Planck-Institut für Biochemie, Martinsried, Germany—The degradation of cytosolic protein is carried out predominantly by protease machines. Their proteolytic active sites are sequestered within the particles and located on the inner walls. The access of protein substrate is regulated by protease sub-complexes or protein domains. In his lecture, Huber described four protease machines (proteasome, HslV/HslU, tricorn and DegP) displaying different subunit structures.

The next AIMECS will be held in Korea in 2005.

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