

BIOCHEMISTRY

Blood Cholesterol Lowered

Two drugs that lower cholesterol up to 15%, a new use of algae in space ships and microballoons for lighter plastics were reported to the American Chemical Society.

► BLOOD CHOLESTEROL has been lowered appreciably in human beings by two new drugs, scientists were told at the American Chemical Society meeting in St. Louis.

The drugs, which are chemical relatives of hormones produced by the thyroid gland, lowered blood cholesterol levels by as much as 15% when given in small doses, Dr. Charles Duncan of the University of Louisville School of Medicine said. Many scientists believe that high levels of cholesterol in the blood are connected with atherosclerosis, a cause of heart attacks and strokes.

The drugs were prepared in an attempt to reduce the side effects that often accompany the use of the natural thyroid hormones, Dr. Duncan told a symposium on lipocholesteremic agents (factors controlling fat and cholesterol levels in the blood).

"Except in patients with deficient thyroid function, the use of the natural thyroid hormone to lower blood cholesterol has been limited by other effects, particularly the increase in work load imposed on the heart.

If the cholesterol lowering effect could be separated from the other effects of the thyroid hormones, they would become valuable tools in research on atherosclerosis and potentially useful in prevention or treatment of this very common disease," Dr. Duncan said.

Cholesterol level in the blood is useful in indicating the likelihood of coronary artery disease, Dr. David Kritchevsky of the Wistar Institute, Philadelphia, told the symposium. There is, however, no rigid proof that reduction of serum cholesterol levels in man will decrease the incidence of the disease, he said.

The only true test would be a large-scale experiment with human beings that would apply one method for safely lowering serum cholesterol levels and test its effects on new cases of heart disease, Dr. Kritchevsky suggested.

Three synthetic compounds that have shown laboratory effectiveness against the build-up of cholesterol were reported by Dr. William L. Holmes of the Smith, Kline and French Laboratories, Philadelphia. Due to undesirable side effects, however, the agents cannot be used as therapeutic agents, Dr. Holmes said.

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Algae for Space

► A METHOD for using algae in space vehicles was reported at the American Chemical Society meeting in St. Louis.

Algae are green plants. They use light energy to convert carbon dioxide into oxygen and the protein needed for animal life in the chemical process called photosynthesis. Algae may therefore be used to

support life in a space vehicle.

Dr. Arnold C. Frederickson of the University of Minnesota said the carbon dioxide demand of algae would be supplied by animal respiration, so that the space vehicle could be a self-supporting unit.

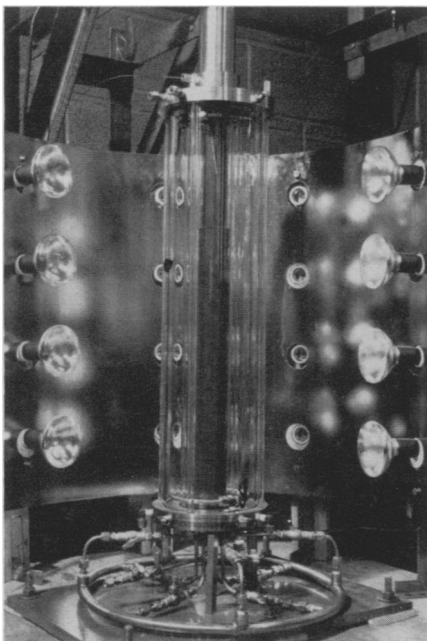
When the light energy is not used by a culture of algae, it rejects the energy as heat. The power supply of the system then has to be partly wasted in cooling, Dr. Frederickson said.

Since a space vehicle must carry either its own source of power or devices for collecting solar energy, low-energy utilization by an algae system increases the weight of the non-propulsive parts of the vehicle.

In most present algae culture systems the distribution of light does not allow the plant to make efficient use of the energy, Dr. Frederickson said. Near the surface, the light intensity is too high, and in the center the intensity is low.

Dr. Frederickson has developed a method to agitate the culture. This exposes all the cells of the culture to a more or less uniform intensity of illumination, he said.

Calculations show that it is possible to speed up the photosynthetic reactions by agitation, but that agitation will not increase the efficiency of energy utilization as much as desired.



GROWING ALGAE—Glass cylinder for growing algae is cooled by refrigerated ferrous sulfate solution circulated through a space outside the algae chamber to reduce heat from lamps.

"The predicted increase in efficiency is large enough, however, so that further research on the problem is indicated," Dr. Frederickson concluded.

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Microballoons for Plastics

See Front Cover

► TINY, HOLLOW SPHERES of glass are making plastics lighter, more rigid and less flammable, scientists were told at the American Chemical Society meeting in St. Louis.

The colorless glass particles, seen on the cover of this week's SCIENCE NEWS LETTER, are about two one-thousandths of an inch in diameter and weigh about one-third as much as water, H. E. Alford of the Standard Oil Company (Ohio) said. They are made by a high-temperature fusion process, he said. They remain unchanged up to temperatures of about 1,200 degrees Fahrenheit in reinforced plastics, such as those used in boat hulls or auto bodies. The hollow spheres give 30% stronger moldings at weight savings of 20% to 50%.

Articles with unique electrical properties can be produced when these low density hollow spheres are combined with a wide variety of plastics. These are finding considerable use in aircraft electronic parts, such as radomes and high frequency radio transmission, he said.

The glass microballoon particles, as they are called, also have fairly good thermal insulating properties and may have some application in acoustical installations.

"Much less dense articles are possible with this product than with any other type of filler material available today," Mr. Alford said. However, he noted, they do not solve all the problems for plastic fillers, since they will not work in applications where high pressures are involved.

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Anti-Cancer Chemical

► ONE TYPE of tumor in mice has been inhibited by 90% to 100%, using a new organic compound containing nitrogen. It has not yet been tried on human beings.

Dr. John A. Carbon, Sandra M. Brehm and James D. Ratajczyk of the Abbott Laboratories, North Chicago, Ill., have found the piperazine derivative (A-20968) effective against carcinoma 755, a transplantable mouse tumor. It also shows activity against two common types of cancer, sarcoma 180 and leukemia 1210, he reported to the American Chemical Society meeting in St. Louis.

The new compound is modeled after a compound called A-8103, which is undergoing clinical tests at the present. Both of these compounds appear to be examples of the anti-tumor agents known as "alkylating agents," although they represent an entirely new type of chemical structure among the anti-cancer drugs.

The organic chemist will be able to synthesize many closely related compounds by varying the "acyl side-chain" in the structure. Further evaluation is planned.

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