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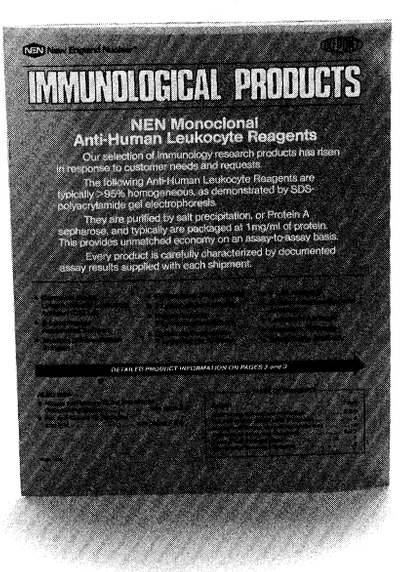

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COVER

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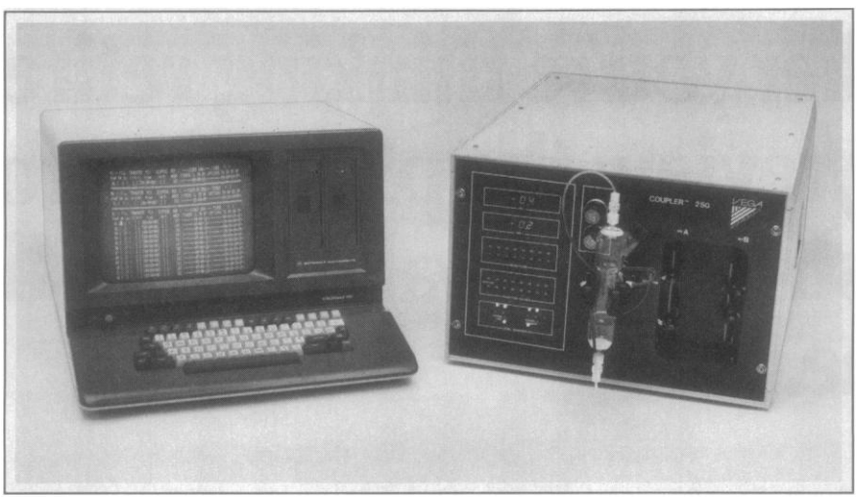

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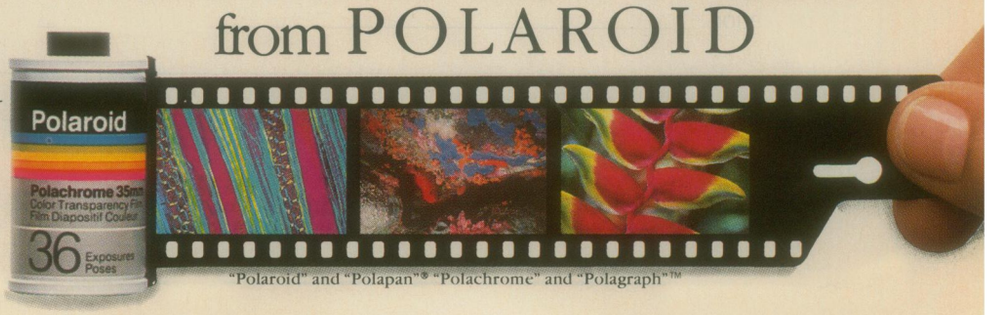

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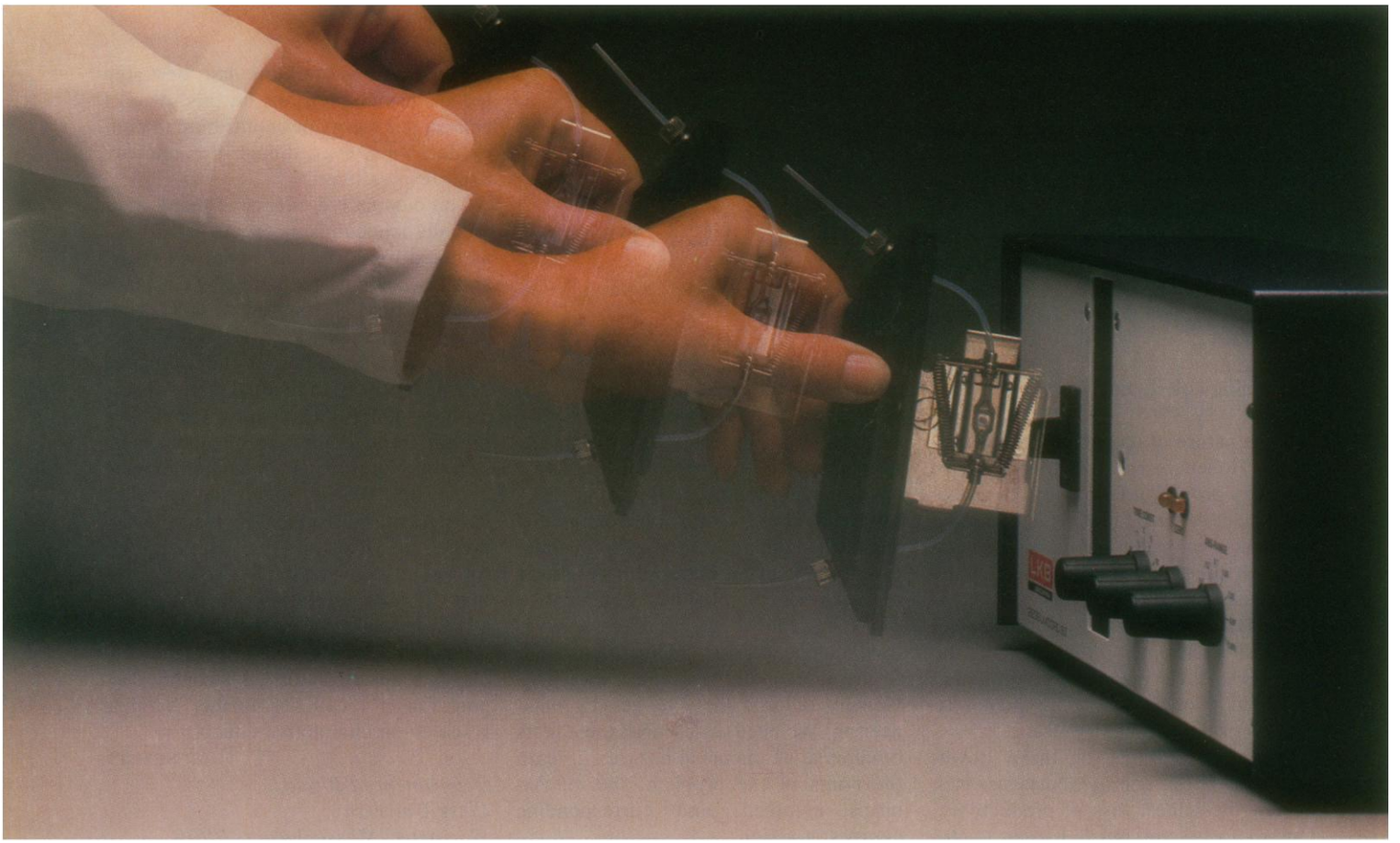

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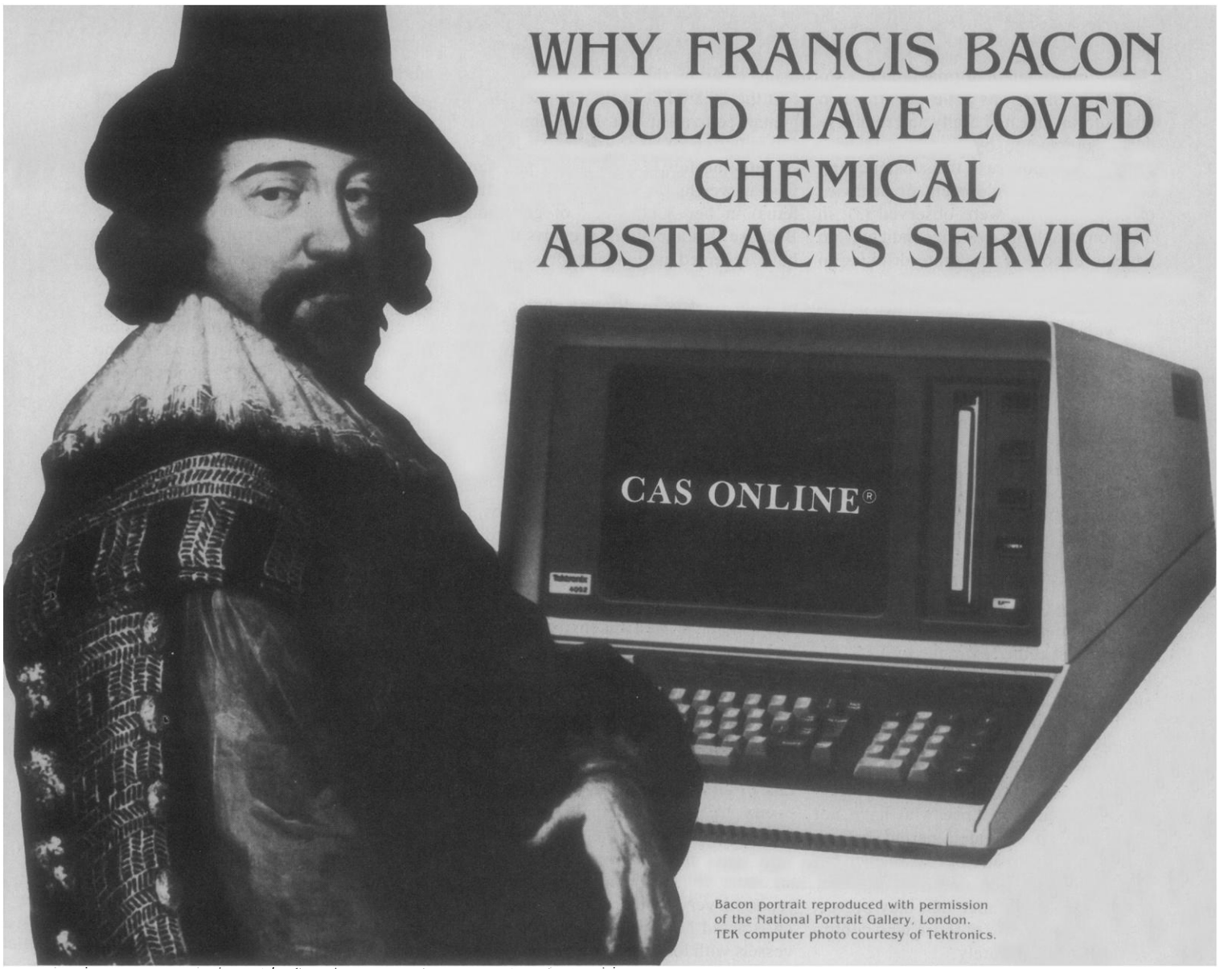

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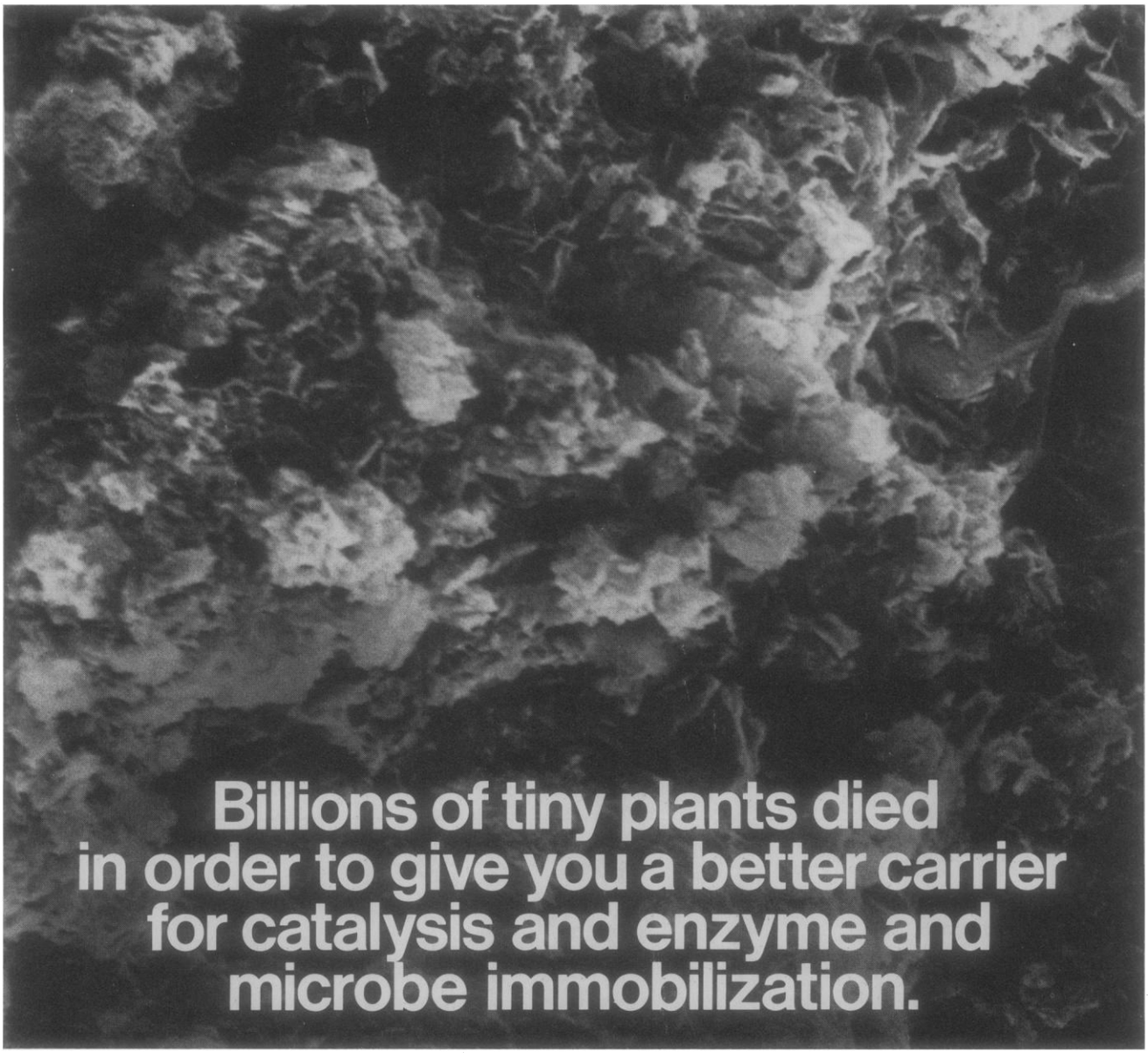

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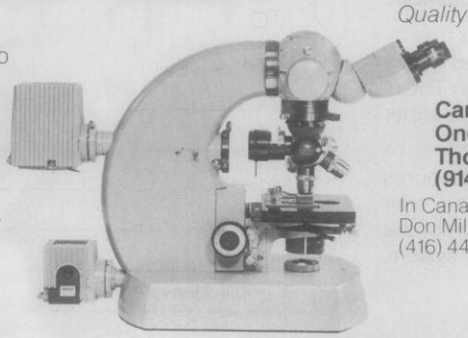

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23 September 1983, Volume 221, Number 4617

SCIENCE

Dietary Carcinogens

In this issue of *Science*, Bruce Ames reviews the increasing body of evidence that large numbers of potent carcinogens arise from natural processes. Mutagens are present in substantial quantities in fruits and vegetables. Carcinogens are formed in cooking as a result of reactions involving proteins or fats. Dietary practices may be an important determinant of current cancer risks.

Ames describes the role of plant materials as follows: Plants in nature synthesize toxic chemicals in large amounts, apparently as a primary defense against the hordes of bacterial, fungal, and insect and other animal predators. Plants in the human diet are no exception. The variety of toxic chemicals is so great that organic chemists have been characterizing them for over 100 years, and new plant chemicals are still being discovered. Recent widespread use of short-term tests for detecting mutagens and the increased testing of plant substances for carcinogenicity in animals have contributed to the identification of many natural mutagens, teratogens, and carcinogens in the human diet.

Safrole and related compounds are present in many edible plants. Safrole is a carcinogen in rodents and some of its metabolites are mutagens. Oil of sassafras, once used to flavor some root beer, is about 75 percent safrole. Black pepper contains about 10 percent by weight of a closely related compound, piperine. Extracts of black pepper at a dose equivalent to 4 milligrams of dried pepper per day cause tumors in mice at many sites. Many hydrazines are carcinogens and mutagens, and large amounts of them are found in edible mushrooms. One carcinogenic hydrazine is present in the false morel at a concentration of 50 milligrams per 100 grams. It causes lung tumors in mice at a level of 20 micrograms per mouse per day.

Carcinogens and mutagens are present in mold-contaminated foods such as corn, nuts, peanut butter, bread, cheese, and fruit. Some of these contaminants, such as aflatoxin, are among the most potent known carcinogens and mutagens. Nitrosamines and nitroso compounds are suspect as causative agents of stomach and esophageal cancer in humans. In the digestive system these nitrogen compounds are formed from nitrate and nitrite. Beets, celery, lettuce, spinach, radishes, and rhubarb all contain about 200 milligrams of nitrate per 100-gram portion.

Rancid fats are possible causative agents of colon and breast cancer in humans. These forms account for a substantial fraction of all the cancer deaths in the United States. Unsaturated fats are easily oxidized on standing and in cooking to form mutagens, promoters, and carcinogens. Among the numerous products of such oxidations are fatty acid hydroperoxides and cholesterol epoxide. Thus the colon and digestive tract are exposed to many fat-derived carcinogens. Human breast fluid can contain high levels of cholesterol epoxide.

Burnt and browned materials formed by heating proteins during cooking are highly mutagenic. Chemicals isolated from such products have been found to be carcinogenic when fed to rodents. In addition, the browning reaction products from caramelization of sugars or the reaction of amino acids and sugars during cooking contain a large variety of DNA-damaging agents.

The view that dietary practices might be a causative factor in cancer is not new. Epidemiologists have noted marked differences in cancer rates between population groups. Effects from changes in diet following migration have also been observed. Results of current studies are beginning to delineate more sharply specific causative agents. When more definitive information is available, it should be possible for prudent people to choose fruits and vegetables that present minimal hazards. In the meantime, there is persuasive evidence that charred meats and rancid fats should not be part of the diet.—PHILIP H. ABELSON

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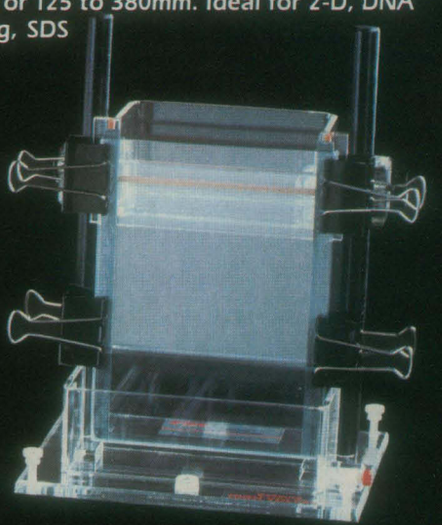

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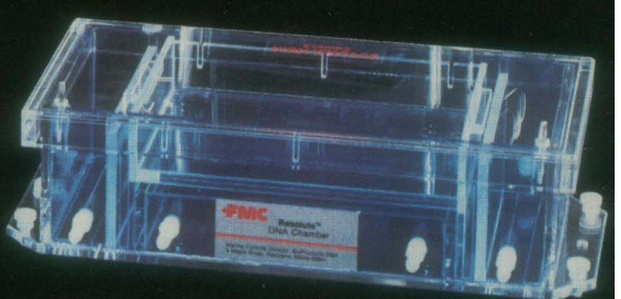

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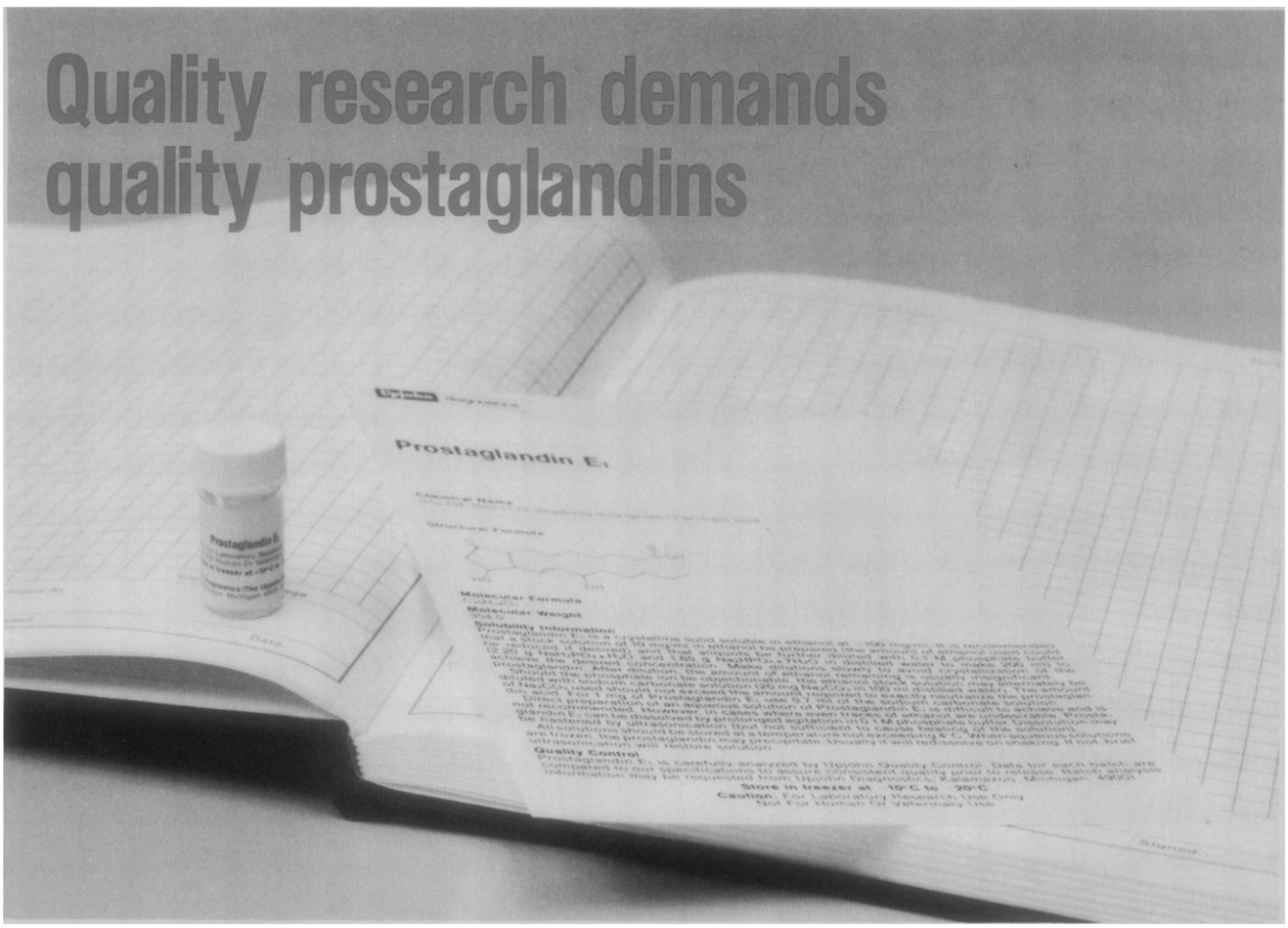

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Description	Cost/10 mg	Description	Cost/10 mg
PGA_1	$135	13,14-diH-15-keto-$PGF_{2\alpha}$	200
PGA_2	135	9,11-dideoxy-9 α,11 α-epoxymethane-$PGF_{2\alpha}$	200
PGB_1	135	9,11-dideoxy-11 α,9 α-epoxymethane-$PGF_{2\alpha}$	400
PGB_2	135	16,16-dimethyl-PGE_2	200
PGD_2	200	6,15-diketo-13,14-dihydro-$PGF_{1\alpha}$	200
PGE_1	135	Thromboxane B_2	400
PGE_2	135	Thromboxane B_2 Antiserum (100 tube vial)	40
$PGF_{1\alpha}$	135		
$PGF_{2\alpha}$ Tromethamine	135		
PGI_2 (Prostacyclin) Na Salt	400		
6-keto $PGF_{1\alpha}$	200		
13,14-diH-15-keto-PGE_2	200		

Free Reprint Available

A comprehensive 15-page report — "Prostaglandins and the arachidonic acid cascade" — providing a detailed history, description, and present and potential uses of prostaglandins is now available. For your free copy, circle Reader Service No. 228

For full information, write or call Upjohn Diagnostics, Kalamazoo, MI 49001, 616-385-7111.

For laboratory research use only. Not for human or veterinary clinical use.

(UD83-047) February, 1983

Upjohn diagnostics
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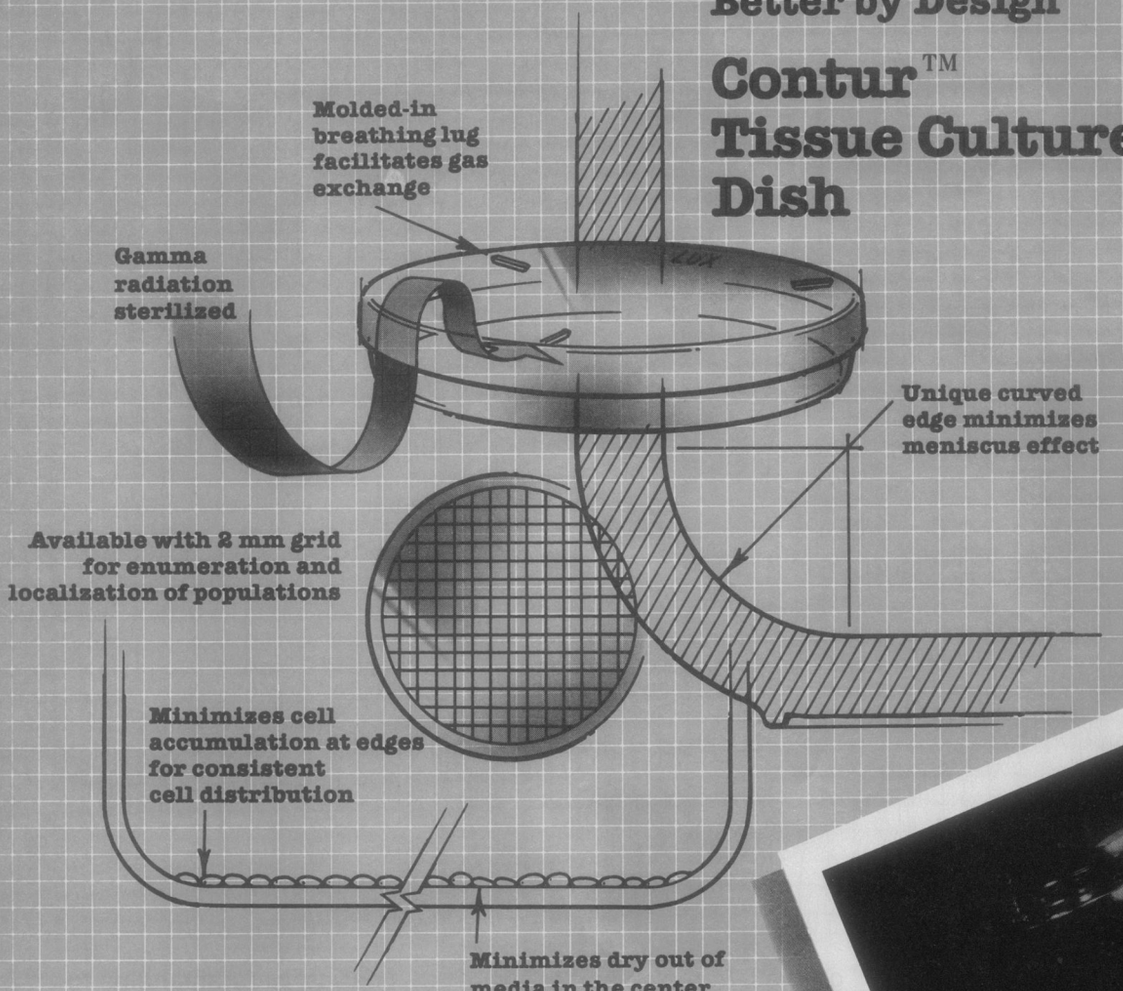
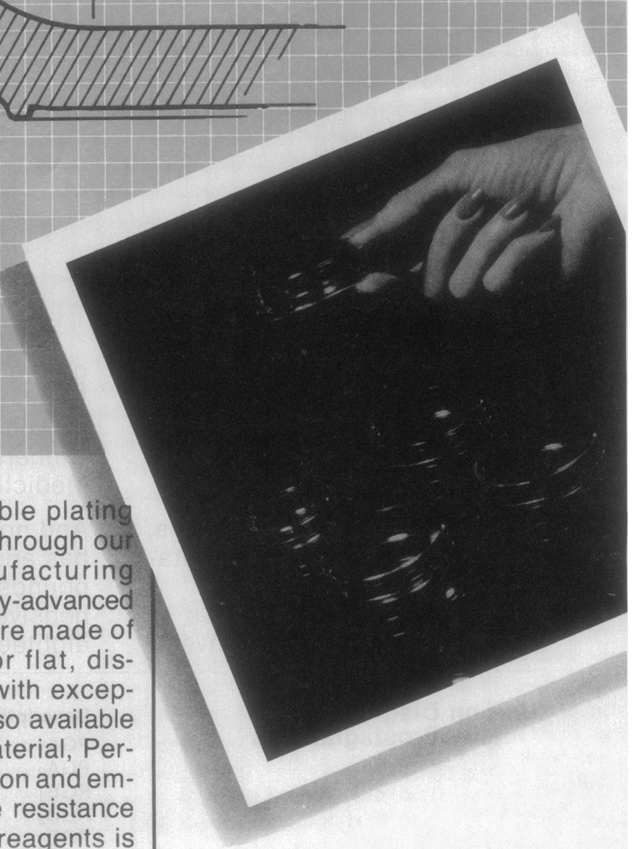
For more information circle RS # 229

Better by Design

Contur™ Tissue Culture Dish





Highlights

Consistent reproducible plating efficiency is assured through our well regulated manufacturing process. Technologically-advanced Lux® Contur Dishes are made of virgin polystyrene for flat, distortion-free surfaces with exceptional optical clarity. Also available in a special plastic material, Permanox, for use in fixation and embedding for EM, where resistance to acetone and other reagents is required.

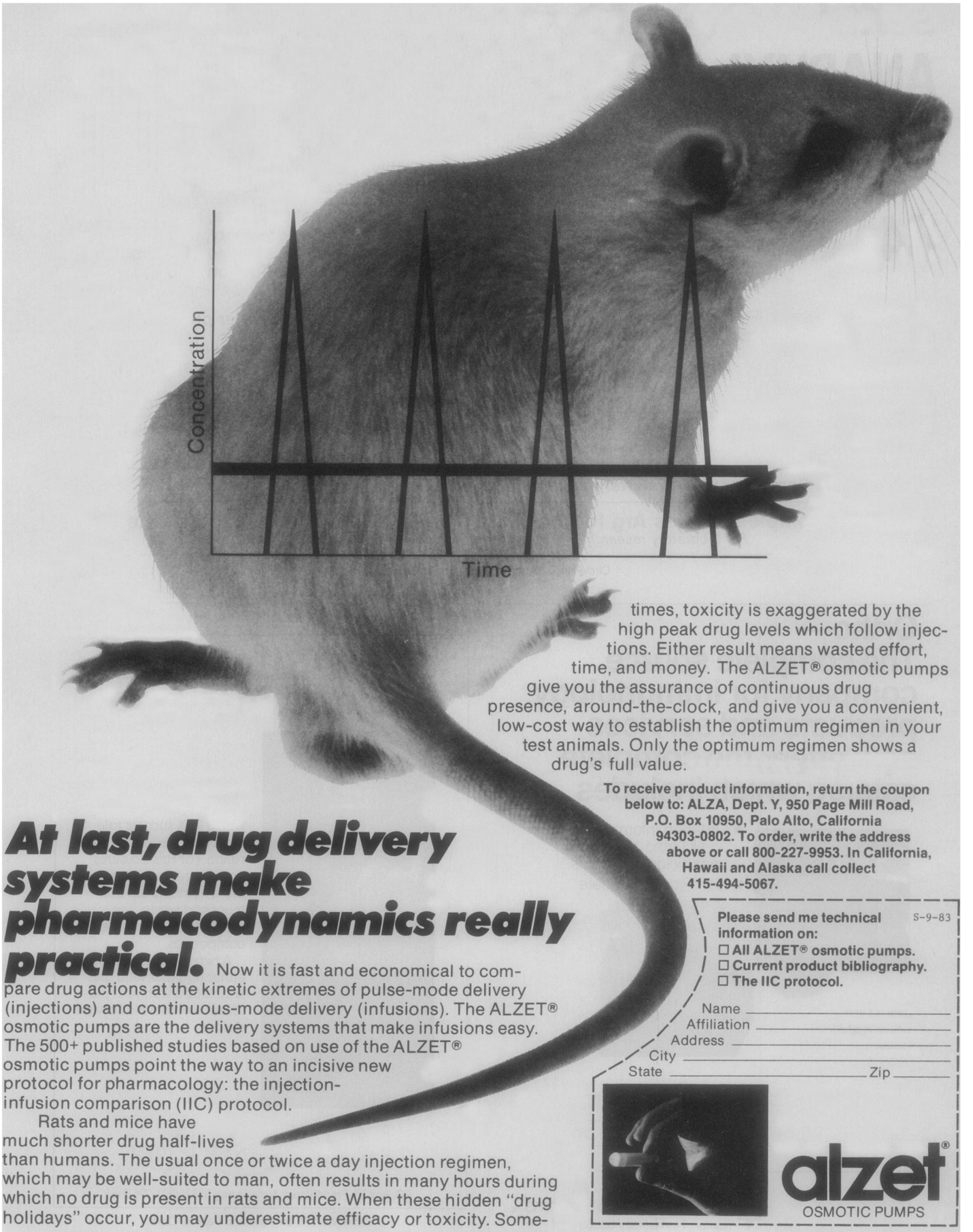
Lux comprehensive line of Tissue Culture Ware includes Contur Dishes, standard style dishes and a Suspension Dish for use with non-adherent cell populations; as well as flasks, tubes, multiwell plates, and coverslips.

For information contact: Miles Scientific, Division Miles Laboratories, Inc., 30W475 North Aurora Road, Naperville, IL 60566. To order Lux® Tissue Culture Ware, contact our distributor: Flow Laboratories, McLean, Virginia.

Advancing Technology Committed to the Tissue Culturist

LUX

MILES



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BIOSYSTEMS UPDATE

Workshop on DNA Synthesis Methods

Applied Biosystems is conducting a number of workshops on the latest methods for oligonucleotide synthesis and purification. If you use or plan to use synthetic DNA, this is a unique opportunity to talk with scientists from the leader in DNA chemistry and instrumentation. Manual and automated methods of synthesis will be demonstrated and information on custom oligonucleotides will be presented.

The workshops will include discussions of new techniques which enable any laboratory to synthesize DNA. Four years ago, production of an oligonucleotide with 20 bases was a major undertaking requiring many days of work. Now, purified reagents and the efficient phosphoramidite chemistry allow up to 200 base additions in one day. Information on the use of this chemistry for both manual and automated synthesis will be included in the program.

Although these workshops are free, advance registration is required. The program will be from 9:00 A.M. to 4:00 P.M. and the Applied Biosystems Model 380A DNA Synthesizer will be available for the production of oligonucleotides during the day.

TOPICS INCLUDE

ORGANIC CHEMISTRY OF OLIGONUCLEOTIDE SYNTHESIS
MANUAL SYNTHESIS METHODS (Including Demonstration)
AUTOMATION OF OLIGONUCLEOTIDE SYNTHESIS
EVALUATION OF CRUDE DNA BY GEL ELECTROPHORESIS
HIGH PRESSURE LIQUID CHROMATOGRAPHY OF OLIGONUCLEOTIDES

LOCATIONS AND DATES

CHICAGO, ILLINOIS	**Monday, October 17, 1983**
ANN ARBOR, MICHIGAN	**Wednesday, October 19, 1983**
BOSTON, MASSACHUSETTS	**Wednesday, October 26, 1983**
NEW YORK, NEW YORK	**Friday, October 28, 1983**
PHILADELPHIA, PENNSYLVANIA	**Monday, October 31, 1983**
WASHINGTON, D.C.	**Wednesday, November 2, 1983**

Additional locations in southern and western United States will be announced later.

If you need the latest information on new methods for DNA synthesis and purification, call us at 800-874-9868 to reserve your place at one of these workshops.

Applied Biosystems

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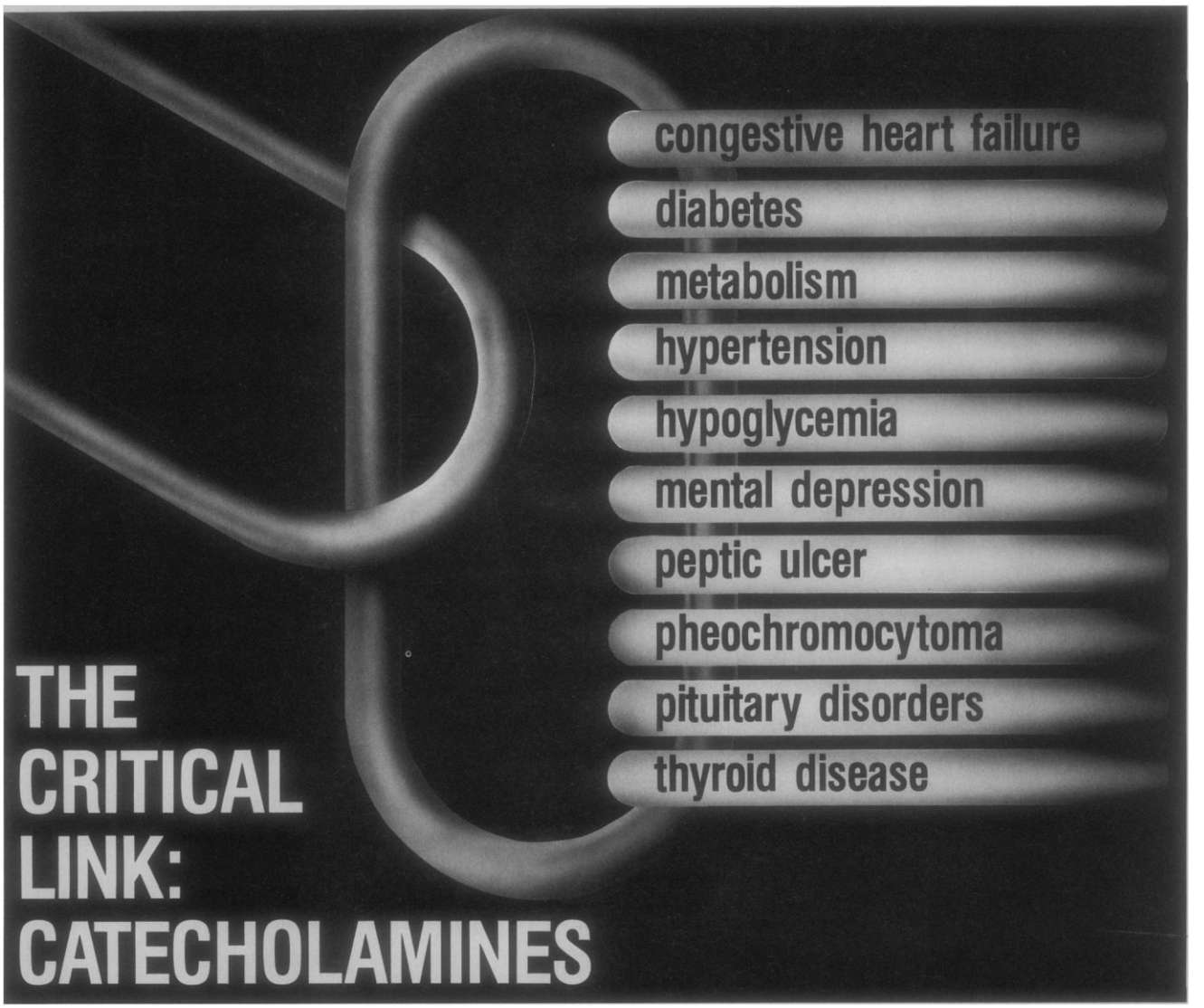

Catecholamines mediate a host of human physiologic and pathophysiologic functions fundamental to the understanding of human adrenergic activity. Until recently, elucidation of the role of catecholamines was hindered by lack of an adequate methodology. But with the development of a radioenzymatic assay, quantitation of specific catecholamines is now a reality.

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For full information, write or call: Upjohn Diagnostics, Kalamazoo, MI 49001, 616/385-7111; or circle reader service card no. 239.

FREE CATECHOLAMINES BIBLIOGRAPHY

Upjohn Diagnostics has assembled a comprehensive and useful bibliography of recently published papers that concern laboratory research into the role of catecholamines in human physiology and pathophysiology and their quantitation. For your free copy, circle reader service card no. 240.

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(UD 82-034) July, 1982

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