CHEMISTRY

Bacteria Aid Cell Study

Important new developments in chemistry from cell growth to propellants for spaceships are reported by Elisabeth Mitchell from the American Chemical Society meeting.

➤ STARVING BACTERIA have helped the study of human cell growth, the American Chemical Society was told in Atlantic City.

Nutrition may play a leading role in the development of many different types of cells, such as skin, muscle, liver and brain cells, from one single fertilized cell, Dr. Gerrit Toennies, Institute for Cancer Research, Philadelphia, told the meeting. When the diet of a single-celled bacterium was modified or limited, it stopped growing normally and produced changes in the cell structure of the organism, he explained.

Like man, this cell, *Streptococcus faecalis,* needs nutrients in the form of building blocks called amino acids, for the production of new protein to live and grow on. It normally multiplies by first growing in size, then dividing into two cells that are exact "carbon copies" of itself. The nature of the growth can be changed by controlling or limiting different amino acids, Dr. Toennies said.

For instance, after the amino acid valine is used up, no new protein is produced and therefore there is no further cell division. However, the cell continues to synthesize wall and membrane material until the cell contains about twice the normal amount.

On the other hand, when the amino acid threonine is depleted, cell division continues, along with wall and membrane synthesis. In this case, cells about one-third smaller than usual, with walls of double thickness, and membranes of single thickness, are formed, Dr. Toennies reported.

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Speed Wound Healing

➤ CHEMICALS from wheat can speed the healing of wounds by as much as 57%, it was announced at the American Chemical Society meeting in Atlantic City.

The materials used were gluten sulfate, a highly absorbent powder made from wheat flour, and sulfated starch, a chemical which prevents blood coagulation, Dr. H. C. Reitz, Purdue University, told the meeting.

Gluten sulfate alone can increase the rate of healing by 35%, Dr. Reitz said, but the sulfated starch enhances this property—a totally unexpected result. Perhaps the bleeding caused by this compound brings nutrients from the blood, while the water-absorbing material holds them in place, he suggested. The mechanism of healing is very complicated, and many unknown processes are going on at the same time, he explained.

The tests were made on male rats, and the amount of healing was determined by how long it took flowing water to tear the wound apart. Several chemicals containing sulfur were tested, including sulfated gelatin, starch and cellulose, but these showed only a slightly positive effect.

Dr. Reitz emphasized that the report is only preliminary.

"When we wonder how gluten sulfate aids in the healing process, we are practically at the frontier of biological knowledge, where most of our thoughts are still guesswork," he said.

It has been shown, however, by other workers using radioactive sulfur compounds that sulfur is used by the body in the early stages of healing. Gluten sulfate may make this sulfur available at the site of the wound, he added.

"Gluten sulfate takes up to 300 times its weight of cold water almost instantly to form a firm gel, but does not dissolve in water," Dr. Reitz said. This tremendous absorbing property aids in drying up the wound and helps reduce the amount of scar tissue.

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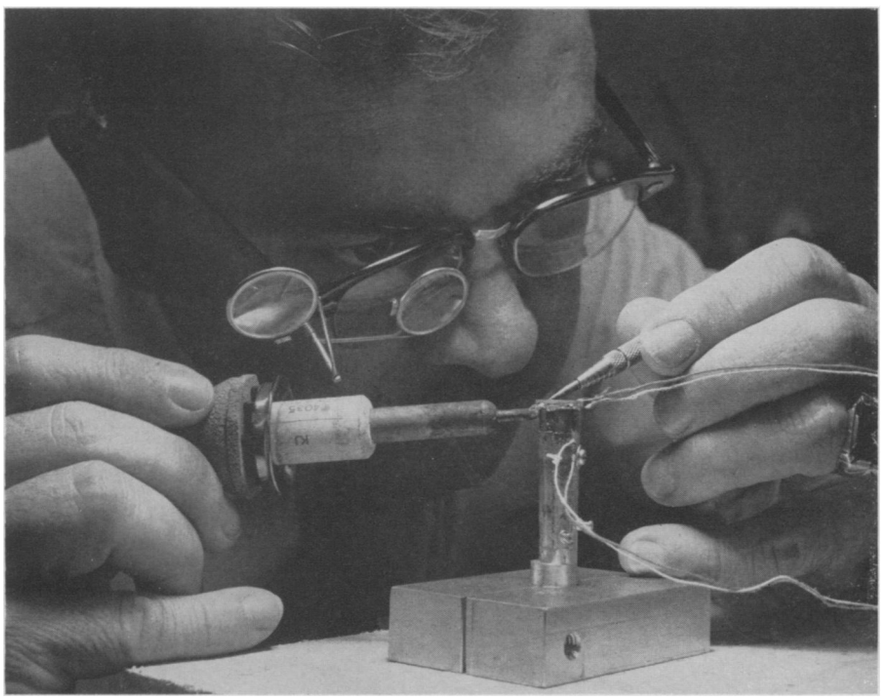

MINIATURE COOLER—A Lilliputian refrigerator to improve the sensitivity of military infrared detectors, whose noise level drops with their operating temperatures, has been developed by Westinghouse. Donald Haase, a technician at the Westinghouse Astroelectronics Laboratory, uses a four- and six-power eye loupe and jeweler's tools as he works on the model cooler, which is still larger than the actual device.

Pigment May Help Vision

➤ THE SAME CHEMICAL that gives you that golden tan from the summer sun may also help you to see.

The brown pigment, melanin, may take part in controlling the messages sent from the eye to the brain, Lieut. Raymond J. Sever, U.S. Navy, told the American Chemical Society in Atlantic City. Melanin is found in the retina, the light sensitive part of the eye. Here, the energy of light is picked up and changed into nerve impulses. It is not known how this is done, he said.

When melanin, extracted from cows' eyes, was exposed to light, there was a rapid appearance of free radicals—high energy particles capable of creating an electric charge, Lieut. Sever continued. These free radicals could produce an electrical voltage across the retina, thus controlling the nerve impulses from the eye to the brain, he suggested.

Free radicals might also be involved in protecting the skin against sunlight, Lieut. Sever said.

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Sex Lure Insect Repellent

➤ SEX APPEAL may be an effective insect repellent, it was announced at the American Chemical Society in Atlantic City.

The sex attractant from the female American cockroach has been isolated, and when placed in minute amounts in poisoned traps effectively lures the male, Dr. Denis Wharton, Army Quartermaster Research and Engineering Command, told the meeting.

The fact that the sex lure of the female cockroach attracts only the male of the same