

CHEMISTRY

Substitute for Morphine

A nonaddicting synthetic substitute for morphine, soon to be marketed, has been developed after a decade of research, eliminating the need for opium—By Faye Marley

► MEDICAL PRACTICE has at last the chance to declare its independence from the curse of opium.

A nonaddicting morphine substitute is expected to be on the market in a short time. It is a synthetic product. With other available synthetic pain killers and cough suppressants, it will battle the illicit drug traffic.

More than a decade of research lies behind this new drug just christened Pentazocine.

Here is the story: Supplies of opium, the sole commercial source of morphine and codeine, on which sufferers from unbearable pain depend, were in danger of being cut off during the Korean war.

Scientists at the National Institutes of Health, Bethesda, Md., developed a new class of synthetic pain killers, which proved to be nonaddicting.

Benzomorphans, a group of compounds, of which phenazocine is best known, were developed at NIH beginning in 1954, by Dr. Everette L. May, chief of the section on medicinal chemistry, and Dr. Nathan B. Eddy. Dr. Eddy, who is executive secretary of the Committee on Drug Addiction and Narcotics, National Academy of Sciences-National Research Council, has spent his life in the search for a nonaddicting pain killer.

A comprehensive book, "Synthetic Analgesics," soon will be published in London, written in part by Drs. May and Eddy.

The new drug Pentazocine, produced by Sterling-Winthrop Research Institute, Rensselaer, N. Y., was called during the research and trials Win 20,228. It was based on the earlier benzomorphan research. (See SNL, 84:131, Aug. 31, 1963)

Results of tests with Pentazocine were reported at the meeting of the American Chemical Society in New York by Dr. Sydney Archer, Sterling-Winthrop's assistant director of the chemistry division.

Work with this drug on human patients at the Lexington, Ky., Addiction Research Center was reported at the meeting by Dr. Arthur S. Keats of Baylor University School of Medicine, Houston, Texas.

Morphine addicts do not like the drug. Because of this, keeping account of every milligram will be easy. Supplies will not have to be guarded any more than penicillin or aspirin.

How long Pentazocine will maintain its effectiveness is not known because it has not yet been tested for tolerance. Five Veterans Administration hospitals are continuing clinical tests on patients. The drug is now given only by injection.

Pentazocine has no pain-killing effect in animals, but is effective against post-operative pain in man at a dose of 30 to 40 milligrams compared with 10 milligrams of morphine.

The new drug will not eliminate the existence of illicit distribution of heroin nor the economic necessity of some countries to sell the opium that they produce from the poppy.

• Science News Letter, 84:179 Sept. 21, 1963

Smog Ozone Measured

► A PRACTICAL method for measuring ozone, a component of smog, was reported at the American Chemical Society meeting.

"It should now be possible, for the first time, for ozone to be measured extensively in the atmosphere of many cities," said Dr. James P. Lodge Jr., a chemist at the National Center for Atmospheric Research, Boulder, Colo. Ozone is formed by the action of sunlight on pollutants in the atmosphere from auto exhaust, factory fumes, and other sources, Dr. Lodge explained. It can crack rubber tires, irritate lung tissue, and even cause the death of animals.

The ozone acts on hydrocarbon compounds, such as gasoline, from these same sources of pollution to produce the eye-smarting "aldehydes" which are characteristic of smog.

In the analytical method developed by

Dr. Lodge and his associate, Humberto A. Bravo, advantage is taken of this action of ozone. It is allowed to react with a hydrocarbon compound called 4,4'-dimethoxystilbene to produce anisaldehyde, a chemical that smells like new-mown hay.

The aldehyde can be measured readily by a subsequent chemical reaction which gives a very intense blue color. The depth of color is proportional to the amount of ozone, and it can be measured on a laboratory spectrophotometer, Dr. Lodge said.

"The equipment necessary for the measurement is available in nearly any chemistry laboratory, although the chemicals are somewhat uncommon. They are, however, commercially available," he said.

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Cell Control Defect

► A CHEMICAL defect found in the blood of leukemia patients looks as if it will explain the mysterious, wild production of white blood cells that characterizes this form of cancer.

Dr. Morton D. Prager, senior staff member of the Wadley Research Institute and Blood Bank, Dallas, Texas, said the defect is in a reaction-causing system operating inside white blood cells.

Dr. Prager, who is also a chemistry professor at Baylor University, was one of 11,000 scientists attending the American Chemical Society's national meeting in New York.

The system containing the defect, he said, regulates the making of pyrimidines, essential parts of the material that guides cell growth and reproduction.

Dr. Prager said this is the first defect in cell growth regulation to be found in leukemia and that the studies, carried out under his direction, are the first of their kind to be made on human white blood cells.

• Science News Letter, 84:179 Sept. 21, 1963

Cancer-Inducing Ability

► PREDICTING THE CANCER causing tendency of a tobacco or coal tar compound requires "no more ability than playing an intelligent game of tic-tac-toe or adding up a bridge score."

Ninety percent accuracy in establishing the carcinogenic or cancer-inducing ability of a chemical of this type can be achieved by simple analysis of the electrons in its molecules, said Dr. F. L. Flurry Jr. of Louisiana State University, New Orleans, at the American Chemical Society meeting.

A transfer of electrical charge from a carcinogen to the protein molecules at the future cancer site is the basis of the chemical cause of cancer, according to some recent theories, Dr. Flurry explained.

By using a mathematical technique proposed by Prof. M. J. S. Dewar of the University of Texas, the likelihood of such a transfer, and hence the possibility of cancer, can be predicted, he said.

"It is found that by using Dewar's method, the carcinogenic properties of about 90% of the molecules to which it applied were correctly predicted."

• Science News Letter, 84:179 Sept. 21



Martin Company

ALGAE IN SPACE—Dr. Edward B. Gassner of Martin Company, Baltimore, studies how sunlight in space, several times more intense than sunlight on earth, will affect algae, a probable food source for long, manned space flights.

New Melamine Process

➤ A NEW METHOD of producing melamine, a high-gloss crystal, from natural gas was described by two Ohio scientists.

Melamine resins are used in making dinnerware, tabletops and other surface coatings, insulators and molded articles where a high-gloss, scratch-resistant surface is necessary.

In the process, hydrogen cyanide received from natural gas is fed into an electrolytic cell that converts it into cyanogen bromide. A rapid and continuous conversion of cyanogen bromide with ammonia to cyanamid leads to the final production of a high purity melamine with no by-products.

The electrochemical cell of the process, which recently received French and Belgian patents, is nearly 100% efficient, with a low electrical cost.

Drs. R. W. Foreman and J. W. Sprague of the Standard Oil Company Ohio Research Center in Cleveland described the process before the Industrial Engineering Chemistry Section of the American Chemical Society meeting in New York.

• Science News Letter, 84:180 Sept. 21, 1963

New Platinum Catalyst

➤ A NEW TECHNIQUE which may simplify the manufacture of gasoline, drugs, and cooking fats was reported by a 19-year-old chemistry student at the American Chemical Society meeting.

The technique permits the hydrogenation process, widely used in chemical manufacturing and research, to be carried out quickly, safely and conveniently at ordinary pressures, said Charles A. Brown, a Purdue University senior.

Previous procedures have been slow and difficult to carry out, and have generally required the use of expensive high pressure equipment, he indicated.

Mr. Brown described the main features of the new technique as a highly active new platinum catalyst and a simple glass apparatus that permits automatic control of the hydrogenation process. He developed both of them in his father's laboratory, he said. His father, Dr. Herbert C. Brown, Wetherill professor of chemistry at Purdue, was coauthor of the report.

The new apparatus makes it possible to determine the speed at which hydrogen adds to a substance and to tell how much hydrogen has been added. The latter is particularly important in the manufacture of gasoline and cooking fats, Mr. Brown said.

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Electric Nose Sensitive

➤ AN ELECTRIC NOSE, in operation in the City College chemistry laboratory in New York, has proved to be 100 times as sensitive to alcohol as the human nose, it was reported at the American Chemical Society meeting.

The device conducts an electric current through a liquid, which acts like the mucus in the lining of the nose, said Prof. Henri L. Rosano of the City University.

When an odor is "whiffed" by the instrument, it dissolves in the liquid surface, and the current is changed in a characteristic way. The current makes a pattern on a chart, and this pattern can be used for the identification of this particular odor, he explained.

"A perfected technique would have immense applications in theoretical and applied research, such as anti-pollution enforcement, medical diagnosis, odor prevention, air conditioning, testing for alcoholic intoxication, and perhaps even as a mechanized bloodhound for guerrilla warfare," he commented.

The latter use could be applied by spraying suspected guerrilla areas from the air with a vapor that the machine could pick up and then screening suspects with the device, he suggested.

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Intensify Atherosclerosis

➤ ATHEROSCLEROSIS PRODUCED in rabbits by experimental diets can be intensified by heating the corn oil used in the diets, it was reported at the American Chemical Society meeting.

Atherosclerosis is the formation in the arteries of fatty deposits which in man may lead to heart attacks and strokes.

The new finding raises a question about the advisability of prolonged heating of cooking fats intended for human consumption, Dr. David Kritchevsky of the Wistar Institute, Philadelphia, said. No connection between heated fats and the development of atherosclerosis in man, however, can be established without extensive clinical testing, Dr. Kritchevsky cautioned.

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Questions

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INVENTION—What is an improved "pumping" technique for lasers? p. 182.

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SCIENCE NEWS LETTER

VOL. 84 SEPTEMBER 21, 1963 NO. 12

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington, D. C. 20036, North 7-2255. Cable Address: SCIENSERV.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; ten or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage. Change of address: Three weeks notice is required. Please state exactly how magazine is addressed. Include postal zone number.

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Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U.S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member of Audit Bureau of Circulation.



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