carboxylic acid in vivo; rodents were unable to form the hydroxymethyl product. The metabolism of some drugs yielded multiple products. A good example is 17α-ethynylestradiol, which is converted to about eight different metabolites, varying markedly in relative amounts in rat and dog (beagle). One product, *d*-homoestrone, was formed by dog, but not by rat, liver microsomes.

Studies of drug interactions continue to yield important information. Drugs like ephedrine were shown to speed the rate of blood clearance of other drugs like dexamethasone, possibly by altering its rate of biotransformation. Other drugs have similar effects but may act, like phenobarbital, by altering hepatic blood flow. Phenobarbital was reported to increase hepatic blood flow up to 30 percent, thereby increasing hepatic drug clearance and altering body distribution and metabolism of almost any drug present in the patient's blood.

The importance of knowing all drug metabolites and their biological significance was stressed by many studies. Overdoses of glutethimide, for example, caused toxic manifestations that did not correlate well with the concentrations of glutethimide in the plasma. Upon examination, it was found that a hydroxy metabolite is formed, with a potency twice that of the parent drug. It can reach much higher concentrations than those of glutethimide when large doses are administered, thereby causing toxic manifestations. However, when normal doses are given, the concentrations of the metabolite are very low.

The objective of clinical pharmacology and toxicology is better patient care. Research efforts in this area are directed toward improving the safety of drugs by recognizing and eliminating the causes of undesirable drug effects. In addition, biochemical studies of pathways of drug metabolism have generated ingenious new treatments for previously untreatable diseases.

Immunoglobulin D antibodies to penicillin may be important mediators of nonanaphylactoid but serious reactions to penicillin, such as exfoliative dermatitis, serum sickness, and the potentially fatal Stevens-Johnson syndrome, according to J. R. Caldwell (University of Florida).

Hematologic toxicity has severely limited the use of chloramphenicol, an otherwise effective antibiotic. Adel A. Yunis (University of Miami) and his colleagues have studied the reversible and irreversible effects of this drug on bone marrow cultures. Chloramphenicol and its sulfur-containing analog exert a dose-related but reversible suppression of bone marrow cells by inhibiting synthesis of mitochondrial proteins. An irreversible suppression of mitochondrial protein synthesis in bone marrow cells is thought to be caused by an alteration of DNA synthesis in genetically predisposed patients that is caused by the para-nitro group of chloramphenicol.

Treatment for the porphyrias in man has been lacking. T. R. Tephly (University of Iowa) and his colleagues reported results of research that may lead to the prevention of serious and painful attacks of this disease. Metabolic studies have indicated that all porphyrias are associated with a derangement of the heme biosynthetic pathway. This results in an accumulation of various intermediates instead of the end product, which should be hemoprotein. Using sodium benzoate and para-aminobenzoic acid, Tephly and his associates diverted glycine away from heme biosynthesis to hippurate synthesis. The clinical and biochemical manifestations of porphyria in animals were thus ameliorated. Both sodium benzoate and para-aminobenzoic acid have been safely used in humans for other disorders. Based on a firm biochemical foundation, this clever and apparently safe pharmacologic method of control of porphyria may soon be used to treat humans.

This was a unique symposium in that all of the research was supported by grants from the Pharmacology-Toxicology Program of the National Institute of General Medical Sciences.

GEORGE J. COSMIDES
National Institute of General Medical Sciences, Bethesda, Maryland 20014

Forthcoming Events

April

22–25. American Acad. of **Pediatrics**, Bal Harbour, Fla. (R. G. Frazier, 1801 Hinman Ave., Evanston, Ill. 60204)

22–26. Conference on **Anomalous Scattering**, Intern. Union of Crystallography and Commission on Crystallographic Apparatus, Madrid, Spain. (S. C. Abrahams, Bell Labs., Murray Hill, N.J. 07974)

22–26. European Conf. on **Electrotechnics**, Inst. of Electrical and Electronics Engineers and Natl. Societies of Electrical

Engineers of Western Europe, Amsterdam, Netherlands. (W. E. Noller, Digital Telephone Systems, 85 Mitchell Blvd., P.O. Box 4222, San Rafael, Calif. 94903)

23–24. **Water Quality**, 7th intern. symp., Water Quality Research Council, Washington, D.C. (David X. Manners Co., Inc., 237 E. Rocks Rd., Norwalk, Conn. 06851)

23–25. Society for the **Advancement of Material and Process Engineering**, 19th natl. symp., Buena Park, Calif. (M. Smith, SAMPE, P.O. Box 613, Azusa, Calif. 91702)

23–26. **Acoustical** Soc. of America, New York, N.Y. (B. H. Goodfriend, ASA, 335 E. 45 St., New York 10017)

23–27. Arizona **Medical** Assn., Scottsdale. (B. E. Robinson, AMA, 810 W. Bethany Home Rd., Phoenix 85013)

24–26. Pittsburgh Conf. on **Modeling and Simulation**, 5th annual, Pittsburgh, Pa. (W. G. Vogt, 231 Benedum Engineering Hall, Univ. of Pittsburgh, Pittsburgh 15213)

24–26. North Carolina Acad. of **Science**, Boone. (J. A. Yarbrough, Dept. of Biology, Meredith College, Raleigh, N.C. 27602)

24–27. American Assoc. for the **Advancement of Science**, Southwestern and Rocky Mountain Div., Laramie, Wyo. (M. P. Dunford, P.O. Box 3AF, Las Cruces, N.M. 88003)

24–27. **Biological Rhythms in the Marine Environment** Symp., Georgetown, S.C. (P. J. DeCoursey, Baruch Inst., Univ. of South Carolina, Columbia 29208)

25–26. American **Broncho-Esophagological** Assoc., Palm Beach, Fla. (W. H. Maloney, ABEA, 2065 Adelbert Rd., Cleveland, Ohio 44106)

25–27. Ohio Acad. of **Science**, Wooster. (J. H. Melvin, OAS, 445 King Ave., Columbus 43201)

25–27. Louisiana Acad. of **Sciences**, Lafayette. (R. Smith, Dept. of Physics, Northeast Louisiana Univ., Monroe 71201)

25–29. Association for **Research in Vision and Ophthalmology**, Dallas, Tex. (R. D. Reinecke, Dept. of Ophthalmology, Albany Medical College, Albany, N.Y. 12208)

26–27. Georgia Acad. of **Science**, Valdosta. (G. Koch, Dept. of Geology, Univ. of Georgia, Athens 30601)

26–27. Iowa Acad. of **Science**, Fayette. (R. W. Hanson, Dept. of Chemistry, Univ. of Northern Iowa, Cedar Falls 50613)

26–27. Missouri Acad. of **Science**, Maryville. (R. G. Combs, 206 Electrical Engineering Bldg., Univ. of Missouri, Columbia 65201)

26–27. North Dakota Acad. of **Science**, Fargo. (A. W. Johnson, P.O. Box 8123, University Station, Grand Forks 58201)

26–27. Wisconsin Acad. of **Sciences, Arts and Letters**, Green Bay. (J. R. Batt, WASAL, 5001 University Ave., Madison 53706)

26–27. American Assoc. of **University Professors**, Washington, D.C. (B. H. Davis, AAUP, Suite 500, 1 Dupont Circle, NW, Washington, D.C. 20036)

26–28. National Assoc. for **Research in Science Teaching**, Chicago, Ill. (R. W. Lefler, Dept. of Physics, Purdue Univ., Lafayette, Ind. 37907)

26–28. International Symp. on the

World's Cats, 3rd, Woodland Park Zoological Gardens, Seattle, Wash. (R. L. Eaton, Zoology Dept., Univ. of Washington, Seattle 98105)

27–3. American **Pediatric** Soc., Washington, D.C. (C. D. Cook, Yale Univ. School of Medicine, 333 Cedar St., New Haven, Conn. 06510)

28–1. Association of **American Geographers**, Seattle, Wash. (J. W. Nystrom, AAG, 1710 16th St., NW, Washington, D.C. 20009)

28–1. Institute of **Environmental Sciences**, 20th annual, Washington, D.C. (B. L. Peterson, IES, 940 E. Northwest Highway, Mount Prospect, Ill. 60056)

28–1. Arkansas **Medical** Soc., Little Rock. (P. C. Schaefer, AMS, P.O. Box 1208, Fort Smith 72901)

28–1. Nebraska **Medical** Assoc., Omaha. (K. E. Neff, 1901 First National Bank, Lincoln 68508)

28–2. American **Ceramic** Soc., 76th annual, Chicago, Ill. (F. P. Reid, ACS, Inc., 65 Ceramic Dr., Columbus, Ohio 43214)

28–2. **Diesel and Gas Engine Power** Conf., American Soc. of Mechanical Engineers, Houston, Tex. (M. Churchill, ASME, 345 E. 47 St., New York 10017)

28–2. American **Oil Chemists'** Soc., Mexico City, Mexico. (J. C. Lyon, AOCS, 508 S. 6 St., Champaign, Ill. 61820)

28–3. Society of **Photographic Science and Engineering**, 27th annual, Boston, Mass. (R. A. Eynard, SPSE, P.O. Box 2001, Teterboro, N.J. 07608)

29–30. **Ambulatory Pediatric** Assoc., Washington, D.C. (E. Hillman, Montreal Children's Hospital, 2300 Tupper St., Montreal 108, Canada)

29–1. Institute of **Electrical and Electronic Engineers** and Intern. Soc. for **Hybrid Microelectronics**, Orlando, Fla. (C. E. Jones, Mail Joint 47, Martin Marietta Corp., P.O. Box 5837, Orlando 32805)

29–1. American **Power** Conf., American Soc. of Mechanical Engineers, Chicago, Ill. (M. Churchill, ASME, 345 E. 47 St., New York 10017)

29–2. American College of **Obstetricians and Gynecologists**, Las Vegas, Nev. (M. Newton, 1 E. Wacker Dr., Chicago, Ill., 60601)

29–2. **Physical Organic Chemistry**, 2nd Conf., Intern. Union of Pure and Applied Chemistry, Noordwijkerhout, Netherlands. (Th. J. de Boer, Lab. for Organic Chemistry, Nieuwe Achtergracht 129, Amsterdam, Netherlands)

29–3. Society of **Manufacturing Engineers**, Philadelphia, Pa. (R. W. Taylor, SME, 20501 Ford Rd., Dearborn, Mich. 48128)

29–3. American Assoc. of **Workers for Children**, 8th congr., Intern. Assoc. of Workers for Maladjusted Children, Fribourg, Switzerland. (S. B. Ross, Jr., AAWC, 26 E. 31 St., New York 10016)

30. American Assoc. of **Scientific Workers**, New York, N.Y. (I. Goodman, College of Physicians & Surgeons, Columbia Univ., 630 W. 168 St., New York 10032)

30–2. Conference on **Electrodeposited Metallic Coatings**, American Soc. for Testing and Materials, Philadelphia, Pa. (J. McFadden, ASTM, 1916 Race St., Philadelphia 19103)

30–2. Connecticut State **Medical** Soc., Hartford. (W. R. Richards, 160 St. Ronan St., New Haven 06511)

30–3. Virginia Acad. of **Science**, Norfolk, Va. (B. M. Bruner, Box 8454, Richmond 23226)

30–4. Mexican **Pediatric** Assoc., 4th, Mexico City. (G. S. Santibanez, José Ma Izizaga 70, 2° Piso, Mexico 1, D.F.)

May

1–3. Conference on **Metal Powders and Metal Powder Products**, Committee B-9, American Soc. for Testing and Materials, Fort Lauderdale, Fla. (J. McFadden, Meetings Dept., ASTM, 1916 Race St., Philadelphia, Pa. 19103)

1–3. American **Surgical** Assoc., Colorado Springs, Colo. (G. T. Shires, ASA, 5323 Harry Hines Blvd., Dallas, Tex. 75235)

1–3. International Conf. on **Transport of Persistent Chemicals in Aquatic Ecosystems**, Natl. Research Council of Canada, Ottawa. (M. K. Ward, Natl. Research Council of Canada, Ottawa K1A OR6)

1–4. International Symp. on **Flammability and Fire Retardants**, Cornwall, Ont., Canada. (V. M. Bhatnagar, 209 Dover Rd.. Cornwall, Ont.)

1–6. American **Psychoanalytic** Assoc., Detroit, Mich. (M. A. Berezin, 90 Forest Ave., West Newton, Mass. 02165)

2–3. **Fiber** Soc., Inc., Williamsburg, Va. (L. Rebenfeld, Textile Research Inst., P.O. Box 625, Princeton, N.J.)

2–3. American Soc. of **Naval Engineers**, Washington, D.C. (ASNE, Suite 807, 1012 14th St., NW, Washington, D.C. 20005)

2–4. Society for American **Archaeology**, Washington, D.C. (R. E. W. Adams, College of Humanities and Social Sciences, Univ. of Texas, 4242 Piedras E, San Antonio 78284)

2–4. Midwestern **Psychological** Assoc., Chicago, Ill. (R. W. Schulz, Dept. of Psychology, Univ. of Iowa, Iowa City 52240)

2–5. Christian **Medical** Soc., Ann Arbor, Mich. (H. W. Robinson, CMS, 3909 Swiss Ave., Dallas, Tex. 75214)

2–6. North Dakota **Medical** Assoc., Fargo. (L. A. Limond, Box 1198, Bismarck, N.D. 58501)

3–4. American College of **Clinical Pharmacology**, Atlantic City, N.J. (W. D. Sharpe, ACCP, 100 Bergen St., Newark, N.J. 07103)

3–4. **Drug-Induced Carcinogenesis** Symp., American College of Clinical Pharmacology, Atlantic City, N.J. (ACCP, 2 E. 103 St., New York 10029)

3–4. Minnesota Acad. of **Science**, St. Paul. (M. I. Harrigan, MAS, 3100 38th Ave., S, Minneapolis 55406)

3–4. Southern California Acad. of **Sciences**, Fullerton. (S. L. Warter, Dept. of Biology, California State Univ., Long Beach 90840)

3–5. American Soc. of **Internal Medicine**, San Francisco, Calif. (W. R. Ramsey, ASIM, 525 Hearst Bldg., 3rd at Market, San Francisco 94103)

3–5. American Acad. of **Psychoanalysis**, Detroit, Mich. (J. Barnett, AAP, 40

Gramercy Park, N, New York 10010)

3–8. American **Ceramic** Soc., 77th annual, Washington, D.C. (F. P. Reid, ACS, 65 Ceramic Dr., Columbus, Ohio 43214)

3–17. International Acad. of **Proctology**, 26th annual, Montreux and Zurich, Switzerland. (IAP, 147-41 Sanford Ave., Flushing, N.Y. 11355)

4. American Soc. for **Clinical Nutrition**, Atlantic City, N.J. (G. Knight, ASCN, 9650 Rockville Pike, Bethesda, Md. 20014)

4. Society for **Investigative Dermatology**, Atlantic City, N.J. (J. S. Strauss, Boston Univ. Medical Center, 80 E. Concord St., Boston, Mass. 02118)

4–5. American Soc. for **Clinical Investigation**, Atlantic City, N.J. (P. Calabresi, Roger Williams General Hospital, Providence, R.I. 02908)

4–5. American Federation for **Clinical Research**, Atlantic City, N.J. (C. B. Slack, 6900 Grove Rd., Thorofare, N.J. 08086)

4–5. Guild of **Professional Translators**, Philadelphia, Pa. (C. Parsons, GPT, 5914 Pulaski Ave., Philadelphia 19144)

5–7. Louisiana State **Medical** Soc., Lake Charles. (A. A. Thomas, 1700 Josephine St., New Orleans, La. 80113)

5–8. **Health Sciences Communications** Assoc., Denver, Colo. (S. A. Agnello, Box 3163, Duke Univ. Medical Center, Durham, N.C. 27710)

5–8. Kansas **Medical** Soc., Topeka. (O. E. Ebel, KMS, 1300 Topeka Ave., Topeka 66612)

5–8. **Offshore Technology** Conf., American Soc. Mechanical Engineers, Houston, Tex. (P. Drummond, ASME, 345 E. 47 St., New York 10017)

6–9. **Aerospace Medical** Assoc., Washington, D.C. (M. H. Goodwin, Washington Natl. Airport, Washington, D.C. 20001)

6–9. **Design Engineering** Conf., American Soc. of Mechanical Engineers, Chicago, Ill. (ASME, United Engineering Center, 345 E. 47 St., New York 10021)

6–9. Mississippi State **Medical** Assoc., Biloxi. (C. L. Mathews, 735 Riverside Dr., Jackson, Miss. 39216)

6–10. Symposium on the **Formation of Uranium Ore Deposits**, Intern. Atomic Energy Agency, Vienna, Austria. (J. H. Kane, Office of Information Services, U.S. Atomic Energy Commission, Washington, D.C. 20545)

6–10. American **Psychiatric** Assoc., Detroit, Mich. (W. E. Barton, APA, 1700 18th St., NW, Washington, D.C. 20009)

6–11. **Polar Oceans** Conf., 2nd Scientific Committee on Oceanic Research and Antarctic Research, Montreal, P.Q., Canada. (M. J. Dunbar, Marine Sciences Director, Bedford Inst. of Oceanography, Dartmouth, N.S., Canada)

8–10. Conference on **Gas-Cooled Reactors**: HTGR and GCFBR, American Nuclear Soc., Gatlinburg, Tenn. (P. R. Kasten, Oak Ridge Natl. Lab., P.O. Box Y, Oak Ridge, Tenn. 37830)

8–10. **Logistics Research** Conf., Office of Naval Research, George Washington Univ., Air Force Office of Scientific Research, and Army Research Office, Washington, D.C. (A. V. Fiacco, George Washington Univ., Washington, D.C. 20006)

8–12. Florida **Medical** Assoc., Hollywood-by-the-Sea. (W. H. Parham, FMA, P.O. Box 2411, Jacksonville, Fla. 32203)

9–10. **Spontaneous Regression of Cancer** Symp., Johns Hopkins Medical Inst., and American Cancer Soc., Baltimore, Md. (M. Heyssel, Turner 19, Johns Hopkins Hospital, Baltimore 21205)

9–11. American College of **Legal Medicine**, Atlanta, Ga. (B. Hanna, Suite 1201, 1340 N. Astor St., Chicago, Ill. 60610)

9–11. American College of **Sports Medicine**, Knoxville, Tenn. (D. E. Herrmann, ACSM, 1440 Monroe St., Madison, Wis. 53706)

9–11. Association of **University Radiologists**, 22nd annual, New York, N.Y. (N. E. Chase, New York Medical Center, New York 10016)

9–12. Cooper **Ornithological** Soc., Flagstaff, Ariz. (J. D. Ligon, Dept. of Biology, Univ. of New Mexico, Albuquerque 87106)

10–12. Pennsylvania Soc. of **Anesthesiologists**, Champion. (L. J. Hampton, 300 Highland Ave., Hanover, Pa. 17331)

10–12. **Medical** Assoc. of Georgia, Savannah. (J. M. Moffett, 938 Peachtree St., NE, Atlanta, Ga. 30309)

10–12. Pacific Northwest **Radiological** Soc., Seattle, Wash. (B. J. Wood, Dept. of Radiology, Vancouver General Hospital, Vancouver 9, B.C., Canada)

11–13. Iowa **Medical** Soc., Des Moines. (D. L. Taylor, 100 Grand Ave., West Des Moines 50265)

11–14. **Medical** Soc. of New Jersey, Atlantic City. (V. A. Maressa, P.O. Box 904, 315 W. State St., Trenton, N.J. 08605)

12–14. South Carolina **Medical** Assoc., Myrtle Beach. (M. L. Meadors, 113 N. Coit St., Florence, S.C. 29501)

12–15. Ohio State **Medical** Assoc., Cleveland. (H. F. Page, Suite 500, 17 S. High St., Columbus, Ohio 43215)