

nucleus, while the cytoplasm of hepatoma 9121 behaved like normal liver.

In the session on carbohydrates and fatty acids, Gullino described work with hepatomas implanted in rat ovaries to permit sampling of afferent and efferent blood in vivo. He found a reversed Pasteur effect: anaerobiosis resulted in a lowered glucose consumption and lactic acid production. Devlin reported that, whereas liver mitochondria catalyze both an intra- and extra-mitochondrial β -hydroxybutyrate dehydrogenase, the hepatoma mitochondria had only the intramitochondrial activity. The enzyme seemed to be significantly lower in all hepatomas than in normal liver. Weinhouse has found that in homogenates of the well-differentiated hepatomas lactate production was low and respiratory phosphorylation was not diminished. Intermixing of particulate and supernatant fractions from hepatomas with different glycolytic capacity made it clear that glycolysis could be regulated by the intensity of mitochondrial respiration. Fractionation of several enzymes by electrophoresis or column chromatography established that the highly differentiated hepatomas possessed enzymes characteristic of adult liver while the poorly differentiated hepatomas had enzymes characteristic of nonhepatic or fetal tissue. Fatty acid oxidation and synthesis in Morris hepatomas 5123C, 7793, 7795, and 7800 occurred but was insensitive to the nutritional state of the host, in contrast to normal liver (Abraham). Cholesterol synthesis was impaired in host liver presumably caused by cholesterol deposition, but in the tumors the rate was up to ten times that of normal liver (Ofner).

In the final session Wu reported that glutamine synthetase is present in some Morris hepatomas and is almost lacking in others. Cortisol induced the enzyme in the hepatomas to a much greater extent than in normal or regenerating liver. Rechcigl measured rates of catalase synthesis and degradation in hepatomas and in host liver. In one example, the catabolic rate was 2.4 percent per hour in both hepatoma and host liver, whereas the synthetic rate was 0.92 and 3.88 unit/g per hour, respectively, showing that the catalase concentration in the hepatoma was determined by decreased synthesis rather than by increased degradation. Sorof presented the latest findings on the h_2 soluble proteins of liver which bind liver carcinogens and inhibit cell

replication in tissue culture. Evidence was presented linking the relevant properties of the h_2 proteins with arginase activity. Pitot reported new findings on the glucose repression of serine dehydrase synthesis with immunochemical techniques. Repression of enzyme synthesis was demonstrated in liver but in none of the hepatomas that were studied.

Although none of the studies demonstrated a molecular defect universally present in all hepatomas (such as the total loss or unique presence of an enzyme or individual regulatory protein, membrane component, or regulatory target) several appeared to be approaching this goal. While some investigators were discouraged by the many enzyme patterns that were evidently compatible with the neoplastic process, others were encouraged by the thought that many laboratories were now concentrating on experimental tumors that could be characterized by growth rate, karyotype, activities of a large number of enzymes, and responses to enzyme regulation. It appeared that although many of these hepatomas were nearly normal with respect to glycolysis, karyotype, and enzymes characteristic of normal liver, some showed drastic alterations in certain enzyme activities, and none of them appeared to be normal with respect to their response to normal controls. Many more strains of hepatoma need to be compared; hopefully the essential changes can be separated from nonessential changes, and one or more hepatomas with a minimum of molecular alterations will be discovered. Meanwhile, the multiplicity of enzyme patterns provided a sobering realization that cancer chemotherapy, lacking guiding principles, faces tremendous obstacles until key targets can be identified.

SIDNEY WEINHOUSE

*Fels Research Institute,
Temple University School of Medicine,
Philadelphia, Pennsylvania*

Calendar of Events—November

National Meetings

5-8. National **Agricultural Chemicals** Assoc., 34th annual mtg., Palm Springs, Calif. (National Agricultural Chemicals Assoc., 1145 19th St., NW, Washington, D.C. 20006)

5-8. American Society of **Plastic and Reconstructive Surgeons**, annual mtg., New York, N.Y. (P. Randall, ASPRS,

2850 Sixth Ave., Suite B, San Diego, Calif.)

5-9. American **Nuclear** Soc., Chicago, Ill. (O. J. Du Temple, Executive Secretary, American Nuclear Soc., 244 E. Ogden Ave., Hinsdale, Ill. 60521)

5-10. American Soc. of **Agronomy**, Washington, D.C. (Executive Secretary, 677 S. Segoe Rd., Madison, Wis. 53711)

5-10. **Crop Science** Soc. of America, Washington, D.C. (Executive Secretary, 677 S. Segoe Rd., Madison, Wis. 53711)

5-10. **Soil Science** Society of America, Washington, D.C. (Executive Secretary, 677 S. Segoe Rd., Madison, Wis. 53711)

6-8. **Applied Superconductivity**, conf. and exhibition, Austin, Tex. (G. D. Cody, Publicity Chairman, RCA Laboratories, Princeton, N.J. 08540)

6-8. **Ground-Water Hydrology**, natl. symp., San Francisco, Calif. (M. A. Marino, % AERA Hq., 1201 16th St., NW, Washington, D.C. 20006)

6-8. **Speech Communication and Processing**, annual conf., Cambridge, Mass. (G. Cushman, 555 Huntington Ave., Boston, Mass.)

6-8. **Weather Forecasting**, conf., Fort Worth, Tex. (K. C. Spengler, American Meteorological Soc., 45 Beacon St., Boston, Mass.)

6-9. Interstate **Postgraduate Medical** Assoc. of North America, annual mtg., Chicago, Ill. (R. T. Ragatz, Box 1109, Madison, Wis.)

7-9. **Automatic Support Systems for Advanced Maintainability**, 1967 symp., Clayton, Mo. (D. L. Reed, Box 4124, Jennings Station, St. Louis, Mo. 63136)

7-9. **Reliability Physics**, 6th symp., Los Angeles, Calif. [A. Coppola, Publicity Chairman, RADC (EMERS), Griffis AFB, New York 13440]

8-10. Eastern **Analytical** Symp., New York, N.Y. (E. G. Brame, Jr., Elastomer Chemistry Dept., duPont Experiment Sta., Wilmington, Del. 19898)

8-10. American **Water Resources** Assoc., 3rd annual conf., San Francisco, Calif. (A. A. Stone, International Engineering Co., 74 New Montgomery St., San Francisco 94105)

8-11. **Respiratory Therapy**, 4th annual conf., Boston, Mass. (M. J. Nicholson, 6 Beacon St., Suite 620, Boston 02108)

9-11. **Gerontological** Soc., Inc., 20th annual mtg., St. Petersburg, Fla. (Mrs. M. Adler, 660 S. Euclid St., St. Louis, Mo.)

10. **Laboratory Animal in Gerontologic Research**, symp., St. Petersburg, Fla. (R. H. Yager, Natl. Acad. of Sciences-Natl. Research Council, 2101 Constitution Ave., NW, Washington, D.C.)

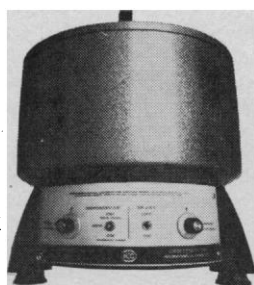
11-12. American Acad. of **Psychotherapists**, annual conf., Warrenton, Va. (H. Rockberger, Conference Chairman, 44 South Munn Ave., East Orange, N.J. 07017)

11-15. American Soc. for **Cell Biology**, 7th annual mtg., Denver, Colo. (M. J. Moses, Box 2982, Duke Univ. Medical Center, Durham, N.C. 27706)

12-17. American Soc. of **Mechanical Engineers**, winter annual mtg., Pittsburgh, Pa. (A. B. Conlin, Jr., 345 E. 47 St., New York 10017)

13-15. **Industrial Diamond Revolution**, technical conf., Columbus, Ohio (Con-

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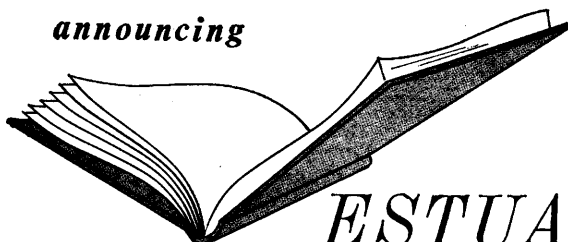


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13-15. American Petroleum Inst., 47th annual mtg., Chicago, Ill. (American Petroleum Inst., 1271 Ave. of the Americas, New York 10020)

13-16. Engineering in Medicine and Biology, 20th annual conf., Boston, Mass. (Professional Assocs., 6520 Clayton Rd., St. Louis, Mo. 63117)

14-16. American Federation of Information Processing Societies, fall joint computer conf., Anaheim, Calif. (Executive Secretary, 211 E. 43 St., New York 10017)

14-17. American Acoustical Soc., fall mtg., Miami Beach, Fla. (J. Steinberg, Inst. of Marine Science, Univ. of Miami, Miami 33149)

14-18. Air-Conditioning and Refrigeration Inst., annual mtg., Miami, Fla. (1815 N. Fort Myer Dr., Arlington, Va. 22209)

15-18. American Society of Tool and Manufacturing Engineers, semi-annual conv., Dearborn, Mich. (The Society, 20501 Ford Rd., Dearborn 48128)

16-18. American Physical Soc., New York, N.Y. (W. W. Havens, 538 W. 120 St., New York 10027)

16-19. National Soc. for Crippled Children and Adults, annual mtg., Los Angeles, Calif. (K. Bauer, Director of Public Relations, 2023 W. Ogden Ave., Chicago, Ill.)

17-18. Computer Applications in Clinical Electrocardiography, postgraduate program, Washington, D.C. (J. S. France, Assistant Director, American College of Cardiology, Bethesda, Md. 20014)

19-21. International College of Surgeons, 5th Western regional mtg., Las Vegas, Nev. (F. M. Turnbull, Jr., 1127 Wilshire Blvd., Los Angeles, Calif. 90017)

19-22. Association of Military Surgeons of the U.S., annual mtg., Washington, D.C. (Brig. Gen. F. E. Wilson, AMSUS, 1500 Massachusetts Ave., NW, Suite 132, Washington, D.C. 20005)

20-22. Society of Economic Geologists, New Orleans, La. (J. O. Kalliokoski, Dept. of Geology, Princeton Univ., Princeton, N.J. 08540)

20-22. American Physics Soc., annual Fluid Dynamics mtg., Bethlehem, Pa. (P. S. Klebanoff, Natl. Bureau of Standards, Connecticut Ave. at Van Ness St., NW, Washington, D.C. 20234)

20-22. Geological Soc. of America, annual mtg., New Orleans, La. (G. E. Murray, Texas Technical College, Box 4680, Technical Station, Lubbock, Tex., or Miss D. Curtis, Shell Oil Co., Box 60193, New Orleans 70160)

20-22. Geochemical Soc., annual mtg., New Orleans, La. (E. C. T. Chao, % U.S. Geological Survey, Washington, D.C.)

20-22. Mineralogical Soc. of America, New Orleans, La. (G. Switzer, % U.S. National Museum, Washington, D.C. 10025)

20-22. Paleontological Soc. of America, New Orleans, La. (R. L. Langenheim, Dept. of Geology, Univ. of Illinois, Urbana)

26-29. American Medical Assoc., clinical conv., Houston, Tex. (W. E. Burmeister, Director, Convention Services Dept., AMA, 535 N. Dearborn St., Chicago, Ill.)

26-30. American Inst. of Chemical En-

gineers, 60th annual mtg., New York, N.Y. (H. I. Wolff, Shell Chemical Co., 50 W. 50 St., New York 10020)

26-1. **Radiological Soc.** of North America, 53rd annual mtg., Chicago, Ill. (M. D. Frazer, RSNA, 713 East Genesee St., Syracuse, N.Y.)

27-29. **American Astronautical Soc.**, natl. mtg., New York, N.Y. (N. Levin, Guidance and Control, Plant 35, Grumman Engineering Corp., Bethpage, N.Y. 11714)

27-30. **Entomological Soc.** of America, annual mtg., New York, N.Y. (R. H. Nelson, ESA, 4603 Calvert Rd., College Park, Md.)

27-1. **Chemical Industries**, New York, N.Y. (International Exposition Co., 200 Park Ave., New York 10017)

28. **American Soc. of Therapeutic Radiologists**, Chicago, Ill. (J. A. Del Regato, Penrose Cancer Hospital, Colorado Springs, Colo. 80907)

29-30. **Society for Industrial and Applied Mathematics**, fall mtg., Santa Barbara, Calif. (H. B. Hair, 33 S. 17 St., Philadelphia, Pa. 19103)

29-1. **Wire and Cable Symp.**, Atlantic City, N.J. (J. Spergel, USAEC, Fort Monmouth, N.J. 07703, attn: AMSEL-KL-EE)

30-3. **American Anthropological Assoc.**, annual mtg., Washington, D.C. (C. Frantz, 1530 P St., NW, Washington, D.C. 20005)

International and Foreign Meetings

1-3. **Northern Development Conf.**, 4th, Edmonton, Alberta, Canada. (Alberta and Northwest Chamber of Mines and Resources, Edmonton)

5-11. **Allergology**, 6th intern. congr., Montreal, Canada. (S. O. Freedman, 1390 Sherbrooke St., W., Montreal 25)

5-11. **Pharmaceutical Federation**, 4th Central American, San Salvador, El Salvador. (% International Pharmaceutical Federation, 11 Alexanderstraat, The Hague, Netherlands)

6-10. **Microbiological Standards and Testing Methods for Irradiated Food**, Vienna, Austria. (International Agency Liaison Branch, Office of the Director General, Food and Agriculture Organization, Via delle Terme di Caracalla, Rome, Italy)

6-11. **Global Impacts of Applied Microbiology**, 2nd intern. conf., Addis Ababa, Ethiopia. (A. Lemma, Faculty of Science, Haile Sellassie I Univ., Addis Ababa)

6-14. **Dentistry**, intern. symp., Quito, Ecuador. (O. C. Jaramillo, Decano, Facultad de Odontologia, Universidad Central, Quito)

6-24. **Meteorological Instructors**, regional seminar, Santiago, Chile. (World Meteorological Organization, 41, Av. Giuseppe Motta, Geneva, Switzerland)

7-10. **Methods in Soil Ecology**, symp., Paris, France (UNESCO, Pl. de Fontenoy, Paris 7)

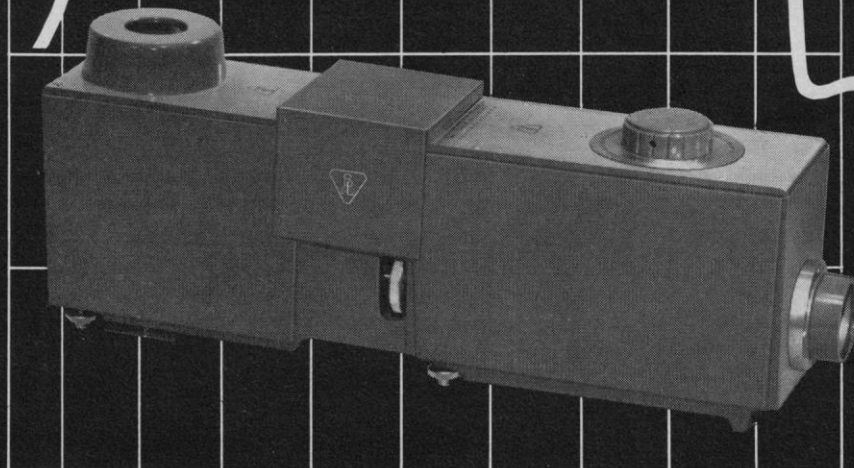
8-10. **Electroplating**, intern. conf., Erfurt, Germany. (Dr. Burkhardt, PV Elektrotechnik, Pa 16, Galvanotechnik, Kammer der Technik, Torgauer Str. 76, 705 Leipzig 5, Germany)

9-10. **American Anthropological Assoc.**, annual mtg., Toronto, Ontario, Canada. (Executive Secretary, 1530 P St., NW, Washington, D.C. 20005)

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