BIOLOGY

Study Slime Molds

➤ THE DIRT in your backyard may explain how some cells become muscle cells, others bone cells, nerve cells, skin cells and so on for all the many parts of the body.

The tiny slime molds found in soil are being studied for clues to the process of cell differentiation in plants and animals. These organisms lead a double life: at one time they live an amoeba-like existence, later thousands of these amoebae stream together to form a complex many-celled structure with spores and a stalk.

Biologists studying the slime molds are trying to discover how cells become different in a regular and controlled way. Dr. John T. Bonner of Princeton University reported.

He told scientists at the National Science Foundation of progress so far in these studies.

There is evidence that when the slime mold amoebae stream together in a kind of mass migration a sorting out process follows. In a manner similar to what occurs in embryonic chick or frog tissue, for example, some amoebae become stalk cells while others become spores. An advantage the slime molds have over embyronic animal tissue is that the sorting out process can be observed in the normal, unmutilated organism, Dr. Bonner said.

One explanation he offered for the regular and controlled way cell differentiation takes place is that individual cells may compete for certain positions during very early embryonic stages. Grafts made with a slime mold during its slug stage when it is about one millimeter long have shown that cells have a definite "preference" as to location.

Thus cells in a piece from the front end grafted on to the back end of the slug would move to the front end of the "new" slug. This does not appear to be either genetically- or pre-determined, however.

Another interesting characteristic of the slime molds is the role played by an as yet unknown chemical that is responsible for making the single amoebae come together in one mass.

This chemical, which is emitted by a central amoeba, has a very powerful attractive force, Dr. Bonner said. Some recent research indicates it may be related to the estrogenic steroids since urine from pregnant animals exerts a similar, although weaker, attractive force over the cells.

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AGRICULTURE

Fatherless Potatoes Seen As New Aid to Breeders

➤ FATHERLESS POTATOES today may mean tastier potato salad for you tomorrow.

The potatoes produced by the fatherless potato plant might have better disease resistance. shallower eyes, and better cooking and processing quality—all because it has half the normal number of chromosomes.

One of the problems in improving our commercial potatoes is that they contain the tetraploid chromosome number of 48 (four times the basic number, 12, for potatoes). Most wild species have 24 chromosomes, 12 from each parent. This has made it difficult to breed any of the desirable characteristics of the wild species into the commercial potatoes. Usually the results of any matings between wild and "tame" potatoes have been sterile.

Now, however, U. S. Department of Agriculture researchers have found a way of tagging commercial potato plants that have only half their normal number of chromosomes, the haploid number 24. Using these plants in crosses with desirable wild plants, the scientists can get the qualities they want in a fertile hybrid. Then as a final step, the chromosome number of these promising potatoes can be doubled to 48 with the drug colchicine and scientists can make crosses with normal commercial potatoes.

USDA geneticists R. W. Hougas and S. J. Peloquin, working cooperatively with the Wisconsin Agricultural Experiment Station, developed the technique for finding the naturally occurring haploid plants.

Higher yields from potato crops may be one result of the new breeding effort. The advantages of as many as five sets of chromosomes in a plant can be compared with the normal two sets, one from each parent.

Robert V. Akeley of the USDA's Agricultural Research Center, Beltsville, Md., said researchers are predicting that within ten years some 80% of the potatoes grown will be processed. It will be important, he pointed out, to have the right kind of potatoes for making chips, frozen or precooked, dehydrated potatoes.

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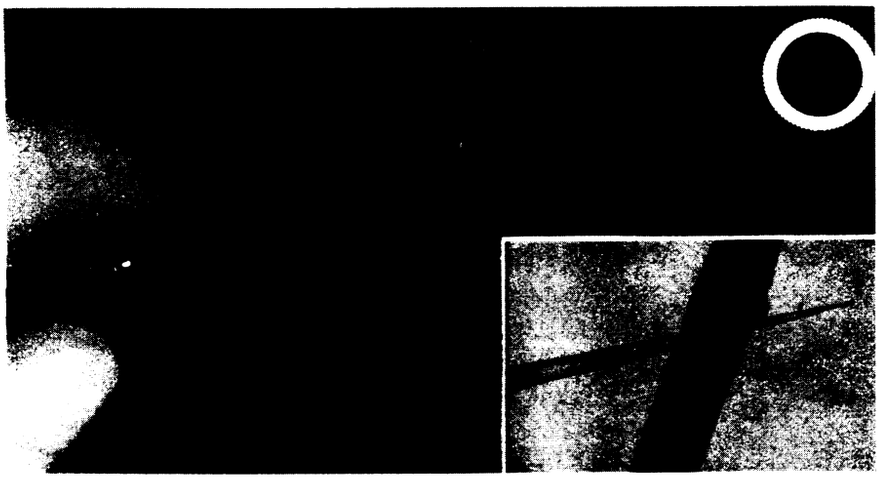

ELECTRODE FOR HEART CELL—An electrode so small at its tip that the point of contact covers only about 1/150 of the area of a single heart cell has been developed as a research tool at the National Jewish Hospital, Denver, Colo. A heated glass tube was slowly stretched to an almost invisible thinness; potassium choloride solution, forced into the hollow filament by vacuum pressure, is the primary conductor. Copper wire inserted into the glass tube transmits the output of about 100 millivolts to a heavier wire which carries it to a recording mechanism. The inset photograph shows the tip, about 3/100,000 of an inch diameter, compared with an average human hair. Drs. Baruch Bromberger-Barnea and Paolo Caldini used the electrode to measure the single cell potentials of the human heart.

ENGINEERING

New Scientific "Sniffer" Detects Fuel Tank Leaks

➤ A SCIENTIFIC "sniffer" is being used to detect elusive fuel tank leaks during the assembly of jet seaplanes.

The sniffer is said to be able to find leaks inside a wing fuel tank in a matter of minutes. Because an inside leak can be many feet away from where it appears on the outside, its detection without the sniffer would take hours or even days, reports the Martin Company, Baltimore, Md.

The sniffer is described as an infrared analyzer that uses nitrous oxide gas to trace the path of a fuel leak from the outside back to its source of origin inside the tank.

The unit's sensitivity can be adjusted to detect as little as 50 parts of nitrous oxide in a million parts of air.

To find an inside leak, a rubber cup fed with nitrous oxide is placed outside over the apparent leak. The cup confines the gas to this area at about five pounds per square inch, forcing the gas into the opening. The gas follows the leak path until it comes out on the inside.

An operator of a probe on the inside of the fuel tank moves the probe in the suspected area until a light starts flashing. This spots the leak.

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