Policy for Announcements in the FJ Calendar

We will consider for advertising in the FJ Calendar any open meeting of a biological topic occurring in any location worldwide. Please send your announcement to the Executive Editor, The FASEB Journal, FASEB, 9650 Rockville Pike, Bethesda, MD 20814, USA. Your announcement should be restricted to: date (include year), title and location of meeting, contact address (with name if appropriate). We will advertise only meetings taking place more than 5 months after the date of receipt of the announcement. Meetings, symposia, and workshops will be included up to 2 years in advance; international congresses will be included up to 3 years in advance.

[FJ] Indicates new entry.

MARCH 1988

5-10 10th International Cystic Fibrosis Congress, Sydney, Australia. Secretary, 10th International Cystic Fibrosis Congress, G.P.O. Box 2609, Sydney NSW, Australia 2001.

6-11 19th Annual Meeting of the American Society for Neurochemistry, Columbus, Ohio, USA. Lloyd Horrocks, Program Chairperson, The Ohio State Univ., 1645 Neil Ave., Columbus, OH 43210, USA.

6-12 Bone Marrow Transplantation: Current Controversies, Tamar- ron, Colorado, USA. UCLA Symposium, Molecular Biology Inst., Univ. of California, Los Angeles, CA 90024, USA.


8-10 The Global Impact of AIDS, London, UK. Conf. ZZ, EMAP Maclaren Exhibitions Ltd., P.O. Box 138, Token House, 79-81 High St., Croydon CR9 3SS, UK.


14-18 Receptor Binding Techniques in Biology and Medicine, The Catholic University of America, Washington, DC, USA. Dr. Roland M. Nardone, The Catholic Univ. of America, The Center for Advanced Training in Cell and Molecular Biology, Washington, DC 20064, USA.

14-24 Arachidonic Acid Metabolism in the Nervous System: Physiological and Pathological Significance, Hyatt Regency Hotel, Bethesda, Maryland, USA. Conference Dept., The New York Academy of Sciences, 2 E. 63rd St., New York, NY 10021, USA.

15-20 Assembly and Dynamics of the Cytomatrix, Maria Alm, Austria. Cosponsored by IUB. Dr. Gerhard Wiche, Inst. of Biochemistry, Univ. of Vienna, Wahringer Strasse 17, 1090 Vienna, Austria.

16-19 Leukemia: Molecular Alterations & Cellular Proliferation, Fourth National Symposium of Leukemia Society of America, Hotel Inter-Continental, New Orleans, Louisiana, USA. Ms. M Louise Toglia, National Coordinator/Medical Programs, Leukemia Society of America, Inc., 733 Third Ave., New York, NY 10017, USA.


MARCH 1988

19-21 Transfusion-Associated Infections & Immune Response, The Fairmont Hotel, San Francisco, California, USA. Sara Burke, Extended Programs in Medical Education, Room U-569, Univ. of California, San Francisco, CA 94143, USA.


21-25 Plasma Membrane Oxidoreductase in Control of Animal and Plant Growth, NATO Advance Research Workshop, Cordoba, Spain. Prof. F. L. Crane, Dept. of Biological Sciences, Purdue Univ., West Lafayette, IN 47907, USA.

27-31 37th Annual Scientific Session of the American College of Cardiology, Atlanta, Georgia, USA. American Coll. of Cardiology, Attn.: Meeting Services, 9111 Old Georgetown Rd., Bethesda, MD 20814, USA.


26 Mar. Molecular Genetics of Plant-Parasite Interaction, Steamboat Springs, Colorado, USA. UCLA Symposia, Molecular Biology Inst., Univ. of California, Los Angeles, CA 90024, USA.
MARCH 1988

26 Mar. The Molecular Basis of Plant Development, Steamboat Springs, Colorado, USA. UCLA Symposium, Molecular Biology Inst., Univ. of California, Los Angeles, CA 90024, USA.

29 Mar. International Conference on Excitatory Amino Acids '88, Manaus, Brazil. E. Calvalheiro, Lab. de Neurologia Experimental, Escola Paulista de Medicina, Rua Botucata, 862, CEP 04023, Sao Paulo, SP, Brazil.

MARCH 1988

FJ

APRIL 1988

7-8 Workshop on Electrofusion in Hybridoma Technology, Oslo, Norway. Electrofusion Workshop Secretariat, C/o Senter for Industri- forskning, P.O. Box 124, Blindern, 0314 Oslo, Norway.

10-15 Advanced Methods in Pharmacokinetics and Pharmacodynamics, San Francisco, California, USA. Univ. of California, Extended Programs in Medical Education, Rm. U-569, San Francisco, CA 94143, USA.

10-16 Stress-Induced Proteins, Keystone, Colorado, USA. UCLA Symposium, Molecular Biology Inst., Univ. of California, Los Angeles, CA 90024, USA.

10-16 Metal Ion Transport and Storage: Molecular Biology and Chemistry, Frisco, Colorado, USA. UCLA Symposium, Molecular Biology Inst., Univ. of California, Los Angeles, CA 90024, USA.

10-17 Molecular Biology of Stress, Keystone, Colorado, USA. UCLA Symposium, Molecular Biology Inst., Univ. of California, Los Angeles, CA 90024, USA.

11-13 Sickle Cell Disease—The State of the Art, Hyatt Regency Hotel, Bethesda, Maryland, USA. Conference Dept., The New York Academy of Sciences, 2 E. 63rd St., New York, NY 10021, USA.

11-13 BIOTECH RIA '88, Molecular Probes: Technology and Medical Applications, Congress Palace, Florence, Italy. Organizing Secretary, Fondazione Giovanni Lorenzini, Via Monte Napoleone, 23—20121 Milan, Italy.

11-15 Molecular Biology, London, UK. Histochemistry Unit, Royal Postgraduate Medical Sch., Hammersmith Hospital, Du Cane Rd., London W12 OHS, UK.


14-16 Arachidonic Acid Metabolism in the Nervous System: Physiological and Pathological Significance, Hyatt Regency Hotel, Bethesda, Maryland, USA. Conference Dept., The New York Academy of Sciences, 2 E. 63rd St., New York, NY 10021, USA.

17-23 Molecular and Cellular Mechanisms of Human Hypersensitivity and Autoimmunity, Keystone, Colorado, USA. UCLA Symposium, Molecular Biology Inst., Univ. of California, Los Angeles, CA 90024, USA.


18-22 Hybridization Histochemistry, London, UK. Histochemistry Unit, Dept. of Histopathology, Royal Postgraduate Medical Sch., Hammersmith Hospital, Du Cane Rd., London W12 OHS, UK.

19-22 Analytical 88, 11th International Exhibition, Munich, FRG. Münchner Messe und Ausstellungsgeellschaft mbH, ANALYTICAL 88, Postfach 121009, D-8000 Munich 12, FRG.

20-21 Mineral Homeostasis in the Elderly: A Conference to Identify Research Priorities, Duke University, Durham, North Carolina, USA. Dr. Connie Bales, Center for Aging, Box 3003, Duke Univ. Medical Center, Durham, NC 27710, USA.

22-24 Taipei Conference on Prostaglandin and Leukotriene Research, Taipei, Taiwan, R.O.C. Organizing Secretariat, Taipei Conference on PG and LT Research, Inst. of Biomedical Science, Academia Sinica, PO. Box 1-12, Nankong, Taipei, Taiwan, R.O.C.
23-30 Human Tumor Antigens and Specific Tumor Therapy, Keystone, Colorado, USA. UCLA Symposium, Molecular Biology Inst., Univ. of California, Los Angeles, CA 90024, USA.

23-30 Mechanisms of Action and Therapeutic Applications of Biologicals in Cancer and Immune Deficiency Disorders, Keystone, Colorado, USA. UCLA Symposium, Molecular Biology Inst., Univ. of California, Los Angeles, CA 90024, USA.

26-28 Infant Formula Conference II, The Radisson Francis Marion Hotel, Charleston, South Carolina, USA. Ms. Margaret Ridgell, AOAC, 1111 N. 19th St., Suite 210, Arlington, VA 22209, USA.


30 Apr. International Symposium on -1 May D. B. Dill's Milestones in Environmental Physiology, University of Nevada, Las Vegas, Nevada, USA. Dr. M. K. Yousef, Dept. of Biology, Univ. of Nevada, Las Vegas, NV 89154, USA.

23-30 May


5-6 Therapeutic Drugs and Drugs of Abuse Monitoring: Practice and Concepts, Boston University School of Medicine, Boston, Massachusetts, USA. Dept. of Continuing Medical Education, Boston Univ. Sch. of Medicine, 80 E. Concord St., Boston, MA 02118, USA.

5-13 Course on Tissue Culture in Neurobiology, University of Saskatchewan, Saskatoon, Saskatchewan, Canada. S. Fedoroff, Dept. of Anatomy, Univ. of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N 0W0.

8-12 79th American Oil Chemists' Society Annual Meeting, Phoenix Civic Plaza, Phoenix, Arizona, USA. Meetings Manager, American Oil Chemists' Society, P.O. Box 3489, Champaign, IL 61821, USA.

9-13 Endocrine Pathology, London, UK. Histochemistry Unit, Dept. of Histopathology, Royal Postgraduate Medical Sch., Hammersmith Hospital, Du Cane Rd., London W12 OHS, UK.

9-13 VIIIth International Washington Spring Symposium: Biomedical Advances in Aging '88: Molecular and Immunological Mechanisms, Intervention and Clinical Approaches to Treatment, Washington, DC, USA. Dr. Allan L. Goldberg, Dept. of Biochemistry, The George Washington Univ. Sch. of Medicine and Health Sciences, 2300 Eye St., NW, Washington, DC 20037, USA.

10-13 Galveston Chapter of the Society for Neuroscience Symposium: Neuroendocrine Modulation of Central Nervous System Function, Galveston, Texas, USA. Dr. J. M. Lakoski, Dept. of Pharmacology, J-51, Univ. of Texas Medical Sch., Galveston, TX 77550, USA.

11-13 Annual Meeting of the Association of Systematics Collections, Field Museum, Chicago, Illinois, USA. Dr. K. E. Hoagland, Association of Systematics Collections, 730 11th St., NW, 2nd Fl., Washington, DC 20001, USA.

12-13 Royal Australian Chemical Institute, Polymer Division, Symposium on Controlled Release: Science and Technology 1988, Victorian College of Pharmacy, Melbourne, Australia. Dr. R. C. Oppenheim, Victorian Coll. of Pharmacy Ltd., 381 Royal Parade, Parkville, Victoria 3052, Australia.

12-14 Cholesterol Metabolism, an international Symposium in memory of the 90th birthday of Rudolph Schoenheimer, New York University Medical Center, New York City, USA. Registration Office, NYU Post-Graduate Medical Sch., 550 First Ave., New York, NY 10016, USA.

16-20 In Vitro Autoradiographic Techniques, London, UK. Histochemistry Unit, Dept. of Histopathology, Royal Postgraduate Medical Sch., Hammersmith Hospital, Du Cane Rd., London W12 OHS, UK.

19-23 Advances in the Biology and Chemistry of N-Nitroso and Related Compounds, Omaha, Nebraska, USA. Ms. Terri Eastman, Epley Inst. for Research in Cancer, Univ. of Nebraska Medical Center, Omaha, NE 68105, USA.

20-22 1st International Congress on Mucopolysaccharidoses and Related Diseases, Radisson University Hotel, Minneapolis, Minnesota, USA. Continuing Medical Education, Univ. of Minnesota, Box 202 UMHC, 420 Delaware St. SE, Minneapolis, MN 55455, USA.

22-25 26th Annual Meeting of the Association for Gnotobiota, Pallas Suite Hotel, New Orleans, Louisiana, USA. Dr. James B. Henghan, LSU-Surgery, 1542 Tulane Ave., New Orleans, LA 70112, USA.

22-26 International Conference on Diet, Lipids and Cancer, Yulara Resort (via Ayers Rock), Northern Territory, Australia. Dr. John R. Sabine, Univ. of Adelaide, Waite Agricultural Research Inst., Glen Osmond, South Australia 5064, Australia.
MAY 1988

23-25 7th Stony Brook Symposium on Recent Advances in Intercellular Communication, Stony Brook, New York, USA. Biochemistry Dept., State Univ. of New York, Stony Brook, NY 11794, USA.

25-28 Seventy-Ninth Annual Meeting of the American Association for Cancer Research, New Orleans Convention Center, New Orleans, Louisiana, USA. Margaret Foti, Executive Director, AACR, Temple Univ. School of Medicine, West Bldg., Rm. 301, Broad and Tioga Sts., Philadelphia, PA 19140, USA.


26-27 Current Issues in Anatomic Pathology, San Francisco, California, USA. Office of Extended Programs in Medical Education, Rm. U-569, Univ. of California, San Francisco, CA 94143, USA.


26-29 Continuous Cell Lines as Substrates for Biologicals, National Clarion Hotel, Arlington, Virginia, USA. Cell Substrates Conference Registrar, Talley Management Group, Inc., 22 Euclid St., Woodbury, NJ 08096, USA.

26-31 Annual Meeting of American Association for the Advancement of Science, Boston, Massachusetts, USA. AAAS Meeting Officer, 101 Vermont Ave., 10th Fl., Washington, DC 20005, USA.

JUNE 1988

5-11 American Chemical Society, Toronto, Ontario, Canada. ACS Meetings Dept., 1155 16th St. NW, Washington, DC 20036, USA.

6-10 1988 Annual Scientific Meeting of Undersea and Hyperbaric Medical Society, Fairmont Hotel, New Orleans, Louisiana, USA. Ms. Jane Dunne, Undersea and Hyperbaric Medical Society, 9650 Rockville Pike, Bethesda, MD 20814, USA.


8-10 70th Annual Meeting of The Endocrine Society, New Orleans, Louisiana, USA. The Endocrine Society, 9650 Rockville Pike, Bethesda, MD 20814, USA.

9-11 International Symposium on Immunotoxins, Sheraton University Center, Durham, North Carolina, USA. Ms. Rosemary Bornes, c/o Dr. Arthur Frankel, Duke Univ. Medical Center, Box 3898, Durham, NC 27710, USA.

12-15 International Symposium on Alzheimer's Disease, Kuopio, Finland. Prof. Paavo Reikkinen, Dept. of Neurology, Univ. of Kuopio, SF-70211 Kuopio, Finland.

12-16 Immunology and Immunopathology of the Alimentary Canal, 11th International Convocation on Immunology, Hyatt Regency Hotel, Buffalo, New York, USA. Dr. James F. Mohn, Director, The Ernest Witebsky Center for Immunology, 235 Sherman Hall, State Univ. of New York at Buffalo, Buffalo, NY 14214, USA.


12-16 Hormones, Thermogenesis and Obesity, University of Wisconsin, Madison, Wisconsin, USA. Stenbock Symposium, Inst. for Enzyme Research, Univ. of Wisconsin, Madison, WI 53706, USA.

12-17 Yeast RNA: Transcription, Splicing, Translation, Replication and Transposition, FASEB Summer Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

13-16 Biological Membranes in Cancer Cells, Le Trevaselle Hotel, Torgiano, Perugia, Italy. New York Academy of Science Conference, Dr. A. Scarpa, Case Western Reserve Univ., Dept. of Physiology and Biophysics, Cleveland, OH 44106, USA.

15-18 Canadian Federation of Biological Societies (and Pharmacological Society of Canada, Canadian Society for Nutritional Sciences, and Society of Toxicology of Canada), Laval, Quebec, Canada. Robin Vander Kluet, 575 King Edward Ave., Ottawa, Ontario, Canada K1N 7N5.


15-19 8th Annual Symposium of the American Society for the Immunology of Reproduction, Portland, Maine, USA. Dr. Neal Rote, Foundation for Blood Research, Box 190, Route 1, Scarborough, ME 04074, USA.

18-29 NATO Advanced Study Institute on Vascular Endothelium: Receptors and Transduction Mechanisms, Porto Carras, Halkidiki, Greece. Dr. John D. Catravas, Dept. of Pharmacology and Toxicology, Medical Coll. of Georgia, Augusta, GA 30912, USA.
19–22 International Symposium: Basic and Clinical Approaches to Virus Chemotherapy, University of Helsinki, Helsinki, Finland. Secretariat, Antivirals-88, c/o Duodecim, Kalevantakatu 11 A SF-00100 Helsinki, Finland.

19–23 Molecular and Cellular Mechanisms of Antiarrhythmic Agents, Nashville, Tennessee, USA. Dr. Luc Hondeghem, Vanderbilt Univ., Cardiovascular Research Program, Rm. CC-2209 Medical Center N., Nashville, TN 37232, USA.

19–23 Bioelectromagnetics Society Annual Scientific Meeting, Westin Hotel, Stamford, Connecticut, USA. Dr. W. G. Wisecup, Executive Director, 120 W. Church St., Suite 4, Frederick, MD 21701, USA.

19–24 Retinoids, FASEB Summer Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

19–24 Canadian Society of Microbiologists, Windsor, Ontario, Canada. Dr. H. Fackrell, Dept. of Biology, Univ. of Windsor, Windsor, Ontario, Canada N9B 3P4.

20–22 Northeast Regional Section Meeting of the Association of Official Analytical Chemists, Lowell University, Lowell, Massachusetts, USA. Edmond Bareta or Jim Fitzgerald, FDA, Winchester Engineering and Analytical Center, 109 Holton St., Winchester, MA 01890, USA.

20–22 Midwest Regional Section Meeting of the Association of Official Analytical Chemists, Holiday Inn West, Columbia, Missouri, USA. George Rottinghaus, Univ. of Missouri, Columbia, Veterinary Medicine Diagnostic Laboratory, Columbia, MO 65211, USA.

23–24 Pacific Northwest Regional Section Meeting of Association of Official Analytical Chemists, Evergreen College, Olympia, Washington, USA. Mike Wehr, Oregon Dept. of Agriculture, 635 Capitol St., NE, Salem, OR 97310, USA.

26 Jun. Fourth Congress of the International Society for Biomedical Research on Alcoholism, Kyoto, Japan. Dr. Kinya Kuriyama, Chairperson, Dept. of Pharmacology, Kyoto Prefectural Univ. of Medicine, Kawaramachi-Hirokoji, Kamikyo-ku, Kyoto 602, Japan.


26 Jun. Smooth Muscle, FASEB Summer -1 Jul. Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

26 Jun. Neuroimmunomodulation, FASEB Summer -1 Jul. Research Conferences, Copper Mountain, Colorado, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.


28–30 50th Annual Scientific Meeting of the Committee on Problems of Drug Dependence, Sea Crest Resort and Conference Center, North Falmouth, Massachusetts, USA. Dr. Martin W. Adler, Executive Secretary, CPDD, Dept. of Pharmacology, Temple Univ. Sch. of Medicine, 3420 N. Broad St., Philadelphia, PA 19140, USA.

3–8 Autoimmunity, FASEB Summer Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.


3–8 Sixth International Conference on Biochemistry and Biophysics of Cytochrome P-450, Vienna, Austria. Cosponsored by IUB. Dr. Inge Schuster, Sandoz Research Inst., Brunnerstrasse 59, A-1235 Vienna, Austria.

4–8 18th Lindbergh-Lang Conference: Aspartic Proteinases: Biochemical, Physiological and Clinical Aspects of Pepsin, Chymosin, Renin and Related Proteinases, Elsinore, Denmark. Prof. Bent Foltmann, Inst. of Biochemical Genetics, Univ. of Copenhagen, Oster Farimagsgade 2A, 4., 1353 Copenhagen K., Denmark.

5–9 Conference on Bioreactive Chromatography and Biotechnology, Mogilany, Poland. Satellite to IUB Congress in Prague. Dr. Grazyna Muszynska, Inst. of Biochemistry and Biophysics, Polish Academy of Sciences, Warsaw, Poland.


6–8 Biotechnological Aspects of Protein Production by Cultured Cells, Prague, Czechoslovakia. Satellite symposium of 14th IUB Congress. Dr. F. Franek, Inst. of Molecular Genetics, Videnska 1083 CS-142 20 Praha 4, Czechoslovakia.

6–9 Local Changes in DNA Structure and Their Biological Implications, Brno, Czechoslovakia. Satellite Meeting of the IUB. 14th International Congress of Biochemistry, 166 50 Prague 6, Czechoslovakia.

JUNE 1988

JUNE 1988

JULY 1988
10-15 14th International Congress of Biochemistry, Prague, Czechoslovakia. Sponsored by IUB. 14th International Congress of Biochemistry, 166 50 Prague 6, Czechoslovakia.

10-15 Phospholipases, FASEB Summer Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

10-15 Regulation of Gene Expression in Higher Animals in Response to Hormones and Nutritional Substrates, FASEB Summer Research Conferences, Copper Mountain, Colorado, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.


11-15 CRYO 88—25th Annual Meeting of the Society for Cryobiology, Aachen, FRG. Dr. Christoph Körber, Helmholtz-Inst. für Biomedizinische Technik, Pauwelstr., D-5100 Aachen, FRG.

11-16 Design and Analysis of Scientific Experiments, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA. Director of the Summer Session, Room E19-356, Massachusetts Inst. of Technology, Cambridge, MA 02139, USA.


17-23 8th International Congress of Endocrinology, Kyoto, Japan. The Secretary, 8th International Congress of Endocrinology, Travel Planners-Kyoto Congress, Suite 150, GPM Bldg., San Antonio, TX 78216, USA.

18-20 Biotechnological Aspects of Protein Production by Cultured Cells, Prague, Czechoslovakia, Satellite Meeting of the IUB. 14th International Congress of Biochemistry, 166 50 Prague 6, Czechoslovakia.

18-20 21st Century Prospects of Biotechnology in Agriculture and Environment, Slusovice, Czechoslovakia, Satellite Meeting of the IUB. 14th International Congress of Biochemistry, 166 50 Prague 6, Czechoslovakia.

18-20 10th Symposium on Biology, Biochemistry and Clinical Biochemistry of Lectins, Prague, Czechoslovakia, Satellite Meeting of the IUB. 14th International Congress of Biochemistry, 166 50 Prague 6, Czechoslovakia.

18-20 Cellular Pathology and Pharmacology, Budapest, Hungary. Dr. Jozsef Gaal, CHINOIN Pharmaceutical and Chemical Works Ltd., Research Centre, PO. Box 110, 1325 Budapest, Hungary.

18-20 Fourth International Symposium on Selenium in Biology and Medicine, University of Tubingen, Tubingen, FRG. Dr. Albrecht Wendel, Physiologisch-Chemisches Inst. der Univ., Hoppe-Seyler-Str. 4, D-7400 Tubingen, FRG.


17-22 Molecular Biology and Infectious Diseases, FASEB Summer Research Conferences, Copper Mountain, Colorado, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

17-22 Annual General Meeting, Nottingham, UK. Meetings Officer, The Biochemical Society, 7 Warwick Court, London WC1R 5DP, UK.

20-23 International Symposium on Tachykinins, University of Graz, Graz, Austria. Dr. F. Lembeck, Tachykinin Symposium, Dept. of Pharmacology, University of Graz, Universitätsplatz 4, A-8010 Graz, Austria.

24-27 The Mammalian Myocardium—Biochemical and Physiological Mechanisms Underlying the Heartbeat, Leeds, UK. Dr. C. Orchard, Dept. of Physiology, The Worsley Medical and Dental Bldg., The University, Leeds LS2 9NQ, UK.

24-28 Sixth International Symposium on Calcium-Binding Proteins In Health and Disease, Hotel Nagoya Castle, Nagoya, Japan. Satellite symposium of 8th International Congress of Endocrinology. Secretariat, Sixth International Symposium on Calcium-Binding Proteins in Health and Disease, Dept. of Pharmacology, Nagoya Univ. Sch. of Medicine, Showaku, Nagoya 466, Japan.

24-29 Structure and Function of Cell Membranes, FASEB Summer Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

24-29 Trichothecene, Blue-green Algal, and Marine Toxins: Mechanisms, Detection, and Therapy, FASEB Summer Research Conferences, Copper Mountain, Colorado, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

25-29 1st World Congress of World Association of Veterinary Microbiologists, Immunologists and Specialists of Infectious Disease, Lyon, France. Prof. Y. Richard, WAVMI, École National Vétérinaire de Lyon, Route de Sain Bel, Marcy-l’Étoile, 69260 Charbonnieres-les-Bains, France.

25-30 International Symposium on Mucus and Related Topics, Society for Experimental Biology, University of Manchester, UK. Dr. E. Chantler, Dept. of Obstetrics and Gynaecology, Univ. Hospital of South Manchester, Nell Ln., West Didsbury, Manchester M20 8LR, UK.
**JULY 1988**

31 Jul. Cellular and Molecular Genetics, FASEB Summer Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

**AUGUST 1988**

8-11 XIIth Meeting of the International Society of Oxygen Transport to Tissue, Ottawa, Canada. K. Rakusan, Dept. of Physiology, Sch. of Medicine, Univ. of Ottawa, 451 Smyth Rd., Ottawa, Ontario, Canada K1H 8M5.

8-12 Fifth International Magnesium Symposium, Kyoto International Conference Hall, Kyoto, Japan. Professor Yoshinori Itoikawa, Dept. of Hygiene, Faculty of Medicine, Kyoto Univ., Kyoto 606, Japan.

14-19 International Conference on Human Laetation, Melbourne University, Melbourne, Australia. Nursing Mothers' Association of Australia, P.O. Box 231, Nunawading, Victoria 3131, Australia.

14-19 Electrophysiological Mechanisms of Propagation and Activation of Cardiac Muscle and Smooth Muscle, FASEB Summer Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

14-19 Neoplastic Transformation of Liver Cells, FASEB Summer Research Conferences, Copper Mountain, Colorado, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.


15-19 General Principles in Toxicology and Toxicologic Pathology, Parker House Hotel, Boston, Massachusetts, USA. Dept. of Continuity, Mutari. Development, Boston Univ. Sch. of Medicine, 80 E. Concord St., Boston, MA 02118, USA.

16-19 Groupe Polyphenols International Conference, Ontario, Canada. Dr. T. Fuleki, Horticultural Research Inst. of Ontario, Vineland Station, Ontario, Canada L0R 2E0.

17-20 29th Annual Drosophila Conference, University of Toronto, Toronto, Ontario, Canada. Dr. Ellen Larsen, Dept. of Zoology, Univ. of Toronto, 25 Harbord St., Toronto, Ontario, Canada M5S 1A1.


21-24 Bioavailability 88—Chemical and Biological Aspects of Nutrient Availability, University of East Anglia, Norwich, UK. G. R. Fenwick, AFRC Inst. of Food Research, Norwich Lab., Colney Ln., Norwich, Norfolk NR4 7UA, UK.

21-25 Key Issues in Mental Retardation Research, 8th International Congress of the International Association for the Scientific Study of Mental Deficiency, Dublin, Ireland. Mr. John O'Gorman, Congress Chairperson, 8th World Congress, IASSMD, 12, Pembroke Park, Dublin 4, Ireland; or Dr. Michael Mulcahy, Stewarts Hospital, Palmerstown, Dublin 20, Ireland.

22-26 The Pharmacology of Thermoregulation, 7th International Symposium, The University of Odense, Odense, Denmark. Dr. Peter Lomax, Dept. of Pharmacology, UCLA Sch. of Medicine, Los Angeles, CA 90024, USA.
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<th>Date</th>
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<td>AUGUST 1988</td>
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<td>23–26</td>
<td>7th International Symposium on Mass Spectrometry in Life Sciences, State University of Ghent, Ghent, Belgium. Dr. A. De Leenheer, Lab. voor Medische Biochemie en voor Klinische Analyse, Harelbeekstraat 72, B-9000 Ghent, Belgium.</td>
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<td>29 Aug.</td>
<td>102nd Annual International Meeting and Exposition of Association of Official Analytical Chemists, The Breakers, Palm Beach, Florida, USA. Ms. Margaret Ridgell, AOAC, 1111 N. 19th St., Suite 210, Arlington, VA 22209, USA.</td>
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<td>31 Aug.</td>
<td>Symposium on Cholecystokinin, CCK '88, Robinson College, Cambridge, UK. Prof. G. J. Dockray, Physiological Laboratory, Univ. of Liverpool, Brownlow Hill, PO. Box 147, Liverpool L69 3BX, UK.</td>
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<tr>
<td>29 Aug.</td>
<td>102nd Annual International Meeting and Exhibition, Association of Official Analytical Chemists, Palm Beach, Florida, USA. Margaret Ridgell, AOAC, 1111 N. 19th St., Suite 210, Arlington, VA 22209, USA.</td>
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<td>SEPTEMBER 1988</td>
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<td>3–7</td>
<td>Advances in Liquid Chromatography: 8th Annual American-Eastern European Colloquium and Symposium on Liquid Chromatography, Szeged, Hungary. Dr. Huba Kalázs, Dept. of Pharmacology, Semmelweis Univ. of Medicine, Budapest VIII. Nagyvárad tör 4, Hungary 1089.</td>
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<td>4–8</td>
<td>8th International Congress of Eye Research, Hyatt Regency Hotel, San Francisco, California, USA. 8th ICER Secretariat, Stanford Univ. Medical Center, Rm. S-030, Stanford, CA 94305, USA.</td>
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<td>4–9</td>
<td>XVIII World's Poultry Congress and Exhibition, Nagoya, Japan. XVIII World's Poultry Congress and Exhibition, c/o International Congress Service, Kasho Bldg., 2-14-9 Nihombashi Chuo-Ku, Tokyo, Japan 103.</td>
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<td>7–9</td>
<td>Prenatal Abuse of Licit and Illicit Drugs, Hyatt Regency Hotel, Bethesda, Maryland, USA. Conference Dept., The New York Academy of Sciences, 2 E. 63rd St., New York, NY 10021, USA.</td>
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<td>11–17</td>
<td>Thermodynamics Applied to Biological Systems, Santa Margherita Ligure, Italy. Cosponsored by IUB. Prof. Giovanni Rialdi, Centro Studi Chimico Fisico Macromolecole CNR, Corso Europa 30, 16192 Genova, Italy.</td>
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<td>12–13</td>
<td>2nd International Symposium on Lipid Metabolism in the Normoxic and Ischemic Heart, Maastricht, The Netherlands. Dr. G. J. van der Vusse, Dept. of Physiology, Univ. of Limburg, PO. Box 616, 6200 MD Maastricht, The Netherlands.</td>
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<td>13–15</td>
<td>International Conference on Computers in Clinical Medicine-Medical Informatics 88, Nottingham, UK. Conference Division, British Medical Informatics Society, 87 Gower St., London WC1E 6AA, UK.</td>
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<tr>
<td>13–16</td>
<td>Fourth International Conference of the International Organization of Psychophysiology, Prague, Czechoslovakia. Prof. Tomas Radil, Czechoslovak Academy of Sciences, Inst. of Physiology, 142 20 Praha 4-KRC Videnska 1083, Czechoslovakia.</td>
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<td>13–17</td>
<td>Ninth European Immunology Meeting, Rome, Italy. Organizing Secretariat, MGA Via P. Cossa, 41 00193, Rome, Italy.</td>
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<td>14–16</td>
<td>Meeting of the British Electrophoresis Society, Glasgow, Scotland. Dr. J. A. Beeley, Oral Biology Group, Glasgow Dental Hospital and School, 378 Sauchiehall St., Glasgow, UK.</td>
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<td>17–18</td>
<td>Nutrition in the Pathogenesis and Treatment of Organ Failure, Clarion Hotel, New Orleans, Louisiana, USA. ASCN Postgraduate Course, 9650 Rockville Pike, Bethesda, MD 20814, USA.</td>
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<td>19–22</td>
<td>29th International Conference on the Biochemistry of Lipids, Tokyo, Japan. Prof. Y. Seyama, Dept. of Physiological Chemistry and Nutrition, Faculty of Medicine, Univ. of Tokyo, Bunkyo-ku, Tokyo 113, Japan.</td>
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<td>21–23</td>
<td>Galway Meeting, University College, Galway, Ireland. Meetings Officer, The Biochemical Society, 7 Warwick Court, London WC1R 5DP, UK.</td>
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<tr>
<td>25–30</td>
<td>American Chemical Society, Los Angeles, California, USA. ACS Meetings Dept., 1155 16th St. NW, Washington, DC 20036, USA.</td>
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<td>26–29</td>
<td>11th International CODATA Conference, Karlsruhe Congress and Exhibition Centre, Karlsruhe, FRG. DEHEMA, Am. CODATA Conference, PO. Box 97 01 46, D-6000 Frankfurt/M.97, FRG.</td>
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### 27-29 SEPTMBER 1988

### OCTOBER 1988

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### NOVEMBER 1988

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### DECEMBER 1988

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<tr>
<td>19-21</td>
<td>London Meeting of The Biochemical Society, Royal Free Hospital of Medicine, London, UK. Meetings Officer, The Biochemical Society, 7 Warwick Court, London, WCIR 5DP, UK.</td>
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### JANUARY 1989

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<tr>
<td>5-6</td>
<td>Society for General Microbiology Irish Branch Meeting, Maynooth College, Dublin, Ireland. Dr. C. S. Dow, Dept. of Biological Sciences, Univ. of Warwick, Coventry, CV4 7AL, UK.</td>
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### FEBRUARY 1989

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<td>5-9</td>
<td>Royal Australian Chemical Institute Symposium on Advances in Biomedical Polymers, Observation City, Perth, Western Australia. The Secretary, W. A. Polymer Group, Royal Australian Chemical Inst., 125 Hay St., Perth WA 6000, Australia.</td>
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### MARCH 1989

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<tr>
<td>19-24</td>
<td>73rd Annual Meeting of the Federation of American Societies for Experimental Biology, New Orleans, Louisiana, USA. FASEB Office of Scientific Meetings, 9650 Rockville Pike, Bethesda, MD 20814, USA.</td>
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**APRIL 1989**

4-7 Society for General Microbiology Easter Meeting, University of Cambridge, UK. Dr. C. S. Dow, Dept. of Biological Sciences, Univ. of Warwick, Coventry CV4 7AL, UK.

9-14 American Chemical Society, Dallas, Texas, USA. ACS Meetings Dept., 1155 16th St. NW, Washington, DC 20036, USA.

12-14 Aberystwyth Meeting of The Biochemical Society, Aberystwyth, Wales. Meetings Officer, The Biochemical Society, 7 Warwick Court, London WC1R 5DP, UK.

20-22 International Atherosclerosis Congress, Hofburg, Vienna, Austria. Dr. G. M. Kostner, Medical Biochemistry, Univ. of Graz, Harrachgasse 21, A-8010 Graz, Austria.

**MAY 1989**

24-27 Eightieth Annual Meeting of the American Association for Cancer Research, San Francisco, California, USA. Margaret Foti, Executive Director, AACR, Temple Univ. School of Medicine, West Bldg., Rm. 301, Broad and Tioga Sts., Philadelphia, PA 19140, USA.

**JULY 1989**

23-27 International Symposium on Developmental Neuroscience, Beijing, China. Dr. Ramon Lim, Division of Neurochemistry and Neurobiology, Dept. of Neurology, Univ. of Iowa, Iowa City, IA 52242, USA.

30 Jul. 7th International Congress of Immunology, Berlin, FRG. DER Congress Organization, Augsburger Str. 27, D-1000 Berlin 30, FRG.

**AUGUST 1989**

7-11 Conference on the Biochemistry and Genetics of Ribosomes, East Glacier, Montana, USA. Professor Walter E. Hill, Dept. of Chemistry, Univ. of Montana, Missoula, MT 59812, USA.


**SEPTEMBER 1989**

7-9 10th European Section Meeting, International Society for Heart Research, Rotterdam, The Netherlands. Dr. J. W. de Jong, Cardiochemical Lab./Thoraxcenter, Erasmus Univ. Rotterdam, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands.

10-15 American Chemical Society, Miami Beach, Florida, USA. ACS Meetings Dept., 1155 16th St. NW, Washington, DC 20036, USA.

19-22 Cork Meeting of The Biochemical Society, University College, Cork, Ireland. Meetings Officer, The Biochemical Society, 7 Warwick Court, London WC1R 5DP, UK.

**OCTOBER 1989**


**NOVEMBER 1989**

7-11 Drugs Affecting Lipid Metabolism, Houston, Texas, USA. Dr. Louis C. Smith, Baylor Coll. of Medicine, The Methodist Hospital, Dept. of Medicine, Mail Station A-601, 6565 Fannin St., Houston, TX 77030, USA.

8-10 Tenth International Symposium on Drugs Affecting Lipid Metabolism, Westin Galleria Hotel, Houston, Texas, USA. Ms. Lynne K. Tiras, International Meeting Managers, Inc., 4530 Post Oak Pl., Suite 248, Houston, TX 77027, USA.

11-15 40th Annual Meeting of The American Society of Human Genetics, Baltimore, Maryland, USA. Ms. Peggy Gardiner, Meeting Manager, ASHG Administrative Office, 9650 Rockville Pike, Bethesda, MD 20814, USA.

**DECEMBER 1989**

18-20 London Meeting of The Biochemical Society, St. Bartholomew's Hospital Medical School, London, UK. Meetings Officer, The Biochemical Society, 7 Warwick Court, London WC1R 5DP, UK.

**APRIL 1990**

1-6 74th Annual Meeting of the Federation of American Societies for Experimental Biology, Washington, DC, USA. FASEB Office of Scientific Meetings, 9650 Rockville Pike, Bethesda, MD 20814, USA.
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<tr>
<th>APRIL 1990</th>
<th>DECEMBER 1990</th>
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<tr>
<td>22–27 American Chemical Society, Boston, Massachusetts, USA. ACS Meetings Dept., 1155 16th St. NW, Washington, DC 20036, USA.</td>
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<td>MAY 1990</td>
<td>APRIL 1991</td>
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<tr>
<td>23–26 Eighty-First Annual Meeting of the American Association for Cancer Research, Washington, DC, USA. Margaret Foti, Executive Director, AACR, Temple Univ. School of Medicine, West Bldg., Rm. 301, Broad and Tioga Sts., Philadelphia, PA 19140, USA.</td>
<td>10–12 Reading Meeting of The Biochemical Society, Reading, UK. Meetings Officer, The Biochemical Society, 7 Warwick Court, London WC1R 5DP, UK.</td>
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<td>OCTOBER 1990</td>
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<td>28 Oct. Annual Meeting of the Society for Neuroscience, St. Louis, Missouri, USA. Nancy Beang, Executive Director, Society for Neuroscience, 11 Dupont Circle, Suite 500, Washington, DC 20036, USA.</td>
<td>15–18 Eighty-Second Annual Meeting of the American Association for Cancer Research, Houston, Texas, USA. Margaret Foti, Executive Director, AACR, Temple Univ. School of Medicine, West Bldg., Rm. 301, Broad and Tioga Sts., Philadelphia, PA 19140, USA.</td>
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<td>JULY 1991</td>
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<td>16–19 Manchester Meeting of The Biochemical Society, Manchester, UK. Meetings Officer, The Biochemical Society, 7 Warwick Court, London WC1R 5DP, UK.</td>
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Horizons in Biochemistry and Biophysics, Volume 8, Human Genes and Diseases, edited by F. Blasi, John Wiley & Sons, Ltd., Chichester, United Kingdom, 1986, 676 pages, $84.95, ISBN 0-471-91674-4

Reviewed by Karl H. Muench, Division of Genetic Medicine, University of Miami School of Medicine, Miami, Florida 33101, USA

This book, volume 8 in the Horizons in Biochemistry and Biophysics series, has the appearance of a published symposium, but the imagined symposium is nowhere mentioned, and the 16 chapters must then be the product of invitations for material under the broad heading of Human Genes and Diseases. The result is necessarily selective, but the basis for the selection is not entirely clear. Authorship is international, with seven chapters from the United States, four from Italy, two from the United Kingdom, and one each from Japan, France, and Italy–United States. The book is divided roughly into two sections, the X chromosome and the autosomes, with chapters giving the results of the new genetic approaches, made possible by restriction fragment polymorphisms, to such genetic problems as Lesch-Nyhan disease, thalassemias, familial hypercholesterolemia, and cancer. There are no chapters on Duchenne muscular dystrophy, chronic granulomatous disease, Huntington disease, polycystic renal disease, or retinoblastoma, to name some human diseases whose genes are currently submitting to the same techniques to give linkage and mapping information and, ultimately, reverse genetics. The preface promises a comprehensive introduction in each chapter to facilitate understanding of the subsequent content, some of which is comprehensive review and some of which is data from the authors' own laboratories. Unavoidably, such introductions may be too elementary for researchers in human molecular genetics, too complex for students, and repetitive for either. In particular, the introductions to the chapters concerning the X chromosome are repetitive. Cross-references to other chapters are infrequent.

Produced by photo-offset for rapid publication and distribution, the volume pays the inevitable penalty in format, with variations in the typescript including typeface, single and double spacing, and presence or absence of a justified right margin. The editing is inexact, and the method of reproduction reveals other variations in style. For example, chapter 1, "Towards a complete linkage map of the human X chromosome," occupies 27 pages of text but requires 32 pages for 135 listed references, each alphabetically by first author. Citations of 135 references by author's name occupy significant space in the 27 pages. In contrast, chapter 2 omits titles of references and lists 90, numerically instead of alphabetically, in 7 pages. Typographical errors vary from chapter to chapter but are frequent, and line divisions are sometimes glaring, such as the placement of \(7 \times 10^7\) at the end of one line and the rest of the exponent 5 at the start of the next.

Indexing is unreliable. For example, on page 14 OTC appears with no definition and is unlisted in the index, which does, however, reveal that OTC is ornithine transcarbamylase, which is discussed on page 100. RFLP is defined on pages 4 and 322, both indexed, and again on page 141, not indexed.

In spite of these distracting or annoying imperfections, I found the informational content to be consistently interesting and authoritative. In my opinion the chapters on hypoxanthine phosphoribosyl transferase, metallothionein, \(\beta\)-globin disorders, hyperlipidemia, human collagens, and cellular oncogenes were particularly good, and all chapters have value as reviews of progress until 1986 in this field for which published research becomes instant history. The book will be of interest to students of human molecular genetics and should be made available as a library resource if not as a personal acquisition.

Effective Animal Care and Use Committees, edited by F. Barbara Orlans, Richard C. Simmonds, and W. Jean Dodds. Scientists Center for Animal Welfare, Bethesda, Maryland, 1987, 178 pages, $45.00, ISSN 023-6764

Reviewed by W. R. Klemm, Department of Veterinary Anatomy, Texas A&M University, College Station, Texas 77843, USA

This book is a special issue of Laboratory animal science, derived from regional workshops held in cooperation with five universities. The book's purpose is to describe effective institutional practices for operating animal care and use committees (ACUCs). The book lists 18 consensus recommendations (p. 11) endorsed by the Scientists Center for Animal Welfare.

The book is timely; the vast majority of biomedical researchers in the United States have recently been directly affected by the practices of their institutional ACUCs. Of the approximately 1000 U.S. animal research institutions, about 700 receive some federal funding and are thus required to operate ACUCs. Although the emphasis here is on university environments, there are chapters dealing with ACUCs in other types of institutions (industry, drug companies, small research centers). Small institutions have special problems in meeting the requirements of the Animal Welfare Act, but possible remedies are suggested (p. 125). All biomedical scientists would benefit from reading the book, and it should be considered must reading for every member of an institutional ACUC.

I review this book from the perspective of an active researcher, a perspective that is reasonably represented in the collection of 51 essays in the book. These essays, as could be expected, are laced with numerous opinions, most of which hold the premise that research with animals is necessary, but that the animals should be treated humanely. These essays range from advocacy of a middle ground to what I would call over-zealous constraints on animal use in research.

Researchers are all too aware of the animal rights movement, and supporters of these activities are finding ways to get appointed to some ACUCs, where they can cause great difficulty for researchers because the ACUCs now have the power to prevent or stop animal research that violates their interpretation of federal guidelines. Some of the essay authors even claim that ACUCs should review proposals for scientific merit.

Personnel assignment to ACUCs is controlled by the institutional CEO, and scientists have every right to lobby against creation of ACUCs that are obstructive. Each ACUC is required to have at least one veterinarian and one active researcher. I agree with those authors who argue that the scientist committee members should be broadly trained (as, for example, a physiologist). The selection of the required lay person must be done carefully to avoid assignment of someone who is not supportive of research.

Even ACUCs that operate in moderate ways infringe on academic freedom and impose significant burdens on scientists who are already hassled by other regulatory bodies in their struggles to get funding, conduct and publish research, and compete with peers.

None of the essays gives much attention to the need to simplify procedures and paperwork. Bureaucratization does not necessarily accomplish the ends toward which it is aimed. The most glaring oversight in these essays is consideration of how one does bootleg research; indeed, it seems to be prohibited, despite the fact that truly creative research typically begins as pilot studies, or
even spur-of-the-moment experiments, that are not full-blown projects or programs.

Although the basic standards for ACUC operation are provided in Public Law 99-158 (1985) and the Animal Welfare Act, as amended in December 1985, local ACUCs have considerable latitude in interpreting and applying standards of human animal care. One author (H. J. Baker, p. 20) argues that the best way to expedite development of criteria for humane care is to accept formal rulings from outside sources. For example, he cites the usefulness of the report of the AVMA Panel on Euthanasia. However, as useful as that publication is, major controversy has arisen over their suggestion that decapitation should be performed only on anesthetized animals.

There are some essays on the ethical and philosophical issues underlying humane animal care issues, but most are rather sophomoric. For a sophisticated, reasoned philosophical discourse, I commend the essay by Arthur Fleming (p. 140). His logic is impeccable.

The book has some useful discussions of pain (J. S. Spinelli, p. 65, and L. R. Soma, p. 71), although there is little coverage of objective metrics for the evaluation of pain. The need for more pain research, where pain is deliberately caused in animals, is acknowledged and justified (B. J. Sessel, p. 75).

Particularly useful was the discussion of the major themes of current federal policies, operation of ACUCs, protocol review and animal pain, roles of committee members, other perspectives, training, and conclusion. There is too much repetition describing what ACUCs do and how they are operated. Many of the essays lack merit. There is apparent bias in the selection of contributors: nine of the essays are from faculty at the University of Southern California. That institution's ACUC is patently liberal, boasting that it has an announced antivivisectionist on the committee, along with so-called bioethicists and students.

Perhaps the chief value of this book is that it provides a great deal of practical advice on how to operate an ACUC. The University of California at San Francisco ACUC has a philosophy that all such committees should emulate: the review process should function in a consultative, not imperious, manner. Arthur Caplan's essay (p. 45) offers some wise counsel to those who serve on an ACUC: the only way to cope with the inevitable conflicts of view and the lack of hard facts is for each committee member to operate with a spirit of generosity, humility, and good humor. Sometimes ACUCs are more adversarial than sympathetic and constructive. On the other hand, a properly run ACUC can serve the best interests of the investigators, the institution, and society—and, of course, the animals.


Reviewed by William J. Whelan, Department of Biochemistry and Molecular Biology, University of Miami School of Medicine, Miami, Florida 33101, USA

Carbohydrates is the name of a compendium of more than 700 large-sized pages derived from the fifth edition of the Dictionary of Organic Compounds published in 1982, and its annual supplements. It is intended as a source book and contains data on 2300 carbohydrates, together with a name index, molecular formula index, CAS Registry number index, and type of compound index.

Each entry is accompanied by a structural formula where known, or, for brevity, refers to a similar structure, noting the differences from that structure. The stereochemistry, where known, is also indicated.

For each entry, the usual properties, molecular formula, molecular weight, and physical constants are recorded, as well as those of derivatives. For a compound such as sucrose, of which thousands of derivatives must have been synthesized, a representative group of esters and ethers, numbering about 20, has been selected.

There is no question but that this compilation should be in every scientific library, and will surely also be found on the shelves of carbohydrate research laboratories as an essential resource. A service has been rendered by selecting these compounds from the Dictionary of Organic Compounds to provide a compact reference source.

The price is probably not unreasonable, considering the time and effort that go into producing a specialized dictionary of this kind.

For future editions of this work, and as an improvement to the other source books in this series that are yet to be published, this reviewer would strongly recommend the inclusion of a glossary of the abbreviations that are so freely used without explanation. Nor would it be an insult to the intelligence of the reader if a list were provided of the full spelling of the names of the journals that are listed in their abbreviated form in the bibliography that accompanies each entry. It is, after all, not every day that one wishes to consult Klin. Prir. Soedin.


Reviewed by Cornelius van Bremen, Department of Pharmacology, University of Miami School of Medicine, Miami, Florida 33101, USA

The multiple authors of this book were very well selected to cover in an authoritative fashion the transport mechanisms regulating intracellular Ca²⁺ concentration and the control over cellular function by Ca²⁺ ions. Technical breakthroughs in the areas of patch clamping, Ca²⁺-sensitive dyes, and molecular biology that occurred a few years before the symposium (a Ciba Foundation symposium presented in October 1985) are duly reflected in the discussions of Ca²⁺ transport and binding at the molecular level. Also, the conceptual breakthrough of the discovery of the two-pronged intermediary intracellular messengers inositol-1,4,5-trisphosphate and diacylglycerol is comprehensively discussed by their discoverers, Berridge and Nishizuka. The book is logically structured in that first

Reviewed by Hans L. Kornberg, Department of Biochemistry, University of Cambridge, Cambridge, CB2 1QW, UK

Escherichia coli and its close relative Salmonella typhimurium are gram-negative rods with remarkable properties. They are able to grow, aerobically and anaerobically, on a very wide range of nutrients and can do so with gratifying rapidity. Indeed, on rich media, a doubling time of considerably less than 1 h is not unusual: as the late Dr. Jacques Monod remarked, any one E. coli has only one ambition: to become two E. coli. What makes this propensity useful to microbialphysiologists is J) that the organism can grow on a single carbon source plus a spoonful of salts, and 2) that its transfer from one carbon source to another often results in a virtually instantaneous cessation of synthesis of some proteins and initiation of synthesis of others.

But there are many bacteria that share these properties. What makes E.c. and S.t. (if one may term them thus) special is that they also have genetic systems that are readily susceptible to manipulation by a variety of techniques. Conjugation was discovered in the K12 strain of E.c. some 40 years ago; this was swiftly followed by the discovery of transduction (a technique of great utility, particularly in S.t.). The recognition of DNA restriction and modification in 1953 had to wait until DNA ligases were discovered 14 years later before experimenters were able to achieve our present ability to cut, stitch, and transfer genes not only from the chro-

cytosis, cytoskeletal protein assembly, cell proliferation, and fertilization. The latter and final chapter introduces the fascinating subject of standing intracellular Ca2+ gradients in relation to the developmental axis in fertilized cells. In view of the fact that this volume is an assembly of symposium papers, it provides a remarkably coherent picture of the central regulatory role played by Ca2+ in biology. In spite of the fact that research in this field is progressing rapidly, and important new developments have happened since the writing of this book, it should provide stimulating reading for a wide range of biological scientists and graduate students.

of the basic information (the metabolic pathways that enable biosynthetic building blocks to be made and assembled, and that provide energy from the fragmentation and combustion of food materials) would have been known to microbiologists 25 years ago: my experience as an academic teacher persuades me that it has come to be regarded as distinctly old hat and is now barely known even by our better students. What makes the present compilation very special is that many of the articles are written by the people who have actually elucidated these processes; these articles provide, in general, admirably balanced, concise, and splendidly readable assessments of the present position. Of course, there are variations in standard, and of course one is tempted to find occasional faults in the accounts of those areas in which one has also worked, but these variations are trivial compared to the overall astonishingly high levels of presentation.

Volume 2 also contains over 800 pages of text, divided into four main sections. Very properly, the front 110 pages enshrine the latest editions of the linkage maps of E.c. and S.t. Although the texts of these have been published previously elsewhere, it is a real benefit to have all the references, to all the markers described, assembled in one place. This is followed by the updated gene-protein index that, similarly, enables the inquirer to find, in one place, a list of these proteins that have been identified as products of defined genes of E.c. and of some of its plasmids. Two excellent articles, on the physical organization of the genome and the IS elements it may naturally harbor, followed by an unusual and arresting compilation of the manner in which mutants of specific genes were actually induced and selected, complete this initial survey of The genome. They lead naturally into five articles that deal with alterations in the genome, and include discussions of the mechanisms of mutagenesis, of recombination (in E.c.), of DNA repair, and of transposition and transposons in theory and practice. As might be expected, the various modes of gene transfer, mapping techniques, and (for the historian as well as the practitioner) genealogies of major strains of E.c.
and *S.t.*, plus a list of useful strains and techniques, complete this section and also bring the reader to the halfway mark of the volume. A proliferation of books currently available contain much of the information in this section, but I know of no other book that assembles all these data and, more important, presents a critical evaluation and discussion of their significance, in one place. Rashtra though it may be to predict the outcome of any publication venture, I am confident that this material, presented as it is here and on its own, would be a best-seller and a must for every microbial geneticist.

Part IV of this massive work concerns itself with the means whereby the expression of genes is regulated. The material, in the 21 articles that comprise it, is divided into three major areas: discussions of 1) the mechanics of control, whether through control of transcription and translation (and of the initiation, modification, and termination of these processes) or proteolysis; 2) the physiological response elicited by alterations in the environment (including a brave attempt to cover the still rapidly moving area of heat shock response); and 3) a bravura description of the regulation of seven operons. This follows an introductory account, by Jon Beckwith, of the history of the operon concept that will surely become required reading for all who are interested not only in the findings but in the philosophy of microbiology.

The remaining 120 pages or so of the book cover two main themes. The first focuses on the growth of *E.c.* and *S.t.* as a process in which a division cycle is initiated and sustained until one cell becomes two and that can be influenced in many of its component parts. Thus, there are articles that deal with the effect of growth rate on the shape, size, and composition of the cells; with the effects of physical factors (pH, pressure, etc.) on growth; with the signals that control chromosome replication; and with the timing of expression of particular genes during the cell cycle. Characteristically unusual and thought-provoking, Arthur Koch concludes this section by asking whether two sister bacteria are indeed as identical as they are assumed to be. I must confess that I had never asked this question and was considerably enlightened by the brief article that considers this matter.

The final theme deals with ecology, evolution, and population structure. It is, perhaps, the least comfortable section of the book and gives the impression that its scope and content have been less carefully thought out than others. Thus, it begins with an interesting survey of colicins and Col plasmids. Salva Luria could never be dull, and this paper, by him and Joan Suit, is concise and crystal clear—but why put it here? It appears to have little connection with the two articles (on the genetic structure and variation in natural populations of *E.c.*, and on the evolutionary history of enteric bacteria) that follow it. This last paper that, as it were, wraps up the book, also contains the only repeated misprint that I spotted—endearingly and appropriately, the running title contains an IS that describes the history as "evolutionary." But then, reviewers would be unhappy if they could not spot at least one misprint. . . .

Reviewers are also said to become unhappy if they cannot manifest their intellectual superiority by indicating how they would have done better than the authors of the book under review. If so, I should be positively distraught: I am bound to confess that I could not have done better. I happily declare that I think these two volumes are admirable; that I wholeheartedly congratulate Drs. Neidhardt, Ingraham, Brooks Low, Magasanik, Schaechter, and Umbarger as well as the numerous other contributors; and that I strongly urge all students of microbiology to invest the few dollars required to purchase these books: it will be an investment they will not regret.

BOOK REVIEWERS

We invite readers who would be interested in reviewing books for our Book Review section to inquire about becoming a contributor. Reviews cover the subject matter, timeliness and importance of the contents, and the audience to which the book is directed (practicing biological scientists). The reviews should be approximately 500 words long, and would be expected within 8 weeks of receipt of the book, which would then become the property of the reviewer. Please address inquiries to the Editor-in-Chief, William J. Whelan, The FASEB Journal, P.O. Box 016129, Miami, FL 33101-6129, USA.


COMPETITIVENESS SPOTLIGHTS RESEARCH RESULTS

by Alice W. Hellerstein

Short skirts may be all the rage in Paris and Milan, but the height of fashion in Washington political rhetoric these days is "competitiveness." Concern for improving the long-range competitive position of the U.S. economy has become the hottest item in the couture of public policy debate.

It is easy enough to become cynical after hearing mindless repetitions of the mantra of competitiveness as the solution for all economic problems. After all, many factors contribute to the lack of competitiveness of U.S. goods, and some of the proposed solutions -- such as trade barriers -- can lead to greater problems.

However, there is one way the United States can improve its economic competitiveness without risking repercussions: Through technological advancement, production costs can be lowered and new products can be developed that are on the cutting edge of technology. Not only in foreign trade, but also in terms of domestic economic growth, new technology can be a boon. Robert Solow, the 1987 Nobel Laureate in Economics, showed that in industrialized societies, technological advancement is a major source of economic growth.

Competitiveness has been brought to the forefront of political debate in recent years because of the political tug-of-war over spending priorities and the worsening of the U.S. budget and balance of trade deficits. Every expenditure is subjected to rigorous scrutiny, and competitiveness has frequently been called upon to justify science, technology, and research funding. The argument is that the benefits of funding scientific research will be reaped as the new knowledge is applied to develop new products and production techniques. But a competitiveness justification for research funding must have something to show for itself, and there have long been complaints about the low rate of return to society from federal research dollars. Last year the Senate Appropriations Committee noted this problem in particular with respect to biotechnology research at the National Institutes of Health. In its FY 1988 report, the committee wrote that the United States "cannot afford to fund billions of dollars of research only to have the results commercialized by foreign countries and sold to the United States to further aggravate our balance of trade."

Particular interest thus came to be directed to the question of how to transfer to U.S. industry the discoveries that have been made through federally funded research. And, cynicism over the competitiveness fad aside, significant changes in law and administrative procedures in the past few years have improved procedures enabling companies to commercialize research sponsored by the U.S. government.

The problems to be overcome included lack of patent protection, little effort being made to license government-patented inventions, obstacles to government and industry cooperation on research, and lack of awareness within some government research institutions that their technology needed to be made available to the private sector.

Lack of patent protection played a key role in fields such as biomedical research, where results were generally reported in the open literature, but discoveries were rarely patented. While published research results were available to one and all, American companies were reluctant to make use of them because they could not enjoy the economic protection of a manufacturing license for a product developed with information that was in the public domain.

Patent ownership played a role in the relative disinterest in commercializing new discoveries. Until the laws were
changed, the U.S. government had owned all inventions patented by federally employed scientists or by recipients of federal grants and contracts. The government did license these inventions, generally on a nonexclusive basis, and the proceeds went to the U.S. Treasury. While bonuses were given to government employee inventors, these were awards, rather than something to which the inventor was entitled. Furthermore, the laboratory or the grantee institution was not rewarded when an employee patented an invention.

The University and Small Business Patent Procedure Act of 1980 gave patent rights to universities, small businesses, and certain non-profit organizations conducting research under federal contracts. Under this law, cosponsored by then-Senator Birch Bayh (D-IN) and Senator Robert Dole (R-KS), grantee institutions could hold title to a patent they developed with government funding. The government still retained the right to use the invention without having to pay royalties and, in some instances, to "march in" and license an invention that was not being fully exploited by its grantee-owner.

The 1980 Patent Procedure Act also allowed patent holders to grant a company an exclusive license for five-to-eight years to develop a new product. While the difficulties associated with gaining an exclusive license varied from agency to agency, this problem had been seen in some instances as contributing to industry's unwillingness to commercialize government held patents.

Later amendments to the Patent Protection Act allowed exclusive licenses to be granted for the full 17-year term of a patent. In February 1983, President Reagan further expanded the scope of patent rights delegation by sending a memorandum to executive departments and agencies directing them, as far as their legislative research authority permitted, to allow all R & D contractors to retain title to inventions developed with government funds.

A second 1980 law, the Stevenson-Wydler Technology Innovation Act, was specifically intended to promote technology transfer from government operated federal laboratories to the private sector. This law provided federal laboratories with the authority to license innovations with potential commercial or other practical applications to universities, state and local governments and private firms.

The Technology Innovation Act also required federal laboratories with more than 200 employees to establish Offices of Research and Technology Applications, whose mission was to identify technologies with commercial possibilities. The law further established a Clearinghouse for the Utilization of Federal Technology (CUFT) within the Department of Commerce to disseminate information on potentially useful federal research.

Problems remained, however. Firms still encountered obstacles in trying to gain access to federal laboratories and federally employed scientists, and there were concerns about being able to recoup the investment for product development. Uncertainty about what licensing rights the government would grant made firms reluctant to look to the government for research innovations. In addition, the role of disseminating information about federal technology that Congress had intended for the Commerce Department's clearinghouse was actually being carried out by an ad hoc group of representatives from various Offices of Research and Technology Assessment (ORTAs).

In 1986, acting on the basis of its own oversight hearings and the recommendations of the 1982 White House Science Council Federal Laboratory Review Panel, Congress amended the Stevenson-Wydler Act to encourage federal laboratories to enter into cooperative research and development agreements with private firms. These amendments, part of the Federal Technology Transfer Act of 1986, were intended to provide specific statutory authority to promote the transfer of federal technology to the private sector and to clear up some perceived gaps in the earlier Technology
Innovation Act.

A key provision of the new law formalized the role of the Federal Laboratory Consortium for Technology Transfer (the informal network of ORTAs) as focal point for the exchange of information on federal technology, and provided for it to be housed within the National Science Foundation.

The 1986 law also provided specific authority for federal laboratories to negotiate "cooperative research and development agreements" with private companies to pursue a project of mutual interest. Firms can contribute personnel, facilities, equipment, and funds, while the government laboratories can contribute personnel, facilities, and equipment, but not funds.

That the government does not contribute funds is the crucial distinction between cooperative R & D agreements and other government research arrangements, such as grants, contracts and cooperative agreements, which are funding mechanisms. As a result the procedures for entering into cooperative R & D agreements can be simpler and can avoid some of the red tape necessary for awarding government funding.

The 1986 law allows flexibility in how patent and licensing rights are awarded. Companies that will make significant contributions to projects can negotiate in advance to receive exclusive licenses. Whether a company was guaranteed an exclusive license or only a nonexclusive one, the government still reserves the right to royalty-free use of the invention. Who owns the patent would depend upon whether the invention was made by industry or government scientists alone or jointly.

Another provision of the 1986 law offered incentives to both the federal laboratory and scientist-inventors by returning to them patent license royalties. Federal scientists will now receive at least 15 percent of licensing fee royalties paid to the government for their inventions, up to $100,000 a year. The rest of the royalties will go to the employing laboratory, rather than to the U.S. Treasury.

Since few inventions are likely to be tremendously lucrative, the law gave federal laboratories latitude to devise royalty schedules with more generous rates of return. At the National Institutes of Health, for example, inventors will receive 25 percent of the first $50,000 in licensing fees for their inventions, 20 percent of the next $50,000 received, and 15 percent of any royalty fees in excess of the first $100,000 paid to the government. The annual limit of royalties to the employee remains $100,000.

The laboratory's share in patent licensing fees must be used within two years and for purposes related to technology transfer. At the NIH, 90 percent of the laboratory's share is returned to the institute where scientist-inventors are employed, with the remainder going to central NIH. The law says that the money can be used to provide cash awards to other contributors to the invention, including technicians, scientists associated with the project, and researchers who made basic discoveries that led to the invention. The funds can also be used for technology development education and to pay patent filing costs and other administrative expenses associated with technology transfer.

The Federal Technology Transfer Act was signed into law on October 20, 1986, but according to Rep. Doug Walgren (D-PA), chairman of the House Science, Space and Technology Subcommittee on Science, Research and Technology, implementation of its provisions has been "a little slow."

In the health area, however, where "the intensity of the mission is greater" than in some fields of research, he anticipates considerable private sector interest in government research.

How technology transfer is conducted is bound to vary widely among the 700-800 large and small federal labs to be found in the Departments of Energy, Defense, Agriculture, Health and Human Services, Interior, as well as the Veterans' Administration, Environmental Protection Agency,
and NASA.

But high level concern about technology transfer remains. On April 10, 1987, President Reagan issued an executive order encouraging executive branch departments and agencies to make every effort to facilitate collaboration between federal laboratories, state and local governments, universities, and the private sector "in order to assist in the transfer of technology to the marketplace."

Congress is also still looking for ways to fine tune the technology transfer process. Certain areas of scientific research are seen as having particularly good potential for yielding discoveries with commercial application, including superconductivity, semiconductors, the human genome, and biotechnology.

Senator Pete Domenici (R-NM) introduced a bill last year that would give the Department of Energy's National Laboratories the lead role in cooperative research initiatives with private industry on superconductivity, semiconductor manufacturing, and the mapping and sequencing of the human genome.

The Senate Appropriations Committee last year asked NIH to report on the efforts it has undertaken to assist U.S. firms in commercializing NIH-funded biotechnology research.

Senator Lawton Chiles (D-FL), chairman of the Appropriations Subcommittee on Labor, Health and Human Services, and Education, introduced a bill late last year that would establish a national biotechnology policy board to review publicly and privately funded biotechnology research and make recommendations how to enhance basic and applied research, U.S. competitiveness in this field, and the transfer of technology from university and government laboratories to the private sector. The bill would also establish a national center for biotechnology information within NIH to develop information handling systems to allow access to existing databases containing genetic information on plant and animal genetics, as well as the human genome. The third section of the bill deals with creating a national advisory panel on the human genome that would report to the biotechnology board. The bill was cosponsored by Senators Edward Kennedy (D-MA), chairman of the Senate Labor and Human Resources Committee, Patrick Leahy (D-VT), chairman of the Senate Agriculture Committee, Robert Graham (D-FL), Pete Wilson (R-CA), and Domenici. According to Domenici's staff, he now prefers the approach of allowing an expert panel to oversee the large scale gene-mapping project.

For all the attention being paid to technology transfer, care is being taken to keep its role in perspective.

"Technology transfer, consistent with mission responsibilities, is a responsibility of each laboratory science and engineering professional," states the Federal Technology Transfer Act (emphasis added). But that most recent law was proposed because, as the House Science, Space, and Technology Committee noted in its report, there is a "widespread belief that research in the federal laboratories can be better attuned to industrial needs without compromising the laboratories' missions."

Dr. Philip S. Chen, Jr., associate director for Intramural Affairs at the National Institutes of Health and chairman of NIH's Patent Policy Board, who has been active in making arrangements for NIH to implement the 1986 law, said that the push for commercialization of research results is due to "a desire to get something of practical benefit to serve the needs of the American people."

In addition to its mission as a research institution, Chen said, the NIH -- along with all other federal laboratories -- is now being called upon to respond to concerns that the results of research "get utilized by somebody."

Alice W. Hellerstein is Legislative Coordinator in FASEB's Office of Public Affairs.

Prepared by the FASEB Office of Public Affairs March 1988
The FASEB Journal

Information for Authors*

Purpose and Scope

The FASEB Journal (FJ) is the official publication of the Federation of American Societies for Experimental Biology (FASEB). FJ publishes two types of articles: 1) brief, definitive, and essentially final research communications of broad interest that are considered to warrant prompt publication; and 2) state-of-the-art reviews, drawn, as far as possible, from the topics of the FASEB symposia.

Manuscripts containing original communications, or proposals for reviews, should be sent to the Editor-in-Chief, Dr. W. J. Whelan, The FASEB Journal, P.O. Box 016129, Miami, FL 33101-6129, USA.

Original Research Communications

FJ devotes a major portion of its pages (outside the meeting abstracts) to the publication of brief, definitive, original, and essentially final research communications that are considered to warrant prompt publication.

The aim of FJ is to illustrate the unity of biology and the independence of its constituent disciplines. Therefore, in keeping with this policy, and to qualify for acceptance, an original communication must not only be of outstanding scientific quality but must also be of broad interest.

The subject coverage of FJ is illustrated by the following disciplinary areas: biochemistry, biophysics, cell biology, developmental biology, genetics, immunology, neurobiology, nutrition, pathology, pharmacology, and physiology.

Papers should begin with an abstract written for the general reader and be free from jargon. They should continue with an introduction followed by the results and discussion; they should conclude with a succinct bibliography. Methods may be included within the figure legends and tables or as a separate section. Papers may not occupy more than four printed pages (equivalent of 4000 words and inclusive of illustrations and diagrams) and will be returned as unacceptable if they exceed this limitation.

Papers (an original and four copies) should be sent to the Editor-in-Chief. Prompt publication of acceptable papers will be ensured by careful conformity to the instructions to contributors and the expeditious return of proofs.

State-of-the-Art Reviews

FJ also presents research reviews. Herefore these have been in the form of extended reports emanating from symposia or mini-symposia presented at FASEB meetings. To provide such research summaries in a more compact form and thereby to allow, within space limitations, a more comprehensive and representative survey of the acquisition of new biological knowledge, FJ publishes state-of-the-art reviews that emphasize interdisciplinary aspects of the growing points of research.

These reviews will serve as a window on topics addressed at Society-sponsored symposia or plenary lectures. Therefore, review authors are sought from among those engaged in organizing the symposia. At the same time, volunteered reviews are welcomed that embody the principles of timeliness, topicality, and broad interest. A proposal for such a review, not a completed review, should be sent to the Editor-in-Chief, who will advise on its acceptability.

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Authors will be asked to certify that an original communication has not been published other than as an abstract and is not being considered for publication elsewhere, and that the paper will not be submitted for publication elsewhere until its acceptability for FJ has been decided. Authors of reviews will be asked to certify that the review has not been published, is not being considered elsewhere, and will not be submitted elsewhere until its acceptability for FJ has been decided.

Style of Manuscript

General Instructions

1) Manuscripts should be typewritten, with double spacing and 1-inch margins, on 8½ × 11 inch bond paper. Computer printouts of manuscripts must be readable; a dot-matrix printer is generally unacceptable. Metric units should be used. An original and four copies, with figures and tables, should be submitted to the Editor-in-Chief. Pages should be arranged and numbered consecutively in the following order: title page, footnotes, abstract of up to 200 words and indexing key words (maximum of five), text, references, figure legends, tables, and illustrations.

2) The title page should show: title of article, author(s); laboratory or institution of origin with city and state or country; complete address for mailing proofs and telephone number for corresponding author; and shortened title (maximum of 50 characters and spaces) for the running foot.

3) The title should be brief (no more than 90 characters, including letters, spaces, and punctuation) and informative. Do not use phrases in which more than three words modify another word (use "Atrial natriuretic factor renal hemodynamic effects" rather than "Atrial natriuretic factor renal hemodynamic effects"). Serial titles, such as "Interferon, IX," are not permitted, except as a footnote.

4) The abstract, a paragraph of no more than 200 words, should be a writing for the general reader and be free from jargon. It should be self-explanatory and suitable for use by abstracting services without rewriting. It should state the purpose and major findings and conclusions of the study. Citation of references should be avoided; if used, include bibliographic information.

5) Footnotes, double-spaced, should be assembled on one or more separate sheets; they should be numbered consecutively throughout.

6) The text should be readable, clear, and concise. Any corrections should be neat and legible. Standard nomenclature should be used; unfamiliar or new items should be defined at first mention. (See Abbreviations section below.) Foreign words not in general use in the English language should be underlined for italic type; italics should not be used for emphasis. Latin plurals should not be used if the English equivalent has been accepted, e.g., lamellae, not lamellae. Webster's new collegiate dictionary (1977) should be followed for spelling, compound words, and word separation.

7) Drugs and Trade Names. The chemical or generic name should precede the abbreviation of a drug name the first time it appears. Proprietary (trademarked) names should be capitalized and the spelling carefully checked. Trade names of chemicals or equipment should also be capitalized. Authors should supply an acceptable scientific name in every case as an alternative to the trade name. Trade names should not ordinarily be used in titles. More generally, the use of trade names should conform to the customary standards of good taste in scientific literature.

8) Active voice rather than passive voice should be used whenever possible. Present tense is used for references to existing knowledge or accepted concepts, and for proven conclusions from the present work; past tense is used when describing experimental work on which the paper is based.

Abbreviations, Symbols, and Terminology

Each author must include, as a footnote to the first page of text, a list of any new or special abbreviations used in the paper, with the spelled-out form and definition if necessary for clarity. For information on style in general, authors are referred to the CBE style manual, 5th ed. (1983), prepared by the CBE Style Manual Committee (Bethesda, MD). Chemical and biochemical terms and abbreviations should be in accordance with the recommendations for usage by the International Union of Pure and Applied Chemistry (IUPAC) and its committee on nomenclature [see Biochemical


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nomenclature and related documents, a compendium of IUPAC-International Union of Biochemistry (IUB) documents, available from The Biochemistry Society, PO. Box 32, Commerce Way, Colchester, CO2 8HP, Essex, UK. Isotope specifications should conform to the IUPAC system, with the mass number placed as a superscript preceding the chemical symbol as $^{13}C$. Genotypes are italicized; phenotypes are not. Enzymes should be identified with their EC number and recommended name, in accordance with the recommendations of the IUB; see Enzyme nomenclature: recommendations (1984) of the Nomenclature Committee of the International Union of Biochemistry (Orlando, FL: Academic; 1984). For specialized fields, see: "Glossary on respiration and gas exchange" (J. Appl. Physiol. 34: 549-558; 1973); "Glossary of terms for thermal physiology" (J. Appl. Physiol. 35: 941-961; 1973); The ACS study guide: a manual for authors and editors, edited by J. S. Dodd and M. C. Brogan (Washington, DC: American Chemical Society; 1986); A manual for authors of mathematical papers (Providence, RI: American Mathematical Society; 1980); Style manual for guidance in the preparation of papers for journals published by the American Institute of Physics and its member societies, 3rd ed. (New York: American Institute of Physics; 1978).

The following abbreviations or acronyms may be used without explanation; others should be defined at first use in the text.

- A: ampere; blood group; chromosome group
- A: absorbance; area
- Å: Ångström
- a: atto-
- ac: alternating current
- A.D.: anno Domini
- A-h: amper-hour
- AM: before noon
- AMP, ADP, ATP: adenosine phosphates
- AMPase, ADPase, ATPase: adenosine phosphates
- aq: aqueous
- atm: standard atmosphere
- at. wt: atomic weight
- BCG: bacille Calmette-Guérin
- bp: boiling point
- Bo: bequerel
- Btu: British thermal unit
- C: coulomb
- °C: Celsius
- c: centi-
- ca: calorie
- cAMP, cGMP: cyclic AMP, cyclic GMP, etc.
- CD: circular dichroism
- cd: candela
- cDNA: complementary DNA
- cf: compare
- Ci: curie
- cm, cm², cm³: centimeters
- CMP, CDP, CTP: cytidine phosphates
- CoA: coenzyme A
- CoASAc: acetyl coenzyme A
- cpm: counts per minute
- cps: cycles per second
- cp: centipose
- c/s: cycles per second
- cRNA: complementary RNA
- cubic: use exponent 3
- °: degree, angle
- D: diffusion, coefficient
- d: dextro configuration
- d: density
- d, (+): dextrorotatory
- Da: dalton
- da: deca-
- dB: decibel
- dc: direct current
- DDT: 1,1,1-trichloro-2,2-bis-(p-chlorophenyl)ethane
- DEAE-cellulose: O-(diethylaminoethyl)cellulose
- df: degrees of freedom
- DNA: deoxyribonucleic acid
- DNase: deoxyribonuclease
- dpm: disintegrations per minute
- dss: disintegrations per second
- dyn: dynes
- E: electron force; exa-
- E: electrode potential; energy
- EC: effective concentration, 50% editor
- ED: effective dose, 50% editor
- EDTA: ethylenediaminetetraacetic acid
- e.g.: for example
- EGTA: ethylene glycol bis(β-aminoethyl ether)-N,N,N',N'-tetraacetic acid
- emf: electron magnetic force
- EPR: electron paramagnetic resonance
- Eq.: equation(s)
- ESR: equivalent
- eV: electron spin resonance
eq: and others
- exp: exponential
- F: foot-candle
- °F: foot-pound
- FAD, FADH₂: foot-pound
- f: Fahrenheit
- FADH: flavin adenine dinucleotides
- ft: Fahrenheit
- f: foot-candle
- Fig.: Figs.
- FMN, FMNH: foot-candle
- fp: foot
- ft lb: foot-pound
- g: gauss; general; giga-
- G: gravitational constant
- g: guanosine phosphates
- g: greater than
- GMP, GDP, GTP: glutathiones
- GH, CSSG: H: foot-pound
- h: hour
- Hb: hemoglobin
- hRNA: heterogeneous nuclear RNA
- hp: horsepower
- h: height
- Hz: hertz
- IC₅₀: inhibitory concentration, 50%
- ID₅₀: infective dose, 50%
- i.d.: inside diameter
- i.e.: that is
- Ig: immunoglobulin
- i.m.: intramuscular
- IMP, IDP, ITP: inosine phosphates
- in: inch
- i.p.: intraperitoneal
- IR: infrared
- IU: international unit
- i.v.: intravenous
- J: joule
- Jr.: junior, with names
- K: kelvin
- K: Michaelis constant
- k: kilo-
- kcal: kilocalorie
- kg: kilogram
- km: kilometer
- L: levo configuration
- L: levoconfiguration
- lb: pound
- lb/in²: pounds per square inch
- LC₅₀: lethal dose, 50%
- LD₅₀: less than
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<td>MW·h</td>
<td>megawatt-hour</td>
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<td>newton</td>
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<td>ortho-</td>
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<tr>
<td>Q₁₀</td>
<td>Q₁₀</td>
<td>increase in rate of chemical reaction for each 10°C increase in temperature</td>
</tr>
</tbody>
</table>

**Note:** standard three-letter or single-letter abbreviations for amino acids may be used in sequences and in tables and figures.

**References**

References should be cited in the text in numerical order, with the numeral placed in parentheses. References should be typed separately with inclusive pages and titles, double-spaced, with only one reference per number. Authors are completely responsible for the accuracy and completeness of their references; they will not be checked in the Editorial Office.

Citations to unpublished work should not be entered in the list of references unless the paper has been accepted for publication. Include them in the text as "(unpublished observations)," "(personal communications)," or "(manuscript in preparation)," with authors' initials and surnames.

For titles of journals, follow the abbreviations listed in Serial sources for the BIOSIS data base. The form of references to periodicals should be in accordance with the following example. (Titles and inclusive pages must be used.)

Book references should include information in the following order: author(s), title of publication, publisher, year, and pages. The title of the book should be underlined for italic type. When one chapter is cited its title and page numbers should be included, and the book's authors or editors should be named.


Illustrations
Illustrations should be identified lightly with pencil on the reverse side with the figure number and author name(s); when necessary, the top should be clearly marked. They should be referred to as figures in the text, and should be numbered with Arabic numerals; each should have a legend.

Inasmuch as good illustrations are possible only from good copy, authors should pay particular attention to the following:

1) Illustrations should be sharp, contrasty, unmounted photographs on glossy paper. Photographs should be the width of one column (3 1/2 inches) or two columns (7 1/4 inches). All drawings for reduction to a given size should be drawn and lettered to the same scale.

2) Lettering should be done in black ink and must be legible after reduction (i.e., at least 1.5 mm high). The smallest elements (subscripts or superscripts) should be readable when reduced. Typewritten or computer-generated lettering is not preferred.

3) Graphs such as electrocardiograms, kymograms, and oscillograms should be prepared by a skillful photographer so that the dark cross-hatched background is eliminated, the faint portions of the graphs are intensified, and sharp, contrasty prints are obtained. To avoid this processing, use blue-ruled instead of black-ruled recording paper for the original records.

4) When possible, all lettering should be within the framework of the illustration; likewise the key to symbols should be on the face of the chart. Where the figure is so filled that it is necessary to explain symbols in the legend, only these standard characters should be used: □ ■ ○ ● △ ▲ ▽ ▼ ▲ ▼ ×.

5) Actual magnification of all photomicrographs should be given. The Editorial Office will make corrections for reduction. An appropriate scale on the photomicrograph itself is, however, preferable and more accurate.

6) Arrangements must be made well in advance with the Editorial Office for the reproduction of any illustrations in color. Authors must have funds available to meet the full cost of color plates and their printing.

7) The approximate position of each figure in the text should be indicated in the margin of the manuscript.

8) Inasmuch as it is the policy of FJ to reproduce figures and charts in the smallest size consistent with readability and purpose of the illustration, it is understood that an author will accept the decision of the Editors on the printed size; however, recommendations may be submitted for reduction or enlargement.

9) If illustrations that have been published elsewhere are included, permission must be obtained from the publisher and the author for their use in FJ. A copy of the letters granting such permission must be submitted with the manuscript to the Editorial Office.

10) Figure legends should be typed double-spaced, consecutively on one or more sheets of paper. They should contain sufficient information to provide adequate description without reference to text.

Tables
Each should be typed double-spaced, on a separate sheet of paper. Each should have a brief title and should be numbered with Arabic numerals. Explanatory matter should be in footnotes. Table footnotes should be listed in order of their appearance with consecutive superior letters.

Tables should not duplicate material in text or illustrations. They should be prepared for printing either 3 1/2 or 7 1/4 inches wide. Nonsignificant figures in tabular data should be omitted. Short or abbreviated column heads should be used. Statistical measures of variation, P, SD, SE, etc., should be identified as such.

The approximate position of each table should be indicated in the margin of the text.

Formulas and Equations
Structural chemical formulas, process flow diagrams, and complicated mathematical expressions should be precisely and carefully arranged, but they should be kept to a minimum because in typesetting they are composed by hand and are expensive. Glossy prints of complicated formulas and expressions suitable as line drawings are preferred. All subscripts, superscripts, Greek letters, and unusual characters must be clearly identified.

Acknowledgments
It is customary to acknowledge only persons who have made substantive contributions to the studies reported in the manuscript. Authors will please obtain written permission for everyone acknowledged by name (including references to unpublished work) because readers may infer their endorsement of the paper and its conclusions.

If appropriate, a statement of grant support may be included. Names of grant sources should not be abbreviated.

Experimental Procedures
This journal endorses the principles embodied in the Declaration of Helsinki and expects that all investigations involving humans will have been conducted in conformity with these principles. It is expected that the "Guiding Principles in the Care and Use of Animals" will have been observed in all animal experimentation reported in FJ.

Auxiliary Publication
Additional detailed tables, appendixes, descriptions of materials and methods, mathematical derivations, extra figures, and other supplementary matter too costly to be included in the journal article may be submitted for deposition without charge to the author with the American Society for Information Science (ASIS), National Auxiliary Publications Service. Material is deposited by the Editorial Office with the consent of the author, and a footnote is carried in the published article to the effect that photoprints or microfiche copies are available at moderate cost.

Author Charges
Authors are allowed a certain amount of illustrative material free of charge. Normally this will cover the equivalent of one full page of tables, figures, and halftones, or a half page of chemical and mathematical formulas and equations. Authors are charged for material exceeding this allowance. When excess charges are anticipated, authors should make the necessary arrangements at the time a manuscript is submitted (i.e., initiation of an institutional purchase order, obligation of funds under a grant, etc.).

Page Charges
No page charges are made for any material appearing in FJ.

Page Proofs
Two sets of page proofs together with the original manuscript are sent to the author. Proofs should be carefully checked without delay and any necessary changes or printer's errors (to be marked in red) should be clearly indicated in the margins. Except for correction of typographic errors, the cost of authors' alterations of subject matter in type will be charged to authors if these charges exceed the journal's allowance. Proofs should be returned promptly to the Editorial Office, The FASEB Journal, 9650 Rockville Pike, Bethesda, MD 20814, USA. A delay in returning the proofs will result in a delay in publication.

Reprints
Each author receives with the proofs a reprint order form that must be completed and returned with the proofs to the Editorial Office if reprints are desired. Orders submitted after the journal is printed are subject to considerably increased prices.
POSITIONS AVAILABLE — Classified advertisement rates: $170.00 for first column inch, $150.00 for each additional inch or portion thereof. A column inch consists of eight lines, each 3 1/2 inches long and containing approximately 70 characters (letters, numbers, symbols, punctuation marks, spaces). Display advertisement rates: $570.00 for 1/4 page (3 1/2 inches x 5 inches); $850.00 for 1/2 page (vertical 3 1/2 inches x 10 inches or horizontal 7 1/2 inches x 5 inches); $1150.00 for full page (7 1/2 inches x 10 inches); copy received not camera-ready is subject to additional typesetting fee of approximately 5% of rate. Advertisements will be published in next available issue unless otherwise specified. Payment or purchase order is required with insertion copy. Advertisements are noncommissionable to agents; no cash discounts are allowed. Blind advertisements are not accepted.

POSITIONS DESIRED — Candidates registered with FASEB Placement Service are allowed one advertisement of five lines, each containing approximately 70 characters (letters, numbers, symbols, punctuation marks, spaces). The issue in which advertisement appears will be based on date of receipt of copy. Fee for publication in additional issues: $10.00 per issue.

Primary employers desiring identification and additional details concerning Positions Desired advertisers should write to address below, indicating hyphenated number appearing as last element of advertisement; a one-page application from advertiser(s) will be provided immediately. Advance telephonic determination of current availability of advertisers from earlier-than-current issues is recommended. Employers not currently registered with Placement Service are charged a minimum fee of $30.00 for identification of up to 10 advertisers, plus $3.00 for each above 10, payable in advance to FASEB Placement Service.

Some registered candidates do not prepare Positions Desired advertisements; some advertisements are published at times not coinciding with employer recruitment activities. Primary employers not finding advertisements that appear to match current or projected needs are invited to request a search of all active candidate files. Telephone a description of the desired qualifications; results of search will be discussed telephonically with requesting official, and applications from candidates declared suitable will be forwarded. Employers not currently registered with Placement Service are charged a minimum fee of $30.00 for up to 10 applications, plus $3.00 for each above 10.

In publishing these advertisements FASEB assumes no obligations as to qualifications of prospective employees or responsibility of employers, nor shall FASEB obtain further information concerning positions advertised or those seeking employment. Accuracy and completeness of all listings are the responsibility of the submitting party.

Various U.S. state and national laws against discrimination, including the Federal Civil Rights Act of 1964, prohibit discrimination in employment in the United States because of race, color, religion, national origin, age, sex, or any reason not based on a bona fide occupational qualification. The Federation of American Societies for Experimental Biology endorses these principles and reserves the right to edit all copy and to refuse advertisements not in consonance therewith.

Employment in countries other than the United States may be restricted by government visa and other policies. Moreover, it is suggested that the generally accepted employment practices, the cultural conditions, and the exact provisions of the specific positions being considered be investigated thoroughly. The U.S. Embassies in countries of interest to potential employees should be able to provide up-to-date data concerning internal conditions.

For a description of operation at annual meetings, please refer to the January or February issue or contact the Placement Service.

Address all correspondence to FASEB Placement Service, 9650 Rockville Pike, Bethesda, MD 20814. (301) 530-7020

POSITIONS AVAILABLE

HEAD, DEPARTMENT OF VETERINARY PATHOBIOLOGY. The School of Veterinary Medicine at Purdue University is seeking a head for the Department of Veterinary Pathobiology. Candidates for this critical scientific leadership position in the school must have excellent scientific credentials and a strong desire to be a leader in veterinary medical research and education. The school is embarking on an ambitious effort to be properly positioned to meet the challenges that will face veterinary medical research, education, and service in the 21st century. We invite applications from qualified individuals who understand that the future can be shaped by creative thought and bold action. Closing date for applications is March 31, 1988, or until a suitable candidate applies and the position is filled. Applicants should submit a CV and names of references along with a letter expressing their professional interests and goals to William W. Carlton, D.V.M., Ph.D., Chairperson, VPB Head Search Committee, Department of Veterinary Pathobiology, School of Veterinary Medicine, Purdue University, West Lafayette, IN 47907. Purdue University is an affirmative action/equal opportunity employer/educator. Women and minority candidates are encouraged to apply.

TWO FACULTY POSITIONS IN FOOD SCIENCE AND NUTRITION. Assistant professor/associate professor, Department of Food Science and Nutrition, University of Minnesota, St. Paul. Tenure-track or tenured. Must have Ph.D. in nutrition or related field. Apply by May 10, 1988, to Dennis A. Savaiano, Chair, Search Committee, Department of Food Science and Nutrition, University of Minnesota, 1334 Eckles Ave., St. Paul, MN 55108; telephone 612-624-6232. Application should include CV and names and addresses of at least three references. Start on or before September 1, 1988. The University of Minnesota is an equal opportunity employer and employer and specifically invites and encourages applications from women and minorities.

TWO ASSISTANT/ASSOCIATE PROFESSORS, 12-month, tenure-track, teaching/research positions in Department of Foods and Nutrition, Purdue University. Must be able to develop own research program. Position 1 is in nutrition with the research area preferably in protein, carbohydrate, or lipid metabolism. Position 2, in food science and methodology with research area open. Postdoctoral experience desirable for each position. Apply to R. P. Abernathy, Department of Foods and Nutrition, Purdue University, West Lafayette, IN 47907 or call 317-494-8231. Screening begins March 1, 1988. EEO/AA.

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The Upjohn Company, a leader in the research and development of pharmaceuticals, is seeking candidates to fill a position in our Infectious Diseases Research Group. Candidates will have a BS or MS in biochemistry, immunology or related discipline. Solid academic achievement, several years of successful laboratory experience, and demonstrated ability to do independent research are necessary. This position will participate in the development and application of systems to study agents that affect the synthesis/release and biological activity of monokines as well as systems to study the phagocytic killing of microorganisms. Experience and background with small animals, cell cultures, immunoassays and/or bacteriological techniques are highly desirable.

We are located in Kalamazoo in Southwestern Michigan, midway between Chicago and Detroit, offering varied cultural events, cosmopolitan shopping and entertainment, lakes and woodlands minutes away, abundant year-round sports and recreation. Upjohn offers advancement opportunities, a highly competitive salary, comprehensive benefits and relocation assistance. For confidential consideration, please call from outside of Michigan toll free 1/800/253-8600 ext. 3-6767 (inside Michigan call collect 616/323-6767) to request an employment application be sent to you immediately. Please refer to position number 21707-A when calling. We are an Equal Opportunity Employer M/F.

Our Commitment to Scientific Excellence Continues...
DIRECTOR
MEDICAL BIOTECHNOLOGY CENTER

The University of Maryland Medical Biotechnology Center, located on the professional schools campus in Baltimore, Maryland, is one of four centers of the Maryland Biotechnology Institute. The center's primary mission is to conduct research in the development and application of biotechnology for the benefit of medical and related sciences. The center will provide an environment for basic and applied research in medical biotechnology with thematic emphasis on bioimaging, vaccine development/immunology/AIDS, nucleic acid metabolism, and neurosciences. This center is an exciting venture combining the resources and perspectives of a major university with state and city governments in continuing collaboration with industrial partners.

The director of the Medical Biotechnology Center will have a unique opportunity to develop and implement a new research facility in an area of significant intellectual and commercial interest. The director is expected to develop the center, including staffing, establish extramural support, and coordinate site development. The direct administrators the resources of the center, maintains liaison with other centers of the institute, coordinates center activities with University of Maryland academic departments, provides direction for center-sponsored research, and maintains working relationships with both private and public partners.

The director will combine strong scientific credentials as a tenured professor, administrative experience, and entrepreneurial spirit necessary to bring the Medical Biotechnology Center into a national leadership position with demonstrated ability to secure private and public funds for support of the center.

Letters of nomination or application should be submitted to:

Dr. Nicholas R. Bachur, Chairperson
Medical Biotechnology Center Search Committee
University of Maryland Medical Biotechnology Center
618 West Lombard St., 2nd Floor
University of Maryland at Baltimore
Baltimore, MD 21201

All nominations or applications should be accompanied by a resume and the names of at least three persons who may be contacted. Nominations or applications received by March 15, 1988, will receive full consideration, but will be accepted until a suitable candidate is selected.

The University of Maryland is an equal opportunity employer.

CHAIRPERSON
DEPARTMENT OF PATHOLOGY
MEHARRY MEDICAL COLLEGE

The School of Medicine of Meharry Medical College invites applications from and nominations of individuals to lead its Department of Pathology. The position is expected to be filled by July 1, 1988. The department provides teaching in pathology for medical, dental, and allied health students. It also directs the laboratory services of Hubbard Hospital, which is the teaching hospital of Meharry Medical College, and the pathology services of the Alvin York VA Medical Center at Murfreesboro, Tennessee, and it interacts with other hospitals affiliated with Meharry Medical College. Interested individuals should hold the M.D. or M.D./Ph.D. degree and possess professional experience appropriate for appointment at the level of associate or full professor. The selected individual must be board certified in both clinical and anatomic pathology and have a track record of investigative scholarly activity. He/she is expected to have demonstrated leadership qualities necessary to energize departmental growth and scholarship in basic and clinical pathology.

Nominations or applications, containing CV, names of five individuals who may be contacted for reference, and other relevant material, should be sent to Iraen H. Arinze, Ph.D., Chairperson of Pathology Search Committee, c/o Department of Biochemistry, Meharry Medical College, Nashville, TN 37208. The deadline for receipt of applications is April 15, 1988. Meharry Medical College is an equal opportunity/affirmative action employer.

PATHOLOGY
Department Chairperson

We seek a successor to retiring chairperson. Full responsibility for all academic and clinical programs including Pathology Laboratory at Albany Medical Center Hospital and Veterans Administration Medical Center. Must evidence continuing interest and productivity in research as well as solid track record of support and direction of teaching and residency programs. Strong administrative and management skills must be evident either directly or through delegation. Must be board certified. Affirmative action/equal opportunity employer/M-F.

Interested M.D.’s should send CV with full bibliography to:

Stanley D. Glick, Ph.D., M.D.
Pathology Search Committee
Albany Medical College
47 New Scotland Ave.
Albany, NY 12208

The University of Maryland is an equal opportunity employer.
The Investigative Toxicology and Immunology and Antiinfectives Therapy Departments of Smith Kline & French Laboratories, located in suburban Philadelphia, are seeking a Postdoctoral Scientist to conduct quantitative cytomtery on proliferative rodent lesions and to study the molecular mechanisms involved in the formation of these lesions. The appointment is for one year, renewable for a second year on mutual agreement.

The successful candidate will:
- correlate DNA content (ploidy) as measured by adherent cell cytometry and flow cytometry with the proliferative activity of rodent lesions as determined by histologic and morphometric criteria.
- compare oncogene expression of spontaneous and drug-induced proliferative rodent lesions.
- study the intracellular oncprotein distribution in tissue sections prepared from proliferative rodent lesions.

Candidates should have:
- Ph.D. in Cell Biology or related discipline with 3-5 years postdoctoral experience.
- Knowledge of quantitative cytometry and molecular biology.
- Excellent verbal and written communication skills.

We offer an excellent compensation, benefits and relocation package as well as opportunities for personal and professional growth. Please forward your C.V. and the names of three references to: Marianne J. Shandy-C0048, Smith Kline & French Laboratories, Research & Development, P.O. Box 1539, King of Prussia, PA 19406-8539. We are an Equal Opportunity Employer, M/F/H/V.

FACULTY POSITIONS IN CELLULAR AND MOLECULAR PHYSIOLOGY. The Department of Physiology of The Pennsylvania State University College of Medicine is seeking applications for two full-time, tenure-track positions at the assistant/associate professor rank to begin in summer or fall 1988. The department presently has eight full-time, well-funded faculty who are working in the general area of cellular and molecular physiology. We are seeking candidates with substantial postdoctoral experience in one or more of the following areas: metabolic regulation, mechanisms of hormone action, membrane receptors, cytoskeletal-membrane interactions, intracellular membrane trafficking, signal transduction, ion channels, control of growth and differentiation, and gene regulation. Special attention will be given to candidates who are able to relate molecular concepts and information to the cell and tissue levels of the organism. Significant research accomplishment and ability to obtain independent funding are essential. Excellent opportunities exist for research collaboration, teaching in a medical school curriculum, and participation in one or more graduate programs. Competitive salaries and start-up funding are available. Applicants should submit, before May 1, 1988, CV, reprints, a statement of current and planned research interests, and letters from at least three references to Dr. Leonard S. Jeffers, Chairperson, Department of Physiology, College of Medicine, The Pennsylvania State University, P.O. Box 856, Hershey, PA 17033. The Pennsylvania State University is an equal opportunity/affirmative action employer.

RESEARCH ASSOCIATE AT THE UNIVERSITY OF PITTSBURGH, SCHOOL OF MEDICINE. The position is available immediately to study the mechanism of host-parasite interactions. Candidate should have a Ph.D. degree in biochemistry and 3-4 years of research experience in the isolation and characterization of proteins, preferably those of parasitic and bacterial pathogens. Background in protein phosphorylation, HPLC, TLC, and phospholipid analysis is desirable. Salary $22,000/year. Send CV, three letters of reference, and recent publications to Dr. Robert H. Glew, University of Pittsburgh, Department of Microbiology, Biochemistry and Molecular Biology, School of Medicine, Pittsburgh, PA 15261. Deadline date: March 31, 1988. An equal opportunity/affirmative action employer.

INSTITUTE OF CHEMICAL TOXICOLOGY WAYNE STATE UNIVERSITY

Wayne State University is pleased to announce the development of a new institute dedicated to research in toxicology. The Institute of Chemical Toxicology occupies newly renovated laboratory space consisting of 16,000 ft² within the Metropolitan Center for High Technology and features modern research and support facilities. Applications are invited for tenure-track faculty positions in the ranks of assistant professor, associate professor, and professor in the areas of molecular, respiratory, and heavy metal toxicology. Emphasis will be placed on research that utilizes modern molecular and cellular approaches in the investigation of mechanism(s) of xenobiotic-mediated toxicity. Although initial emphasis is directed toward the aforementioned areas of research, applications from outstanding candidates in other areas of contemporary toxicology will be considered. Candidates should have an M.D. or Ph.D. degree, at least 2 years of relevant postdoctoral research experience, and demonstrated productivity and should be capable of conducting independent research and securing extramural support. Salary and rank commensurate with qualifications.

A CV and three letters of reference should be sent by March 31, 1988, to: Dr. Raymond F. Novak Chairperson, Search Committee Institute of Chemical Toxicology Wayne State University 1072 Mackenzie Hall Detroit, MI 48202

Wayne State University is an equal opportunity/affirmative action employer.

FULL-TIME, TENURE-TRACK POSITION AS PROFESSOR OR ASSOCIATE PROFESSOR OF DENTAL MATERIALS AND DENTAL TECHNOLOGY in the School of Dentistry and as director of a new Center for Materials and Technology in Dentistry available July 1, 1988. Applicants must have an earned doctorate with advanced training in biomaterials science, significant publications in biomaterials with application to dentistry, and a record of obtaining peer-reviewed, extramurally funded research grants; applicants must qualify for a joint appointment in Case Institute of Technology. Responsibilities include teaching of undergraduate and graduate students and development of an innovative research program in biomaterials. This position presents unparalleled opportunities for research collaborations with faculty of the School of Engineering, as well as a testing ground for dental applications. The ability to coordinate activities among clinicians, dental scientists, and engineers will be an important asset of the applicant. Equal opportunity/affirmative action employer. Send letter of application and CV to Dr. Bernard Tandler, Biomaterials Search Committee, School of Dentistry, Case Western Reserve University, Cleveland, OH 44106.

FACULTY POSITION IN PHARMACOLOGY. A faculty position in pharmacology is available immediately at the research assistant professor level. Applicants should have a strong background in biochemical techniques and extensive experience in investigation of mechanisms of regulation of cyclic AMP synthesis, including techniques for resolution, reconstruction, and purification of components of the hormone-sensitive adenylyl cyclase complex. Interested persons should send their CV to Dr. Alfred G. Gilman, Department of Pharmacology, The University of Texas Southwestern Medical Center at Dallas, 5323 Harry Hines Blvd., Dallas, TX 75235. An equal opportunity employer.

FACULTY POSITION IN PHARMACOLOGY. A faculty position in pharmacology is available on or before April 1, 1988, at the research assistant professor level. Applicants should have a strong background and extensive experience in NMR, including the application of two-dimensional NMR experiments, heteronuclear spectral editing techniques, and conformational analysis using nuclear Overhauser effects. Interested persons should send their CV to Dr. Lila M. Gierasch, Department of Pharmacology, The University of Texas Southwestern Medical Center at Dallas, 5323 Harry Hines Blvd., Dallas, TX 75235-9041. An equal opportunity employer.
MEMORIAL UNIVERSITY OF NEWFOUNDLAND, DEPARTMENT OF BIOCHEMISTRY, FACULTY POSITION IN NUTRITION. Requirements: Ph.D. degree with background in either clinical nutrition (therapeutic human nutrition) or institutional management. Candidates must be eligible for, or have membership in, the Canadian Dietetic Association or the American Dietetic Association. The candidate should have postdoctoral training and teaching experience and be able to conduct independent research. Appointment at the assistant or associate professor level is expected. The department offers undergraduate and postgraduate degrees in biochemistry, nutrition, dietetics, and food science. In accordance with Canadian Immigration policy, consideration, in the first instance, will be given to Canadian citizens and permanent residents of Canada. Others will be considered and are encouraged to apply. Application, including the names of at least three references, should be sent to Dr. K. M. W. Keough, Professor and Head, Department of Biochemistry, Memorial University of Newfoundland, St. John's, Newfoundland, Canada A1B 3X9, from whom further information can be obtained.

CHAIR, DEPARTMENT OF BIOCHEMISTRY. The University of South Dakota School of Medicine invites nominations of and applications from independent scholars. We are looking for a person with a commitment to excellence in teaching and graduate education. A research record that inspires and promotes vigorous support and participation in research and the pursuit of extramural funds is expected. Preference will be given to applicants with demonstrated expertise in molecular biology. The successful candidate will direct the faculty and students and have the opportunity to influence the development of this institution. Initial review of applications will begin April 15, 1988, and continue until the position is filled. Candidates should send a CV, publication list, and the name of three references to Biochemistry Chair Search Committee (Attn.: R. J. Peanasky, Ph.D.), University of South Dakota School of Medicine, Vermillion, SD 57069. The University is an AA/EO employer.

POSTDOCTORAL POSITION available immediately for work on the biochemistry and molecular biology of neurotransmitter receptors. Primary systems under investigation are those for dopamine, serotonin, and NMA. Techniques will be used on receptor purification, characterization of receptor-G protein interactions, biochemical mechanisms of receptor regulation, and molecular cloning of the receptor genes. Position is located in Bethesda, Maryland, and may be filled at the staff level with a salary of $20,000–$37,997 per annum dependent on experience and qualifications. U.S. citizenship or eligibility for citizenship within 4 years required. Further appointment requirements may be obtained by calling Ms. Chris Steyer at 301-496-6334. Please arrange to send CV and two or three letters of reference to Dr. David R. Sibley, Experimental Therapeutics Branch, National Institute of Neurological and Communicative Disorders and Stroke, National Institutes of Health, PHS, Building 10, Room 5C108, 9000 Rockville Pike, Bethesda, MD 20892. NIH is an equal opportunity employer.

POSTDOCTORAL POSITION. Positions in pulmonary-critical care medicine, pulmonary-occupational medicine, and pulmonary research are available for 1988-1990. We are interested in academically oriented M.D.'s with research interests and/or experience in D.V.M./Ph.D. trainees interested in considering careers in investigative pulmonary research with a focus on basic cell biology approaches. Research advisors are available in the areas of: pulmonary epidemiology and occupational medicine, medical decision analysis, airway circulation, regulation of airway secretions, neuropharmacology, airway cell carcinogenesis, IDA, biochemistry, lung cell development, inhalation toxicity, lung defense mechanisms, and lung inflammation and lung repair. Applicants must be U.S. citizens or permanent residents. Send resume, references, and summary of research experience to C. E. Cross, University of California Davis Medical Center, Division of Pulmonary-Critical Care Medicine, 4301 X St., Sacramento, CA 95817. The University of California Davis is an equal opportunity/affirmative action employer.

POSTDOCTORAL POSITION IN MOLECULAR GENETICS. Howard Hughes Medical Institute at the University of Michigan Medical School: Our laboratory is interested in the molecular genetics of several proteinase inhibitors. [See J. Clin. Invest. 78: 1673–1680 (1986)]. Current projects involve 1) RFLPs and genetic linkage analysis, 2) molecular structure/function studies, and 3) the analysis of molecular mechanisms for control of gene expression in endothelial cells. Please send a description of research interests, CV, and names and telephone numbers of three references to Dr. David Ginsburg, M.SR.B. I, Room 4520, University of Michigan Medical Center, Ann Arbor, MI 48109. Equal opportunity employer.

TWO POSTDOCTORAL FELLOWSHIPS will be available June 1, 1988, for research training in respiratory physiology. Applicants must have doctoral degrees and meet residence requirements for support by NIH training grant. Send CV and names of three references to Donald Bartlett, Jr., M.D., Department of Physiology, Dartmouth Medical School, Hanover, NH 03756. An equal opportunity/affirmative action employer.

POSITIONS DESIRED

Ph.D., 5/88 (expected): Pathology/virology, antivirals, carbohydrate chemistry; Extensive exp. with HSV-1, isolation/purification, attachment, polypeptide cascade, DNA replication (TK and DNA pol.), plaque and attachment inhibition assays, monoclonal antibody tech., cell culture, electron microscopy; Staff position in industry or academia; Salary negot. 4-2289

Ph.D., 1973; Pharmacology, biochemistry, toxicology, cell biology, bioanalytical chemistry; Biomembranes and glycoproteins struct. and funct., receptor studies, carcinogenesis, drug toxicity, patents, drug discovery; Avail. imm.; Prefer lab. manager/prin. scient./dir. pos., industry/acad.; Sal. negot. 3-2521

Ph.D., 1983; Cell and molec. biol., biochemistry, endocrinology; Studies of androgen-regulated proteins, protein purification, steroid receptor and mechanism of action, experience in grant writing, student research advising; Available Sept. 1988; Position in academia or govt. research lab., research/teaching; Salary negot. 2-2534

Ph.D., 1988 (expected); Pharmacology, immunochemistry; Experience: tonic pain (analogic) test development, in vivo testing for physical dependence, central injections in mice, in vivo assay of tachykinins, HPLC, single-unit recording, Macintosh PC; Avail. Sept. 1988; Pain pharmacol./physiol. postdoctoral position in industry, academia, or institute; Salary negot. 3-2535

Ph.D., 1986; Nutrition, metabolism, regulation of nutrient intake; Research in taste, dietary intake and metabolism in diabetes, experience in brain lesioning, histology, small-animal surgery, RIA; Avail. 5/88; Position in academia/industry/government; Salary negot. 5-2536

Ph.D., 1987; Physiology, neurophysiology, and temperature regulation; Extracellular/intracellular neural recording, stereotaxic surgery and microinjection, temperature measurement techniques; Date negot.; Staff position in academia, research, and teaching preferred; Salary negot. 1-2537

Ph.D., 1983; Physiology; Hormonal control of circulation (especially in splanchic and renal vascular beds), experience in three animal models (dog, cat, and rat); Date negot.; Academic position or industry acceptable; Salary negot. 1-2538

Ph.D., 1980; Cardiopulmonary physiology/pharmacology; Lung hemodynamics and airway mechanics in allergy and in shock models, cell and organelle isolation and metabolism, inflammation and radiolabel techniques; Avail. fall 1988; Salary open. 1-2539

Ph.D., 1986; Immunology and virology; Cell-mediated immunity, cytotoxic T lymphocytes, human and murine cells, cell culture, monoclonal antibody techniques, in vivo models, cytotoxicity assays, proliferation assays, ELISA, transplantation immunology, Down syndrome, rotavirus, artemisasset; Available August 1986; Academia or industry; Salary negot. 6-2540

Ph.D., 1984; Neurochemistry/pharmaceutical sciences; Neurotransmitter receptor purification and molecular characterization, monoclonal antibody production, ligand binding, excitatory amino acid receptor; Available July 1988; Tenure-track or staff position in academia or industry; Salary negot. 2-2542

Ph.D., 1985; Nutritional biochemistry; Experience membrane protein purification/reconstitution, polyclonal/monoclonal antibody techniques, RNA/DNA isolation/assays, cDNA cloning, library screening, background in lipids; Available immediately; Chicago area; Research and/or teaching academia or industry; Salary negot. 2-2543

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Ph.D., 1984; Pharmacology, biochemistry; Experience in lipid mediators of hormone action (diacylglycerol, phosphatidate), Ca²⁺, inositol phosphates, signal transduction, phospholipases, purification of membrane proteins, lipid purification and analysis; Date negot.; Research position in academia or industry; Salary open. 3-2571

Ph.D., 1988 (expected); Pharmacology, membrane biochemistry; Mechanisms of receptor-coupled phospholipase C activation and desensitization, radioligand binding, lipid chromatography, gradient fractionation, electrophoresis, spectrofluoroscopy, enzyme/transport studies; Available Sept. 1988; Postdoctoral position in academia/industry; Salary negot. 3-2573

Ph.D., 1988 (expected); Physiology of exercise; Skeletal muscle function and biochemistry in animals, substrate and protein assays, histology, muscle cell size and number measurements, human health risk measurement, stress testing, metabolic and cardiovascular variables; Available Aug. 1988; Position in acad./indus./postdoc.; Salary negot. 1-2574

Ph.D., 1976, M.B.A., 1988; Extensive experience in protein purification and analysis, characterization of membrane receptors and signal transduction mechanisms, mammalian cell culture, monoclonal antibody production, RIA/ELISA, HPLC, laboratory and project management; Available immediately; R&D management position in industry; Salary negot. 2-2576

M.S., 1988 (expected); Biochemistry, adrenal endocrinology, and metabolic regulation; Enzymology/protein chemistry, electrophoresis/Western blot, molecular wt. anal., chromatographic separation and identity of steroids, culture of adrenal cells, in vitro enzyme assay; Available immediately; Research or assistantship toward Ph.D.; Salary negot. 2-2577

Ph.D., 1988 (expected); Molecular biology, virology, genetics; cDNA cloning, site-directed mutagenesis, DNA transfection, DNA sequencing, Northern/Southern blot analysis, interested in eukaryotic gene regulation; Available fall 1988; SF bay area; Postdoctoral academic position; Salary negot. 2-2578

Ph.D., 1984; Physical bioorganic chemistry; Postdoctoral, enzymology of eukaryotic DNA synthesis, conventional and HPLC enzyme purification, polyclonal antibody production and purification, protein chemistry skills, protein phosphorylation; Available July 1988; Staff position in academia or industry; Salary negot. 2-2579

Ph.D., 1985; Bioorganic, biochemistry, enzymology; Chemical synthesis and characterization of phospholipid analogs, kinetic analysis of both extracellular and membrane phospholipases; Available June 1988; Research position in industry; Salary negot. 2-2582

Ph.D., 1988 (expected); Biochemistry, enzymology, protein chemistry; Large-scale purification, characterization, and structure-function studies of site-directed mutants; Available August 1988; Postdoctoral position in academia or industry; Salary negot. 2-2583

Ph.D., 1986; Molecular biology, virology; Expression of foreign proteins in E. coli and mammalian cells, tissue culture including transfections, virus purification, functional assays, epitope mapping, RNA, DNA sequencing, site-directed mutagenesis; Avail. August 1988; Phila., NJ, N.Y. City area; Staff position in industry; Salary negot. 2-2584

Ph.D., 1986; Biochemistry and nutrition; Techniques for purification and/or quantitation of minerals, lipids, vitamins, proteins and subcellular organelles, RIA, GC, TLC, HPLC, ion-exchange and gel chromatography, electrophoresis and enzymology, 2 yr. postdoc. exp.; Available fall 1988; Position in academia, industry, or government; Salary open. 2-2585

M.S., 1988 (expected); Biochemistry; Solid-phase peptide synthesis, HPLC purif. of peptides, solid-state NMR spectroscopy, microbiol. and organic lab. techniques, isotopic labeling of amino acids and peptides, characterization of protein structure through solid-state NMR spectra; Avail. Sept. 1988; Industrial position; Salary negot. 2-2586

Ph.D., 1985; Biochemistry, receptor biochemistry/molecular biology, enzymology, metabolic regulation; Major interest in characterization, function, and expression of neuroreceptors, exp. in mRNA prep. and anal., oocyte injection, tissue culture, receptor and enzyme assays, chromatog.; Avail. Sept. 1988; Assistant prof. or equiv. position; Salary negot. 2-2587

Ph.D., 1989 (expected); Molecular genetics; Experience in gel electrophoresis (one- and two-dimens.), Ca PO₄ transfection, Hirt isolation, bacterial transformation, λ library construction/screening, Southern blots, plasmid cloning/purif., plaque purif., DNA isol.; Available June 1989; Molecular biology postdoctoral pos. in academia or industry; Salary negot. 2-2588

Ph.D., 1988 (expected); Biochemistry, molecular biology; Recombinant DNA techniques, gene regulation by insulin in cultured cells, cell culture, electrophoresis, DNA sequencing, mRNA isolation, hybridization, and blotting; Available winter 1989; Postdoctoral or entry-level position in academia in industry; Salary negot. 2-2589

Ph.D., 1988 (expected); Pharmacology, muscle physiology, biochemistry, atherosclerosis; Tissue culture, in vivo and in vitro bioassays, lipid and drug analysis, enzyme assay, glycosaminoglycan biochemistry; Available Jan. 1988; Seek molecular biology (cancer or other) postdoctoral position in academia or industry; Salary negot. 3-2592

D.V.M., Ph.D.; Systemic and exercise physiology, nutrition, hypertension, stroke; Adrenergic receptors, cardiovascular surgery and organ transplant; Available April 1988; Staff position in academia or industry; Salary negot. 1-2593

Ph.D., 1989 (expected); Cell biology, toxicology, biochemistry; Cell growth regulation and interactions, growth factor characterization and purification, cellular response to environmental influences; Available summer 1989; Postdoctoral position in academia or industry; Salary negot. 7-2594

Ph.D., 1988 (expected); Nutrition and physiology of ruminant animals; Surgical experience in vascular cannulations, ruminal and abomasal fistulation, intraabdomin nutrition in sheep, diet effects on in vitro gut tissue metabolism, Van Soest fiber analysis, gas chromatography and RIA; Available Sept. 1988; Postdoctoral position; Salary negot. 5-2595

M.S., 1988 (expected); Clinical immunology; Research areas: endothelial and platelet glycoprotein receptor studies and hybridoma development, experience in tissue culture, gel electrophoresis, Western blot, col. chrom., ELISA; Summer 1988; Industry or academia; Salary negot. 6-2596

D.V.M., 1985, Ph.D., 1988 (expected); Immunology, oncology, pathology; Flow cytometry, monoclonal antibody production, immunohistochemistry, immunoprecipitation/electrophoresis, immunomagnetic binding, tissue culture, transfection/molecular biology; Available 1/89; Staff or postdoctoral position in academia/industry/govt.; Salary negot. 6-2597

Ph.D., 1988 (expected); Neuroendocrine immunology, cellular immunology, cell biology; Mechanisms involved in hormone-modulated immune responses, lymphocyte hormone-receptor interactions: receptor binding and induction of cyclic nucleotides; Avail. Oct. 1988; Postdoctoral position in academia preferred, industry considered; Salary negot. 6-2598

Ph.D., 1985, M.D., 1978; Physiology, muscle, respiratory physiology; In vivo and in vitro studies of airway control, isotonic and isometric measurements of muscle performance, muscle fatigue, NMR applications in muscle research, lung function tests; Date negot.; Research and/or teaching preferred; Salary open. 1-2599

D.V.M., Ph.D., 1986; Physiology, neuroscience, neuroanatomy; Immunohistochemistry, neuronal tract tracing, autonomic control of fluid balance and cardiovascular function, behavioral analysis; Available July 1988; Faculty or staff position in academia or industry; Salary negot. 1-2601

Ph.D., 1988 (expected); Physiology, cardiovascular, endocrinology, pharmacology, atherosclerotic mechanisms and pharmacological interactions; Lipid-lipoprotein metabolism, enzyme, hormone assays/HPLC, prostate steroid metabolism; Avail. Aug. 1988; Postdoc. position in academia or industry; Salary negot. 1-2603

Ph.D., 1988 (expected); Endocrinology, intermediary metabolism, physiology; Analysis of hormonal function in obesity, hormone kinetics, liver enzyme activities, primary cell culture, RIA, spectrophotometry, fluorometry, HPLC, small-animal surgery; Available summer 1988; Postdoctoral position in academia or industry; Salary negot. 1-2605
PLACEMENT SERVICE

The Federation operates a Placement Service, year-round and at annual meetings. It matches candidates seeking postdoctoral training and permanent positions with recruiting employers from academia, government, industry and elsewhere. Most candidates are at the doctoral level and in disciplines represented by member societies; individuals holding degrees below the doctorate are not excluded. Candidates and employers participating in Placement Service activities at any annual meeting must register for attendance at that meeting. Features of the Placement Service:

CANDIDATES
Registration is in effect for one year from receipt of completed registration materials and $10 registration fee. During that year, the candidate is entitled to:
• Inclusion of application, if received by mid-January, in annual Candidates, published and distributed in February to about 300 registered employers
• Publication of Position Desired advertisement in one issue of The FASEB Journal (resulting in referral of about 1900 applications each year)
• Use of interviewing facilities at annual meeting, including interview scheduling services (about 4300 interviews scheduled per year), review of posted position vacancy descriptions (about 750 posted per year) and distribution of application to each participating employer
• Availability of application for review by employers visiting the FASEB campus and by FASEB staff members conducting searches on behalf of employers (resulting in referral of about 1900 applications per year)

EMPLOYERS
Registration is on a calendar year basis. Fee for 1988 is $450 for commercial organizations, $225 for academic and other nonprofit institutions, with a minimal additional fee for more than two interviewers at annual meeting to the limit of five per employer registration. During the year of registration, the employer is entitled to:
• Receipt of one copy of annual Candidates, published and distributed in February (includes about 450 applications)
• Inclusion of unlimited number of position vacancy descriptions in annual Positions, published and distributed in March (distribution is about 450)
• Posting of unlimited number of position vacancy descriptions in Placement Service area at annual meeting
• Receipt of copy of application of each candidate attending annual meeting
• Use of interviewing facilities at annual meeting including interview scheduling services (about 4300 interviews scheduled per year)
Following services, of principal use to employers not registered and who are charged a modest fee, are also provided at no charge to registered employers:
• Receipt, upon request, of applications from candidates who insert Position Desired advertisement in The FASEB Journal
• Receipt of applications from candidates identified by search of active files, conducted by Placement Service staff based on description of desired qualifications as provided by employers

GENERAL
Position vacancy descriptions received from any principal employer, whether or not otherwise participating in Placement Service operations, will be included without charge in annual Positions, if received by early February. This publication is for sale to candidates for $10. Yearly average positions included: 375. Registration of candidates and employers by mid-January and early February, respectively, will provide the advantage of publication in Candidates or Positions, as described above. Later advance registration until nine days before the Sunday on which the annual meeting begins, and at-meeting registration are also available. Schedule for Placement Service operations at annual meetings will appear in several issues of The FASEB Journal, as well as in the Program and other materials distributed in advance of the meeting.

For application forms and instructions and other details, please write or call: FASEB Placement Service, 9650 Rockville Pike, Bethesda, Maryland 20814. (301) 530-7020.

PLACEMENT SERVICE SCHEDULE—ANNUAL MEETING—1988

South Hall, Convention Center—Las Vegas, Nevada

REGISTRATION
Sun, May 1 2:00 pm–8:00 pm
Mon–Tues, May 2–3 8:30 am–4:30 pm
Wed, May 4 8:30 am–1:00 pm

INTERVIEW SCHEDULING
Mon–Wed, May 2–4 8:30 am–4:30 pm

INTERVIEWS
Mon, May 2 1:00 pm–4:30 pm
Tues–Wed, May 3–4 9:00 am–4:30 pm
Thurs, May 5 9:00 am–1:00 pm
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NOTICE: Please enclose a list of research activities and accomplishments that might result in a favorable consideration of you as a participant and contributor to this conference. Applications will be forwarded to the chairperson of the desired conference for review and selection.

Would you like to present a poster? ______ If a poster is requested, you must indicate the author and title, and enclose a brief abstract. Notification of poster acceptance will accompany registration materials.

FIXED CONFERENCE FEES

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How To Choose The Right Low Pressure LC System Even If It Isn’t Ours

To simplify choosing the right peristaltic pump, detector and fraction collector for your LC System, review these guidelines and send for our free Low Pressure System Selection Worksheet:

1 Identify your separation goals.
   - Know the characteristics of your sample. What mass will you load on your column? What flow rate will you need to achieve optimal speed and resolution? At which wavelengths does your sample exhibit maximum absorbance? What size fractions will you collect? Are you interested in collecting peaks?

2 Examine the components’ specs.
   - After you’ve identified the key operating parameters, take a look at the pump, detector and fraction collector specifications to be sure they meet your needs. To illustrate, let’s look at specifications for components in the Gilson Low Pressure System.

   The most important criteria used to select a peristaltic pump are smooth, stable flow and usable flow rate range. The Gilson system uses the new Minipuls 3 Pump. Stepper-motor drive and proven pump head design ensure smooth flow from 1 ul to 50 ml/min. A high flow head allows flow rates from 50 ml to 220 ml/min. Interchangeable pump heads with 1-, 2-, 4-, or 8 channels are available.

   Wavelength specificity and ease-of-use are key considerations when choosing a detector. The Gilson 112 UV/VIS fixed-wavelength detector allows selection of wavelengths from 214 nm to 640 nm. A choice of five flow cells accommodates a wide range of flow rates and sample concentrations. A large digital readout and convenient autozero and event mark functions keep detector operation easy.

   Select a fraction collector according to your collection mode, fraction volume, and multiple column collection needs.

   Gilson’s FC 203 fraction collector allows drop, time, or peak collection modes with up to ten collection windows in each mode. The widest range of racks available—capable of handling as many as 128 fractions—makes the FC 203 suitable for almost any application.

3 Check for compatibility of components with each other and with your future needs.
   - At this point, you’ve identified components to meet basic needs, but also look at the components as a system. Were they designed to work together? Or will you need to buy complicated adapters and special plumbing? Working with a single supplier avoids the service and support problems often associated with a system assembled piece-by-piece.

   You should also assess your future needs. An LC system may work fine for your current application. But will you need to change detection wavelengths or collection volumes later? Is an upgrade to HPLC a possibility? If so, consider modular equipment that adapts to your changing needs easily and inexpensively.

4 Look at each supplier’s record of reliability, service and support.
   - After identifying suitable components, you narrow your choice by looking at each supplier’s track record for reliable equipment and efficient service.

   To evaluate the Gilson Low Pressure System, consider our reputation for fraction collectors and detectors. Gilson has a proven track record that began more than 35 years ago. More than 1000 FC 203s—introduced just 16 months ago—continue to display dependable, trouble-free operation.

   The Minipuls 2, the reliable predecessor to our new Minipuls 3, has earned spaces on more than 24,000 lab benches worldwide, making it the best-selling peristaltic pump.

5 Use our free Low Pressure LC System Selection Worksheet to gather and compare your options.
   - For the final step in choosing your system, compare the information you’ve gathered. To help, we’ve put together a selection worksheet to simplify the process.

   This free worksheet lists major criteria to use in your comparisons. We’ve filled in information about the Gilson Low Pressure System and have left space for you to fill in specifics from other suppliers.

   Why do we encourage this comparison? Because it’s the best way to buy a system matched to your needs. Plus, we’re confident that in most cases your low pressure system will be a Gilson Low Pressure System.

   So, for your free Low Pressure System Selection Worksheet, simply circle the magazine’s reader service number or call us toll free at 800-445-7667. We’ll see that you get your worksheet fast.

4 GILSON

Gilson Medical Electronics, Inc., Box 27, 3000 W Beltine Hwy., Middleton, WI 53562 USA, Tel: (608) 836-1551 Telex: 26-5478
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