BIOCHEMISTRY

Build Protein-Like Molecule

A pituitary hormone influencing skin color has been successfully synthesized. The melanocyte stimulating hormone, or a-MSH, becomes largest man-made protein-like hormone.

➤ THE LARGEST man-made protein-like molecule has been produced. It is a pituitary hormone which causes darkening of human and animal skins.

The synthesis was achieved by Dr. Klaus Hofmann of the University of Pittsburgh department of chemistry.

Dr. Hofmann's work consisted chiefly of linking in a definite arrangement 13 amino acids, the building blocks of all proteins found in the human body. It required six years to make the first minute batch of the substance, which is known as a melanocyte stimulating hormone, or a-MSH.

The hormone is naturally produced in the anterior pituitary gland at the base of the brain. The pituitary is the body's master gland, secreting hormones which both regulate body functions and stimulate other glands to produce hormones.

Synthetic a-MSH may prove useful in treatment of various glandular disorders, such as albinism, caused by lack of the hormone.

As has been the case with many significant scientific achievements, Dr. Hofmann's work was an offshoot of another of his projects, the synthesis of the hormone ACTH. Here is the sequence of events leading to the achievement:

Six years ago, Dr. Hofmann began research on the synthetic production of ACTH. Some four years later, as his progress continued, Drs. A. B. Lerner and T. H. Lee at Yale University discovered a-MSH, isolating it from the pituitary glands of hogs.

Then, Dr. Lerner, in collaboration with Ieuan Harris of the University of Cambridge, took the molecule apart piece by piece and found that its amino acids were linked in exactly the same sequence as part of the ACTH molecule.

When Dr. Hofmann heard of this, he altered his direction to concentrate on the synthesis of the newer hormone.

Having now succeeded in the production of a-MSH, he has shifted back to his original goal, the synthesis of ACTH. All he has to do, essentially, is to continue linking amino acids in the correct pattern to the straight chain of acids making up a-MSH.

Others working with Dr. Hofmann under an American Cancer Society grant were Miriam E. Woolner, Haruaki Yajima, Gertrude Spuhler, Thomas A. Thompson and Eleanore T. Schwartz.

Science News Letter, March 28, 1959

ENGINEERING

Movie Film Stands Still

➤ USING A mirror, an air turbine, two polarized filters, photoelectric eyes, and a flash bulb that must be triggered by 6,000 volts of electricity, a California Institute of Technology engineer has put together a movie camera that can shoot 1,000,000 pictures a second on film that stands still.

Dr. Albert T. Ellis, associate professor of applied mechanics, wanted to see how the collapse of microscopic bubbles generated by a ship propeller could ultimately cause the screw to disintegrate under the impact of resulting shock waves.

To catch this process on film for his study, he devised a special camera with a shutter speed of one 20-millionth of a second. Here is how it works:

The flash lamp, giving 60 times more light than the most powerful flash bulb, is triggered by a 6,000-volt power supply at the critical moment. Two photoelectric cells watch for light to be scattered by the tiny cavitation bubbles. This trips the camera.

The shutter, which can react in one billionth of a second, consists in part of a Kerr Cell—a small transparent glass barrel containing two small nickel electrodes and a pale yellow liquid called nitrobenzene, a fluid used in shoe polish.

The Kerr Cell is put in the middle of a lens system having two optical lenses for focusing, and two crossed polarized filters.

The filters and Kerr Cell make up the shutter.

Light from the image is polarized in one direction by one of the filters. When it hits the Kerr Cell, it may or may not be acted upon by an electric pulse of 19,000 volts. If not, the second filter blocks the light from going further. But if present, the voltage in effect twists the light so that it can scoot through the second filter. This critical 19,000-volt light-shifting device is fed in fast pulses by a vacuum tube developed for radar.

Light that does pass through this entire assembly is then focused onto a mirror in the film box. The film itself is stationary, for it would burn up it it had to move at the speeds required. The mirror, attached to the rotor of an air turbine borrowed from a jet plane's refrigeration system, spins inside the film box 100,000 times a minute, throwing images on the film in sequence to make a movie of the process of collapsing bubbles.

Photographs have shown that heavy shock waves, with pressures of several hundred thousand pounds per square inch, are caused by the microscopic bubbles generated by a turning propeller. This continual, unmerciful pounding will eventually disintegrate any known metal.

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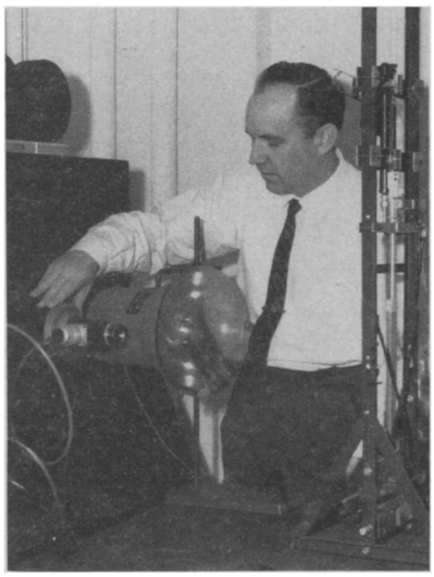

SUPER CAMERA—Dr. Albert T. Ellis, developer of the ultra high speed camera, cocks the shutter for open flash single shot pictures. At the right is the loading frame for specimens to be photographed. Next to Dr. Ellis is the light which gives 60 times more total light than the most powerful flash bulb. The camera has the usual compure shutter.

METALLURGY

Purer Molybdenum Powder Made Faster

➤ A NEW PROCESS for the production of molybdenum metal powder is said to produce the powder five to eight times faster than current methods.

Molybdenum is a refractory metal finding increasing uses in the expanding atomic, missile and other high temperature fields.

The production process, invented by Lester D. Supiro of East Orange, N. J., and announced by Metals and Residues, Inc., Springfield, N. J., makes molybdenum powder by a rapid, single-stage reduction of molybdenum oxide at high temperatures. Because of its extreme volatility molybdenum oxide is now mainly reduced in two stages.

Mr. Supiro's process is claimed to be superior to older processes in offering greater speed and economy of energy. It also affords higher recoveries and a powder of higher purity.

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