

BIOCHEMISTRY

Polyunsaturates Studied

► POLYUNSATURATED fats may cause more damage to heart patients than saturated fats.

This is one of the implications which could be found in the report of a team of Harvard Medical School researchers. Their study has shed light upon the mechanism of fat accumulation in cells and the effects of certain foods upon this mechanism.

Prof. David D. Rutstein, head of the department of preventive medicine at Harvard Medical School, stated that the research of his group has "provided new leads to the mechanism of atherosclerosis."

The research group devised a unique method of observing the actual accumulation of fats in cells when exposed to human blood serum following a variety of test meals.

Human cells that could absorb fatty substances were grown in the laboratory.

In the next stage of the study, 12 volunteers were fed several types of meals—among them fats and carbohydrates. Samples of their blood were taken and introduced into the medium in which the tissues were grown.

The team of physicians also observed the effects of prolonged fasting upon fat accumulation in the cells.

Under control conditions, there is a relative equilibrium of lipids (fats) between the blood serum and adjacent cells. The

rate of fat deposition increases in the bloodstream in direct proportion to the amount of fat consumed.

When people eat polyunsaturated fats in a low-fat meal, the blood level of cholesterol decreases. Paradoxically, however, immediately after a meal containing polyunsaturated fats, there occurs a greater lipid deposition than following a meal containing the same amount of saturated fat such as butter.

This observation raises a question as to the benefit of polyunsaturated fats.

Carbohydrates, if taken in reasonable amounts, prevent fat accumulation.

Prof. Rutstein told SCIENCE SERVICE that a practical objective of his research is: "to develop a diet for coronary patients which would take advantage of the inhibitory effect of carbohydrates on fat deposition in cells."

"Such a diet for testing on coronary patients might consist of a series of small carbohydrate meals, supplemented by the necessary amounts of proteins, fats, minerals and vitamins to provide a balanced diet," he added.

Among the theoretical objectives is the exploration of the basic mechanisms underlying the fat deposition phenomenon.

Prof. Rutstein's findings were reported in the New England Journal of Medicine 27:1, 1964.

• Science News Letter, 86:38 July 18, 1964

PHYSICS

Miniature 'Sun' Machine

► SCIENTISTS are building the forerunner of a "miniature sun," which by 1970 may light everything from baseball games to night rescue operations.

The miniature sun is one use of a new machine that generates plasma. This machine, called a plasma generator, creates "free-burning" plasmajets and has three times the potential brightness of any other steady light source on earth.

The first public demonstration of the new "free-burning" plasmajets was made by the inventor, Dr. Charles Sheer, senior staff scientist at the Electronics Research Laboratory, Columbia University.

The machine generates the plasma directly in the air, free of any enclosing chambers or jackets.

An earlier "confined" plasmajet, developed a few years ago, required a copper jacket, which gave it a 40% efficiency.

However, in Dr. Sheer's new "free-burning" plasmajet, gas fires through porous electrodes, eliminating the need for a jacket. Thus, an efficiency of 89% can be attained with the new plasmajet.

Dr. Sheer pointed out that the new plasma generator, which offers greater simplicity, may also be used in the near future for powering space vehicles.

A plasma-powered spaceship can allow

two or three times the payload of present chemical rockets, he said. In addition, it will provide higher exhaust velocities than its chemical counterpart.

Operating at temperatures of 20,000 degrees Fahrenheit or more, these new plasmajets can easily boil tungsten and slice through concrete.

Another potential use of the machine is to replace the ear-shattering jackhammer by melting rock rather than breaking it.

The new machine generates plasma that can produce a spectrum of radiant energy much like that of the sun itself.

Scientists working with the machine reported that they receive a regular suntan from its brilliant light.

• Science News Letter, 86:38 July 18, 1964

ROCKETS AND MISSILES

Predict Fuel Stability To Save Time and Money

► A NEW PROGRAM to screen possible chemical rocket fuels before costly research gets under way has been announced.

Dr. Joyce J. Kaufman of the Martin Company's Research Institute for Advanced Studies has been awarded a \$49,990 grant by the U.S. Government's Advanced Re-



Martin Company

MOLECULAR MODEL is used by Dr. Joyce J. Kaufman to determine theoretically whether certain potentially useful chemical compounds would be stable.

search Project Agency to conduct her theoretical studies.

Dr. Kaufman will employ computer techniques and available information on the physical properties and chemical behavior of compounds to predict their theoretical stability.

Certain possible high energy rocket fuels, composed of oxygen, nitrogen and fluorine, are very unstable molecules. Dr. Kaufman hopes to develop techniques to "weed out" the stable compounds from the thousands that produce unstable reaction products which often explode immediately.

• Science News Letter, 86:38 July 18, 1964

OCEANOGRAPHY

Record-Breaking Dive In Chamber Successful

► DEEP-SEA DIVERS Jon Lindbergh and Robert Stenuit returned slowly to the surface July 3, after spending more than 48 hours on the sea-floor at a depth of 425 feet, and then spent three days in a decompression chamber to prevent crippling diver's bends.

Inventor Edwin J. Link directed the expedition to explore the Continental Shelf of the Atlantic Ocean off the Bahamas, using his newest equipment, including the balloon-like "squad" diving chamber.

Both Lindbergh, 32, son of the flier Charles Lindbergh, and Stenuit, 30, a Belgian, emerged in fine physical condition.

French oceanauts last summer (1963) lived in a pre-fabricated village 36 feet below surface in the Red Sea. But this week's dive, sponsored by the National Geographic Society, was the longest made to so great a depth.

• Science News Letter, 86:38 July 18, 1964