

BIOCHEMISTRY

Particles Fight Germs

► CHARGED PARTICLES of calcium and magnesium are needed by the body to fight off invading disease germs.

The calcium particles carry a double positive charge. The magnesium particles are similarly charged. Cobalt, nickel and to a less extent, cadmium, manganese or zinc may substitute for the magnesium.

Third of the chemical steps involved in the body's destruction of invading germs requires no charged particles.

These findings from research by Dr. Manfred M. Mayer of Johns Hopkins University, Baltimore, have been announced by the American Cancer Society which supported his work.

Whether the findings have any bearing on cancer depends on whether body cells are so changed in becoming cancerous that they might fall into the category of foreign or invading cells and be attacked as disease germs are.

The cancer society described Dr. Mayer's findings as follows:

Very little is known about the fundamental fight the body puts up against disease. It is known that the body produces a protein, known as antibody, which may clamp over the surface, possibly as a mirror image, of protein particles (or antigens)

on the surface of the invading cells. This causes the bacteria to break open, to clump together or to be precipitated in an inactive and inanimate mass of waste matter.

Another substance, called complement, also is involved. This has several components. Complement abounds in the blood serum and is needed, along with antibody, to destroy invading cells. Just what it does, however, and how it does it never has been known.

The Johns Hopkins scientists have found that complement and antibody are relatively powerless in the absence of the charged calcium and magnesium particles.

They showed this by passing complement through a resin, which depleted it of charged calcium and magnesium particles, and by adding to complement a substance called EDTA (ethylene diamine tetraacetate) which bound the elements and neutralized their charges. When charged calcium particles were added, part of the antigen-antibody reaction with complement took place; and when magnesium later was added, the reaction was completed.

Associated with Dr. Mayer in the work were Drs. Lawrence Levine, Kenneth M. Cowan and Abraham G. Osler.

Science News Letter, September 4, 1954

METEOROLOGY

Desert Weather Control

► GIANT WINDMILLS can control the weather over desert and semi-arid regions so that useful crops could be grown in these now-wasted areas, that comprise such a large part of the earth's land surface.

The 150-foot windmill blades could also solve the Los Angeles smog problem, Dr. Werner Spilger of Holloman Air Force Base, Alamogordo, N. Mex., suggested in a paper read to the American Meteorological Society meeting in Rochester, N. Y., by Col. John Hemen of the U. S. Air Force.

Dr. Spilger has a patent application pending on his weather control method. The huge windmill, with its blade swirling 150 feet above the ground, would be used to create artificial "thermal updrafts," or vertical streams of warm air.

The device would draw air from a radius of about five miles, Dr. Spilger estimates, at a rate of 65 to 90 miles an hour. The result would be a funnel of fast-moving air similar to that found in tornadoes or dust devils.

The thermal updraft can be regulated by changing the angle at which the windmill blades operate or by varying the power of the 500 horsepower motor he suggests should be used to rotate the shaft in desert areas.

About 10 or 15 such windmills located in the mountains could affect the weather

for most of the state of New Mexico, Dr. Spilger believes.

Once such a system has been set up, he said, "we could win useful work with it." One giant windmill, Dr. Spilger has calculated, could tap 50,000 kilowatts of power from the kinetic energy of the updraft.

Dr. Spilger said that several thousand flight tests with gliders have sampled the atmosphere to get some idea of its structure, and his method is based on findings from these flights.

No full-scale versions of the windmill have been built yet, but Dr. Spilger has tested his method with models in his basement laboratory.

By using the hills that surround Los Angeles, Dr. Spilger points out, "it is possible to solve the city's smog problem." In that area, the windmills would be used to destroy the "inversion," which occurs when temperature increases with height, rather than falling off at higher levels as is the usual case. Such warmer air up high blankets the air below, preventing its escape.

Dr. Spilger estimates that ten windmills, each powered by a 5,000 horsepower motor, would do the job of dissipating the inversion layer and relieving Los Angeles of its smog.

Science News Letter, September 4, 1954

• RADIO

Saturday, Sept. 11, 1954, 3:15-3:30 p.m. EDT
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. L. Whittington Gorham, secretary general, 2nd World Congress of Cardiology and 27th Annual Scientific Session of the American Heart Association, will discuss "World Cardiology." The 2nd World Congress of Cardiology will be held in Washington, Sept. 12-17.

BIOCHEMISTRY

Must Check Antibodies For Replaceable Organs

► TO MAKE possible the setting up of "skin banks" for the badly burned or the use of healthy organs to replace diseased ones, scientists will have to devise some way to check the production of antibodies in human beings.

The same sort of mechanism that helps to protect us from disease seems to prevent successful cross-grafting of skin and replacement of body parts, it appears from studies at the University of California at Los Angeles Medical School by Drs. Jack Cannon, Robert Weber and William Longmire.

Permanent successful "takes" of cross-grafted skin in chicks less than a week old have been made. However, as the chicks grow older successful "takes" are no longer possible. The grafts may take initially but soon die. Nor can the grafted skin of a permanent "take" be successfully transplanted back to the original donor after the chicks reach adulthood.

This indicates that the reaction of the body to skin from another individual is related to the mechanism by which the body "kills" foreign bodies such as bacteria. This is known as the antibody reaction.

Antibody reactions can be artificially stimulated by inoculations, such as those of typhoid and tetanus. It seems likely, the scientists suggest, that conversely they might be repressed by some artificial means.

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ZOOLOGY

Begging Burros Stop Black Hills Tourists

► WHAT BEGGING bears are to Yellowstone National Park, some 20 begging burros are to Custer State Park in the Black Hills of South Dakota.

The Black Hills burros are encountered by thousands of visitors annually on U. S. highway 16A not far from Mount Rushmore. They beg food from passing motorists, frequently standing in the road to stop cars. A traffic tie-up such as they cause at times is known locally as a "Jackass jam." Neither burros nor visitors have ever been injured.

Burros once carried visitors up to Harney peak lookout, but proved so stubborn they were eventually replaced by horses. At that time, the burros were freed to roam the park at will.

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