

medical sciences

Aging: A protein cop-out?

Of the various theories of aging, the one that aging is due to an accumulation of defective protein molecules has not received a lot of attention. Yet evidence is mounting to support the hypothesis.

The number of times cells can be cultured depends largely on the age of the individual the cells were taken from. During senescence in the test tube, cells experience changes in the ratio of proteins to DNA and in the proportion of various enzymes. In the July *NATURE*, Robin Holliday and G. M. Tarrant of the National Institute for Medical Research in London report that aging human cell lines contain an increasing number of defective enzymes crucial to sugar metabolism.

Their evidence that the enzymes become defective with age is largely based on the fact that the enzymes from older cells break down more easily under heat than do enzymes from younger cells. The older enzymes are also less efficient in acting on their substrates. What's more, other cells were exposed to a compound known to cause mutations, and higher proportion of the defective enzymes were found in them as well.

What makes a sperm a winner

Why, of the four million or so sperm emitted in a male ejaculation, does one sperm manage to fertilize an egg? Local differences in the structure of the membrane surrounding the sperm may be the answer.

In the past few years, differences have been found in the distribution of electric charges on the membrane surface (by the orientation of sperm in electric fields), the distribution of surface antigens, and the differential binding of colloidal iron to the membrane. Also, the membrane undergoes changes in specific regions as the sperm passes through the genital tract and penetrates the egg. Now, Garth L. Nicolson of the Salk Institute for Biological Studies in San Diego and Ryuzo Yanagimachi of the University of Hawaii School of Medicine in Honolulu report in the July 21 *SCIENCE* that they have determined specific biochemical differences in the sperm plasma membrane, namely, the distribution of sugars on the membrane. Membrane sugar patterns also vary among species, they found.

The whys of skin graft rejection

When inbred mice are grafted with skin from inbred donors that differ from the recipients by only a single minor histocompatibility antigen, some recipients retain their skin grafts while others reject them. Does failure to reject mean the subjects failed to respond immunologically? Ellen Goldberg and her colleagues at Cornell University and the Sloan-Kettering Institute for Cancer Research, New York City, think not.

As they report in the July 12 *NATURE NEW BIOLOGY*, both mice that accepted grafts and those that rejected grafts produced antibodies to the crucial antigen. What's more, some mice accepted grafts the first time, but not the second, suggesting that acceptance or rejection must depend on more than antibody reactions to the antigen. Goldberg and her team conclude that graft acceptance or rejection probably depends not just on antibodies, that is, humoral immune response, but on genetic differences in cell-mediated immunity, which is highly complex and under investigation by many researchers.

July 29, 1972

earth sciences

Creep on a Turkish fault

Two seismologists, Robert D. Nason of the National Oceanic and Atmospheric Administration's Earthquake Mechanism Laboratory and Alkut Aytun, director of the Turkish Earthquake Research Institute, have detected fault creep—slow, nonseismic motion—on Turkey's Anatolian Fault. They report that the fault appears to be creeping at a rate of about two centimeters per year at the village of Ismetpasha, 110 kilometers north of Ankara.

The 500-mile-long Anatolian Fault has caused 13 major earthquakes and thousands of deaths since 1938. Fault creep was discovered on California's San Andreas Fault in 1956, but until now the phenomenon has not been detected on any fault outside California.

The first clue to existence of fault creep in Turkey was an offset, or kink, in a wall at Ismetpasha. By comparing the two creeping faults, seismologists may be able to determine what causes fault creep and whether it relieves stress that might otherwise result in an earthquake or simply indicates that the fault is active.

New regulations for weather-changers

Most weather modification in the United States is either conducted or funded by the Federal Government. There is, however, a small private sector, including 10 fair-sized corporations, of weather modifiers.

The National Oceanic and Atmospheric Administration has now published proposed regulations under which all nonfederal weather modification activities must be reported to the Secretary of Commerce. The regulations would implement a law passed by Congress last December. Under that law, weather modification is defined as any activity performed with the intention of producing artificial changes in the composition, behavior or dynamics of the atmosphere, and includes cloud seeding, use of heaters to disperse fog and dusting land or water surfaces with powders or liquid sprays. All attempts at weather modification must be reported in advance, with detailed interim and final reports to follow. Maximum penalty is a \$10,000 fine.

The new reporting program, to be administered by NOAA, is a reinstatement of a similar program that lapsed two years ago. The earlier program was administered by the National Science Foundation.

What shape Gondwanaland?

Though scientists agree on how most of the present-day continents and other land masses fit into the protocontinents Laurasia and Gondwanaland, they are still juggling those surrounding the Indian Ocean. The position of Madagascar seems to be the keystone.

In the July 14 *NATURE*, D. H. Tarling of the University of Newcastle upon Tyne in England presents a reconstruction that requires more distortion of the continents but shows better agreement with magnetic-pole positions than do previous versions. Tarling says most evidence now indicates that Madagascar has drifted northward. He would place Madagascar between India and Mozambique, Antarctica snug against the southern tips of Africa and India, and Australia to the east of Antarctica. To avoid overlap between Patagonia and the Antarctic Peninsula, he unbends them slightly. West Antarctica must be moved relative to east Antarctica.

75