BIOCHEMISTRY

Explain Nerve Functions

The function of human nerves is explained from knowledge gained in salt water conversion research. Impulses causing reaction to pain imitated.

➤ THE FUNCTION of human nerves has been explained using knowledge gained from salt water conversion research, the American Chemical Society was told in Washington, D. C., by a Swedish physician.

The ion exchange membranes used to desalt sea water have aided scientists to imitate the main features of nerve impulses which cause a body to react to pain.

Dr. Torsten Teorell, director of the Institute of Physiology and Medical Biophysics at the University of Uppsala, explained the discovery:

"Nerves carry their messages from one organ to another in the form of small, rhythmical, electrical signals resembling somewhat the commercial alternating current. The nerves do not spontaneously convey a signal, they have to be 'excited' by some form of stimulus."

Since this property can be duplicated, it is possible to see how pressure on skin can produce pain, Dr. Teorell continued.

"Studies on artificial chemical membranes are of great help in tackling the many unsolved problems residing in living membranes. These studies show clearly how often progress made in the basic sciences like chemistry can be of unexpected importance in biology."

Although the connection between water-desalting materials and nerves might seem strange, the doctor pointed out that all living cells are covered by a thin membrane as chemically complicated as the ion exchange membranes.

"These membranes control the processes which transfer nutrients and water into the cells and also the excretion of waste products formed by the metabolism of the cell."

"The cells select only substances which are in some way useful and exclude others," the doctor said. "The mechanism behind this selection seems to be, in part at least, physico-chemical."

Thus studies on the complicated chemical membranes used for desalting water have pointed to new conclusions in the functions of biologically complicated nerves, he reported.

• Science News Letter, 81:213 April 7, 1962

Intestinal Probes

➤ A TUMOR SPECIALIST told chemists in Washington, D. C., that doctors will diagnose intestinal disorders without X-ray or surgery in the near future.

Speaking at the American Chemical Society meeting, Dr. William H. Fishman, research professor of oncology, Tufts University School of Medicine, and director of cancer research at New England Center Hospital, Boston, told the nation's leading chemists of the advancement which will make this come true.

A new method for measuring alkaline phosphatase, a blood enzyme coming from the intestine in high amounts during intestinal ailments, will allow a patient to be checked without an operation or X-ray.

Ulcers, intestinal sprue and cirrhosis of the liver are some of the disorders which produce high levels of the enzyme, he explained.

"There is reason to hope," Dr. Fishman added, "that the further development of this approach may lead to the discovery of other distinctive enzyme properties which may be useful for evaluating the health of vital organs."

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TEST-TUBE GRASS—UCLA scientist B. Lennart Johnson shows how he dipped the roots of a sterile hybrid grass in colchicine and induced fertility in its seeds. The new grass may have good potentialities for use on wildlands denuded by fire and erosion.

CHEMISTRY

Fresh Water for Space

➤ SPACEMEN ON THE MOON or on a space platform or spaceship may continuously produce more water than they need with a new high-temperature method of burning wastes described at the American Chemical Society meeting in Washington, D.C.

Frank J. Hendel of North American Aviation, Inc., Downey, Calif., told the Society of a process of oxidizing or burning all human wastes, including perspiration and water vapor from breath to produce more water than is originally used.

The water needed for a healthy astronaut is seven pounds each day. A 100-day mission of three men would require one ton of fresh water, he said.

This water would pose a weight problem to present and planned space booster rockets, so water recovery is important to the program. The burning of wastes not only solves the waste problem, but provides the necessary water for extended space or lunar operations.

Solid wastes, accumulating from the process, and harmful gases can be released occasionally in outer space or disposed of on or in the moon's surface, he said.

If an atomic reactor is used for power, other than for propulsion, there will be enough energy produced to heat the wastes to the desired 850 degrees Fahrenheit.

If, however, fuel cells are used for power, water can be obtained as a byproduct, Mr. Hendel explained.

In the new process, all human wastes would be mixed together with some oxygen and fed by a screw conveyor into a reactor. The mixture would be burned at 850 degrees Fahrenheit, where the water would be evaporated and organic materials (including bacteria) would be vaporized.

The vapors and gases would be cooled and collected. The wastes would be ejected. The results would be water purified for drinking and "cooking," or washing.

A moon base could also produce water from ice which might be found in cracks on the moon's surface or from moon minerals.

Thus an astronaut would be able to afford water losses from leakage of water vapor or could cool his space vehicle cabin with the evaporation of water into space, the chemist suggested.

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HORTICULTURE

New "Test-Tube" Grass Born for Denuded Areas

➤ A NEW "TEST-TUBE" grass may protect areas denuded by fire and erosion.

The grass, a cross between Indian rice grass and a needle grass, was produced by Prof. B. Lennart Johnson, University of California at Los Angeles.

Although previously sterile because its chromosomes were unable to pair, the grass is fertile after dipping the roots in colchicine, a drug, Prof. Johnson reported. He found the grass could be grown and tested for several generations, even though it has only been a rare hybrid. The grass, now, may have good potentialities as a forage crop and an erosion control on burned-over wildlands.

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