

## Interleukin 2 After a Decade

**Interleukin 2.** KENDALL A. SMITH, Ed. Academic Press, San Diego, CA, 1988. xxii, 311 pp., illus. \$69.

A short ten years or so after the discovery of interleukin 2 (IL-2), a 311-page book on this one protein is an eloquent testament to how much has been learned and how exciting the prospects are. Non-immunologists who are alternately bemused and annoyed by the interleukin explosion may not feel that any one lymphokine deserves a book. But for those of us who feel increasingly oppressed by information overload, such a compendium of information can be a valuable resource.

IL-2 can claim many "firsts" among cytokines. It was the first lymphocyte growth factor to be identified, one of the first two (with IL-1) whose protein and DNA sequences were defined, and the first whose cellular receptor was identified.

The importance of IL-2 is firmly established. As the major autocrine growth factor for T lymphocytes in all species, it plays a central role in all T cell-dependent immune responses. The use of IL-2 to grow cloned T cells indefinitely in culture has allowed remarkable progress in our understanding of the specificities, functions, and receptors of these lymphocytes. The biology of IL-2 serves as the paradigm for immunologically active cytokines, and studies of other interleukins have followed approaches first applied to IL-2. More recently, IL-2 has moved into clinical practice as the mainstay of attempts to treat advanced cancers with tumoricidal lymphocytes.

This book is an attempt to survey the most important facts about IL-2 and to highlight the questions that remain to be resolved. The editor, Kendall Smith, is a pioneer in IL-2 work whose laboratory has contributed much to the elucidation of the structure and function of IL-2. The 12 chapters vary greatly in style, often according to the theme being discussed. For instance, Smith's introductory section is very much a personal view of the advances in IL-2 research, with a justifiable emphasis on the part played by his own laboratory. In contrast, chapters by Kat and Ciardelli *et al.* on the biochemical characteristics and genes for IL-2 are compendia of structural information.

The major deficiencies of the book are predictably most apparent when authors delve into subjects that are incompletely understood and are being actively investigated at present. For instance, Imboden and Weiss discuss the mechanisms by which antigenic stimulation of T cells leads to IL-2

production, but the link between antigen receptor-mediated stimulation and lymphokine gene transcription is not entirely clear at present. Perhaps the most interesting recent advances in the identification of transcriptional regulatory elements in the IL-2 gene locus and the responses of these elements to T cell stimulation have been reported since this chapter was written (see G. R. Crabtree, *Science* **243**, 355–61 [1989]). Chapters on transmembrane signaling by IL-2 and IL-2-induced gene expression in T cells are unsatisfying, because not much is known about the mechanisms of action of IL-2 (or other cytokines). As a result, attempts to review these areas lead to restatements of obvious problems and little consensus on a central message.

The last four chapters deal with clinically relevant issues and illustrate why IL-2 is the example par excellence of the link between immunological research and clinical medicine. However, these chapters also lack thorough discussions of the most recent advances. For instance, hybrid IL-2-diphtheria toxin proteins are mentioned only briefly, and the current status of tumor immunotherapy is not critically reviewed.

In summary, some chapters provide a valuable perspective and others seem inadequate or outdated. Nevertheless, an attempt to collect in one volume the laboratory and clinical results, established facts, and future research directions concerning one immunologically active cytokine is of some benefit, especially for non-specialists who wish to survey an exciting topic with a modest investment of time and effort.

ABUL K. ABBAS

Department of Pathology,  
Brigham and Women's Hospital,  
Boston, MA 02115

## Double Stars

**Critical Observations versus Physical Models for Close Binary Systems.** KAM-CHING LEUNG, Ed. Gordon and Breach, New York, 1988. xvi, 472 pp., illus. \$95. From a colloquium, Beijing, China, Nov. 1985.

A binary star system can be thought of as "close" if the evolution of either member is altered by the proximity of the other. This interaction generally begins during a phase of a star's lifetime during which it expands drastically, for instance after it leaves the hydrogen-burning main sequence to become a red giant. For typical stars containing 1 to 10 solar masses of material, "close" roughly translates to orbital periods of less than a thousand days or separations of less than a few hundred solar radii between the

two components. Since a large fraction of stars are in fact members of binary or higher-multiplicity systems, and since many binaries are close by the definition given above, we can expect that binary star interactions have affected many of the stars that we study.

At the same time as binary star interactions distort what we may think of as "normal" single-star evolution, they give us the opportunity to examine physical processes occurring inside stars that otherwise are unobservable. The synchronization of orbital and rotational periods through tidal dissipation, for example, obviously is not something that can be studied in isolated stars, yet empirical determination of the time scale for synchronization allows us to test our understanding of the structure of stellar envelopes and the efficiency of damping processes in them. The transfer of material from the surface of one star to its companion reveals successive layers of the star's interior, which in advanced stages of its life contain the products of nucleosynthetic reactions that occurred deep inside it.

This book on close binary systems is the result of the first in a series of joint meetings intended to establish closer ties between the Chinese astronomical community and the West. Eleven invited talks constitute slightly more than half its length. The remainder is shared among 30 contributed papers. There is a brief, incomplete index of topics and object names; there is no record of discussion after the talks. With respect to content the papers fall into three main categories. The largest set is concerned with the correct interpretation of observations, for example how well the models we fit to photometric time series conform to reality. The second set deals with our understanding of how membership in a binary system alters the evolution of a star, and the third and smallest set illustrates how studies of binary stars enhance our understanding of processes in all stars. Many of the shorter contributed papers report results of observations or modeling of specific binary systems, many of which have appeared in print elsewhere since the conference was held. The non-specialist will gain most from the invited papers, many of which are in the nature of reviews.

I found two papers especially interesting. In his discussion of an observational approach to close binary evolution, Leung emphasizes that we have not yet identified all the phases in the mass-transfer history of a close binary star but that new types of systems continue to be found that may be the "missing links." For example, a class of stars called "reverse Algols" may represent the phase of evolution just prior to the rapid

mass-transfer phase during which the mass ratio is reversed. This reverse Algol phase was thought to be so brief as to be unobservable; now there seem to be several examples of it, and a reassessment of the theoretically expected lifetime is in order. R. F. Webbink gives a careful assessment of the observational evidence concerning the "common envelope" evolution of binary stars, in which large amounts of mass and angular momentum are very rapidly lost from the system and the outcome is either a merger of the two stars or a binary system whose orbital period is much smaller than before. Webbink's main concern is to identify the initial conditions that lead to this evolutionary pathway for binary stars rather than to the more familiar quasiconservative pathway.

Nearly every paper in this book adheres closely to the spirit of the conference as indicated by the title. A clear sense of dissatisfaction with our present understanding of binary star evolution is conveyed, along with the expectation that a much improved understanding is likely to be achieved rather soon, not in the vague, distant future. The requests and suggestions at the ends of the papers for additional observations or calculations are, for a change, not merely a conventional sign-off but worthy of serious consideration.

RICHARD A. WADE  
Steward Observatory, University of Arizona,  
Tucson, AZ 85721

## Earth's Dimensions

**Geophysical Geodesy.** The Slow Deformations of the Earth. KURT LAMBECK. Clarendon (Oxford University Press), New York, 1988. xii, 718 pp., illus. \$135; paper, \$55.

Geodesy is the study of the shape of the earth and its gravity field. A number of classical books on geodesy have been published, including Bomford's *Geodesy*, now in its fourth edition, also published by Oxford. In this research monograph Kurt Lambeck presents a comprehensive treatment of classical geodesy including gravity and geoid anomalies, the earth's rotation, and the free oscillations of the earth. The presentations are highly mathematical and complete.

In recent years, space-based position measurements at the centimeter level have brought a renewed interest in geodesy. These observations have confirmed that the relative velocities between plates are the same on time scales of years and millions of years. They have also provided valuable data on the deformation adjacent to plate boundaries, for example in California. This book

gives an excellent analysis of the various systems used for position measurement such as lunar laser ranging and long-baseline interferometry. Some related material on the reasons for making the observations is given, but because of space limitations the discussion tends to be superficial. A detailed treatment of postglacial rebound is also given. This phenomenon places important constraints on the rheology of the mantle and remains a subject of some controversy.

This book is recommended to anyone interested in modern geodetic techniques and their relation to other problems in geophysics. It is clearly written and well produced.

DONALD L. TURCOTTE  
Department of Geological Sciences,  
Cornell University,  
Ithaca, NY 14853

## Books Received

**Adopting a Stream.** A Northwest Handbook. Steve Yates. Adopt-a-Stream Foundation, Everett, WA, 1989 (distributor, University of Washington Press, Seattle). xii, 116 pp., illus., + appendixes. Paper, \$9.95.

**Advanced MOS Device Physics.** Norman G. Einspruch and Gennady Sh. Gildenblat, Eds. Academic Press, San Diego, CA, 1988. xii, 370 pp., illus. \$85. VLSI Electronics Microstructure Science, vol. 18.

**Advanced Programming with Microsoft QuickC.** Keith Weiskamp. Academic Press, San Diego, CA, 1988. xiv, 548 pp., illus. \$49.95.

**Advances in Algorithms and Computational Techniques in Dynamic Systems Control.** Part 1. C. T. Leonides. Academic Press, San Diego, CA, 1988. x, 352 pp., illus. \$65. Control and Dynamic Systems, vol. 28.

**Advances in Chinese Computer Science.** Vol. 1. Xu Kongshe, Ed. World Scientific, Teaneck, NJ, 1988. viii, 224 pp. \$44.

**Allied Health Services.** Avoiding Crises. Institute of Medicine. National Academy Press, Washington, DC, 1989. xvi, 344 pp. Paper, \$35.

**American Space Law.** International and Domestic. Nathan C. Goldman. Iowa State University Press, Ames, 1988. xii, 374 pp. \$34.95.

**Analyses of Hazardous Substances in Biological Materials.** Methods for Biological Monitoring. Vol. 2. J. Angerer and K. H. Schaller, Eds. VCH, New York, 1988. xviii, 252 pp., illus. \$75.

**Analyzing Systems.** James A. Kowal. Prentice Hall, Englewood Cliffs, NJ, 1988. xxii, 441 pp., illus. \$54.

**Andrology and Human Reproduction.** A Negro-Vilar *et al.*, Eds. Raven, New York, 1989. xvi, 341 pp., illus. \$84. Sero Symposia Publications from Raven Press, vol. 47. From a symposium, Sao Paulo, Brazil, May 1987.

**Animal Growth Regulation.** Dennis R. Campion, Gary J. Hausman, and Roy J. Martin, Eds. Plenum, New York, 1989. xviii, 405 pp., illus. \$75.

**Anorexia Nervosa and Other Dyscontrol Syndromes.** E. L. Edelstein. Springer-Verlag, New York, 1989. viii, 117 pp. Paper, \$35.

**Antarctic Ocean and Resources Variability.** Dietrich Sahrhage, Ed. Springer-Verlag, New York, 1988. xii, 304 pp., illus. \$112.90. From a seminar, Paris, June 1987.

**Applied Artificial Intelligence in Japan.** Current Status, Key Research and Development Performers, Strategic Focus. Bruce Rubinger. Hemisphere, New York, 1988. xiv, 256 pp., illus. \$295.

**Auger Electron Spectroscopy.** C. L. Briant and R. P. Messmer, Eds. Academic Press, San Diego, CA, 1988. xii, 259 pp., illus. \$69.50. Treatise on Materials Science and Technology, vol. 30.

**Biological Monitoring for Pesticide Exposure.** Measurement, Estimation, and Risk Reduction. Rhoda G. M. Wang *et al.*, Eds. American Chemical Society, Washington, DC, 1989. x, 387 pp., illus. \$69.95. ACS

Symposium Series, vol. 382. From a symposium, New Orleans, LA, Aug.-Sept. 1987.

**Biologically Active Natural Products.** Potential Use in Agriculture. Horace G. Cutler, Ed. American Chemical Society, Washington, DC, 1988. xii, 483 pp., illus. \$89.95. ACS Symposium Series, vol. 380. From a symposium, New Orleans, LA, Aug.-Sept. 1987.

**The Biology and Utilization of Shrubs.** Cyrus M. McKell, Ed. Academic Press, San Diego, CA, 1988. xx, 656 pp., illus. \$125.

**Biophysical Chemistry of Dioxygen Reactions in Respiration and Photosynthesis.** Tore Vänngård, Ed. Published for the Royal Swedish Academy of Sciences by Cambridge University Press, New York, 1988. vi, 131 pp., illus. \$32.50. *Chemica Scripta*, vol. 28A. From a conference, Fiskebäckskil, Sweden, July 1987.

**Biotechnology for Crop Protection.** Paul A. Hedin, Julius J. Menn, and Robert M. Hollingworth, Eds. American Chemical Society, Washington, DC, 1988. xiv, 471 pp., illus. \$89.95. ACS Symposium Series, vol. 379. From a symposium, Snowbird, UT, June-July 1987.

**Chemical Carcinogenesis.** Models and Mechanisms. Francesco Feo *et al.*, Eds. Plenum, New York, 1988. xvi, 679 pp., illus. \$115. From a meeting, Alghero, Italy, Oct. 1987.

**Chemical Mediation of Coevolution.** Kevin C. Spencer, Ed. Academic Press, San Diego, CA, 1988. xvi, 609 pp., illus. \$95.

**Chemiluminescence.** Principles and Applications in Biology and Medicine. A. K. Campbell. VCH, New York, and Horwood, Chichester, U.K., 1988. 608 pp., illus. \$196. Ellis Horwood Health Science Series.

**Chemistry of the Natural Atmosphere.** Peter Warneck. Academic Press, San Diego, CA, 1988. xiv, 757 pp., illus. \$85. International Geophysics Series, vol. 41.

**The Coastal Zone.** Man's Response to Change. Kenneth Ruddle, William B. Morgan, and James R. Pfafflin, Eds. Harwood, New York, 1988. viii, 555 pp., illus. \$65. Reprinted from *Resource Management and Optimization*, vols. 4 and 5.

**Computer Psychotherapy Systems.** Theory and Research Foundations. Morton Wagman. Gordon and Breach, New York, 1988. xviii, 261 pp. \$68.

**Conformational Analysis of Medium-Sized Heterocycles.** Richard S. Glass, Ed. VCH, New York, 1988. xiv, 274 pp., illus. \$59.50.

**Continuous Decoupling Transformations for Linear Boundary Value Problems.** P. M. van Loon. Centrum voor Wiskunde en Informatica, Amsterdam, 1988. vi, 198 pp. Paper, Dfl 30.40. CWI Tract no. 52.

**Cooperative Research in U.S. Manufacturing.** Assessing Policy Initiatives and Corporate Strategies. Albert N. Link and Laura L. Bauer. Lexington (Heath), Lexington, MA, 1989. xviii, 110 pp. \$29.

**Corn and Corn Improvement.** G. F. Sprague and J. W. Dudley, Eds. American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, Madison, WI, 1988. xx, 986 pp., illus. \$66. Agronomy, vol. 18.

**Critical Stability Constants.** Vol. 6, Second Supplement. Robert M. Smith and Arthur E. Martell. Plenum, New York, 1989. xviii, 643 pp. \$95.

**Cytotoxic Effector Mechanisms.** E. R. Podack, Ed. Springer-Verlag, New York, 1989. viii, 120 pp., illus. \$59.50. Current Topics in Microbiology and Immunology, vol. 140.

**Detection, Diagnosis and Prognosis of Rotating Machinery to Improve Reliability, Maintainability, and Readiness through the Application of New and Innovative Techniques.** T. Robert Shives and Lawrence J. Mertaugh, Eds. Cambridge University Press, New York, 1988. x, 404 pp., illus. \$49.50. From a meeting, Patuxent River, MD, Oct. 1986.

**Did Darwin Get It Right?** Essays on Games, Sex and Evolution. John Maynard Smith. Chapman and Hall (Routledge, Chapman and Hall), New York, 1989. vi, 264 pp. \$22.95.

**Dietary Restriction and Aging.** David L. Snyder, Ed. Liss, New York, 1988. xvi, 335 pp., illus. \$68. Progress in Clinical and Biological Research, vol. 287. From a symposium, Notre Dame, IN, March 1988.

**Do-It-Yourself Astronomy.** Sydney G. Brewer. Edinburgh University Press, Edinburgh, 1988 U.S. distributor, Columbia University Press, New York. viii, 137 pp., illus. Paper, \$15.

**Dynamic Modeling in Behavioral Ecology.** Marc Mangel and Colin W. Clark. Princeton University Press, Princeton, NJ, 1989. xii, 308 pp. \$45; paper, \$15.95. Monographs in Behavior and Ecology.

**The Effects of Radiation on High-Technology Polymers.** Elsa Reichmanis and James H. O'Donnell, Eds. American Chemical Society, Washington, DC, 1989. viii, 272 pp., illus. \$54.95. ACS Symposium