CHEMISTRY

Cortisone by Fermentation

Microbiological oxygenations of sterols by molds of the order that includes bread molds accomplish difficult shift of oxygen atom.

➤ LARGE-SCALE PRODUCTION of cortisone from abundantly available starting materials is promised by a fermentation process devised by a research team of the Upjohn Company, Kalamazoo, Mich.

A mold of the type commonly associated with stale bread is used.

Cortisone, a hormone which has been found effective in treating rheumatoid arthritis and a wide variety of other diseases, is now made from a cattle bile component called desoxycholic acid by what is probably the most intricate series of chemical steps used in any commercial process.

Originally, it took 37 separate steps to make the drug, and the bile acid from 40 head of cattle was needed to provide enough cortisone to treat a single patient for one day. Great improvements have been made in the process, but desoxycholic acid is still the starting material and about 20 steps are still required.

Up to now "the most difficult series of steps" in the partial synthesis of cortisone has involved the shifting, by adroit chemical methods, of an atom of oxygen from one position, technically known as the C-12 position, to another, C-11, in the complex molecule of desoxycholic acid.

Dr. D. H. Peterson, biochemist, and Dr. H. C. Murray, microbiologist, report that they have succeeded in inserting an oxygen atom in the crucial 11 position in another hormone—progesterone—in a single step, providing an intermediate compound which can then be converted into cortisone. (JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, April.)

Progesterone can be made synthetically from vegetable and animal sources, and thus is far more plentiful than desoxycholic acid. Furthermore, Drs. Peterson and Murray say that the Upjohn process can be applied to a variety of abundantly available starting materials of the class known as sterols. Thus, their work apparently has opened the way to a simpler and cheaper production of cortisone. They also have introduced into the cortisone field the fermentation process, which is used in making penicillin and other antibiotic drugs.

The molds used are species of the genus *Rhizopus,* which in turn is a member of the family *Mucoracea.* This family belongs to the order known as *Mucorales,* which order includes the bread molds. The researchers place the progesterone in a "soup" which they describe as a "lactalbumin digest-dextrose-cornsteep medium" and add the mold, allowing the mixture to ferment for a period of 24 to 48 hours.

From progesterone a new 11-oxygenated steroid intermediate is made available for conversion to the cortical hormones. Similar microbiological oxygenations at carbon 11 using molds of the *Mucorales* order have been achieved on other steroid substrates, including androstenedione, 11-desoxy-17-hydroxycorticosterone (substance S) and 11 desoxycortiscosterone.

Each of these substances can be prepared from vegetable sources such as stigmasterol, which comes from soya beans, or from animal sources, such as cholesterol.

Science News Letter, April 19, 1952

● RADIO

Saturday, April 26, 1952, 3:15-3:30 p.m. EST

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Mr. Charles D. Harris, manager, engineering, International Harvester Refrigeration Division, Dr. Robert S. Taylor, chemical engineer, Servel, Inc., and Mr. Edward R. Wolfert, manager, engineering and research, Seegar Refrigeration Co., discuss "Report on Refrigeration."

INVENTION

Dentist Can Now Drill From Sitting Position

➤ NOW THE dentist can sit down to his work. Robert J. Haley, Longmeadow, Mass., has received patent number 2,589,803 for inventing a suspended work seat for dentists. The seat moves on an overhead trolley and is in the form of a saddle. It can be adjusted to go back and forth across a room.

Science News Letter, April 19, 1952

CHEMISTRY

Undiagnosed Cancers

➤ THERE IS probably evidence of many as yet unsuspected cases of lung and stomach cancers in the X-ray photo files of every hospital and doctor in the land.

This was discovered when Dr. Leo G. Rigler, X-ray expert at the University of Minnesota, Minneapolis, searched back over earlier X-rays of cancer patients which had been taken for entirely different reasons. In almost every case where the earlier X-ray picture existed he was able to find that the beginning of the cancer was evident long before the patient began to feel the symptoms of the disease.

Dr. Rigler advised that everyone who can should hold on to his old X-ray pictures. He said that one important factor is to be able to compare X-rays taken at different times. By comparison, changes which point to cancer but which might not otherwise be brought out can be seen.

Now Dr. Rigler is going to take X-ray photos every six months of a group of 10,000 apparently healthy men over age 50. In this group a few are destined to get cancer. He hopes to catch the cancer with his X-ray before it would normally be discovered.

Dr. Rigler knows of one case where an early X-ray taken for another reason revealed that the patient had a small tumor nine years before he died of the disease.

In cases that can be operated on, his study showed that the tumor would be evident on X-ray photos on an average 17 months before the patient complained of symptoms and went to his doctor.

He pointed out that as a by-product of the tuberculosis chest X-ray campaign some lung cancers have been picked up at early stages. However, he would not recommend mass stomach X-rays, first because it would be too expensive and second because there are not enough people in the country with the training required to be able to spot the cancers when they appear on the X-ray photo.

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