

## Molecular basis of maternal inheritance

Genetic traits, according to Mendel, are supposed to come equally from both parents. Apparently this is not always the case. Man and other organisms can receive more traits from one parent than from the other. In many cases the mother is favored.

The molecular basis for maternal inheritance has not been established. In the sexual green alga, gene transmission is mostly maternal, although the female and male germ cells are the same size and contribute their entire contents when they fuse to form a zygote (united germ cell). Why, then, are the female's genes favored in the offspring?

Ruth Sager and Dorothy Lane of Hunter College in New York City report in the September PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES that, while the DNA from the nuclei of the male and female germ cells follows the same paths in the zygote, chloroplast DNA does not. (The chloroplast is a highly pigmented structure of the plant cell that happens to contain, beside chlorophyll, DNA—genetic material.) Chloroplast DNA from the female parent persisted in the zygote, but that from the male did not.

"The findings," the authors conclude, "support the hypothesis that the loss of genetic markers from the male parent is the direct consequence of the loss of the corresponding chloroplast DNA."

## Iron-protein improves lipid metabolism

One of the crucial cellular activities of the body is the conversion of foodstuffs to energy. Stripped of its intricacies, the operation boils down to a passage of electrons. Some of the key electron carriers are iron-containing proteins known as the cytochromes. One of the better-defined cytochromes is cytochrome c.

The liver is known to metabolize (break down) lipids less efficiently with age. This metabolism deficiency may explain why many older people accumulate lipids in their bloodstreams and cholesterol in the blood vessels of the heart. In the Sept. 20 NATURE NEW BIOLOGY, a group of Japanese scientists at the Mochida Pharmaceutical Co. and the Nippon Medical School in Tokyo report that giving cytochrome c orally or by injection to old rats improved the ability of their livers to metabolize lipids.

The authors do not suggest that cytochrome c might be used to correct lipid metabolism deficiencies in older people. Nonetheless the implications are there.

## Pain killers and the neuron membrane

Pharmacologists have had trouble determining how pain-killing drugs act. No proposed mechanism of action is totally accepted. In the Sept. 13 NATURE NEW BIOLOGY, Herbert Levitan and Jeffrey L. Barker of the National Institute of Child Health and Human Development report the effects of pain killers on the neurons (nerve cells in the brain) of invertebrate animals.

Most of the drugs they tested increased membrane potential (conductance of ions across the membrane) by increasing potassium permeability and decreasing chloride permeability. There was good correlation between the ability to alter permeability and the various drugs' effectiveness as pain killers. An increase in membrane potential, the authors conclude, probably explains why pain-killing drugs kill pain.

## Taking the sulfur out of coal

Most sulfur oxide air pollution comes from the sulfur in coal that is burned in various industrial processes. In an average coal, the sulfur is about half in the form of iron pyrites and half in the form of organic compounds, although some Eastern coals have most of their sulfur in iron pyrites. Previous efforts to leach sulfur from pyrites were unsuccessful because the powerful oxidizing agents used also reacted with the coal.

Four TRW Systems Group researchers report in the Sept. 29 SCIENCE that in laboratory experiments aqueous solutions of ferric salts appear to be very effective at removing the pyritic sulfur. The reaction with the salts yields elemental sulfur and soluble sulfates.

They say the ferric reagent meets the criteria of being selective for pyrites and not affecting coal chemistry, is inexpensive, regenerable and highly soluble in both reducing and oxidizing forms.

The final product is a coal with total sulfur reduced by 40 to 75 percent, depending on the ratio of pyritic to the unaltered organic sulfur. The four researchers are R. A. Meyers, J. W. Hamersma, J. S. Land and M. L. Craft.

## PCB's in trout

Polychlorinated biphenyls are organic chlorine compounds chemically similar to DDT and used in numerous commercial applications. Lately scientists have been more worried about environmental dissemination of PCB's than of DDT because so much less is known about PCB's.

Four Cornell University researchers report in the Sept. 29 SCIENCE that they measured PCB's in lake trout from Cayuga Lake, N.Y., and discovered the concentration of PCB's is clearly a function of age of the trout. In the youngest trout, the PCB level was 0.6 parts per million; in more mature trout it was as high as 26.2 ppm. But there was considerable variation of PCB concentration in the older trout, probably "due to greater differences among foraging, metabolic and excretory capabilities of these older fish."

The researchers note that the same pattern of increase with age is also true of DDT in fish. They add that there are many sources of PCB's, and it is not known what combinations of sources lead to contamination of the trout. The four researchers are Carl A. Bache, James W. Serum, William D. Youngs and Donald J. Lisk.

## Atmospheric CO<sub>2</sub> and eutrophication

Some researchers have claimed that internal sources of carbon may sometimes be the limiting nutrient in lake eutrophication and that phosphates and nitrogen may be less important than earlier thought. Detergent companies have seized on this research in an effort to prove their phosphates are not the main culprit.

Two Canadian researchers report in the Sept. 29 SCIENCE that study of a lake with insufficient internal sources of carbon showed that carbon dioxide from the atmosphere made up for the deficit. It entered the lake in sufficient quantities to permit eutrophication when there was sufficient nitrogen and phosphorus. They say their research would apply to "any body of water."

The research was done by D. W. Schindler and G. W. Brunskill of the Fisheries Research Board of Canada.