

BACTERIOLOGY

Synthetic Antigens Promise Revolution in Immunology

Use of Animals May Eventually Be Eliminated; Protection Stimulated With Chemical Compounds

A REVOLUTION in disease prevention methods, which may make unnecessary in future the use of horses or other animals for vaccine preparation, appeared in reports to the Society of American Bacteriologists at their San Francisco meeting.

Instead of shooting germs into horses, and using their blood for source of disease-fighting substances for human protection, scientists of the future may be able to confer this protection by chemical means.

One step in this direction is the preparation, apparently for the first time, of a synthetic "vaccine" which protects rabbits against pneumonia. This was reported by Dr. Walter F. Goebel, of the Hospital of the Rockefeller Institute for Medical Research. No human trials were reported, but these presumably will be made after further animal studies.

Against Streptococci

A similarly synthetic "vaccine," this time against streptococci, which are the germ causes of scarlet fever, childbed fever and other dangerous ailments, was reported by Prof. Stuart Mudd, of the University of Pennsylvania. This new type of vaccine was prepared by Drs. M. G. Sevag and D. B. Lackman, of the University of Pennsylvania.

These synthetic "vaccines," which technically should be called antigens, are chemicals. Ordinarily the germs produce such chemicals, and the body fights them off by producing other substances called antibodies. Dr. Goebel succeeded in preparing chemicals, without benefit of the germs, which call up the pneumonia antibodies just as the germ chemicals do. Drs. Sevag and Lackman obtained the chemicals from the streptococci or germs themselves. Such chemicals have been obtained from streptococci before, but never before in a state in which the chemicals had any practical, disease-protecting possibilities.

Another new pneumonia vaccine was reported by Dr. René J. Dubos, also of the Hospital of the Rockefeller Institute. This was prepared from pneumonia germs that had lost their disease-produc-

ing ability. Small amounts of this vaccine protect mice against one type of pneumonia only, but larger amounts give protection against others of the 32 types of pneumonia. No human trials were reported.

The value of animal charcoal as an aid in treatment of pneumonia appeared in the report of Dr. George E. Rockwell, of Cincinnati. The charcoal is injected into the veins in conjunction with anti-pneumonia serum. Of the 16 patients given this treatment by Dr. Rockwell, only one died. That was a man over 70, who developed acute heart failure.

A tiny amount of carbon or charcoal, Dr. Rockwell reported, saved the lives of mice that had been given fatal doses of pneumonia germs, even when the carbon was given as long as four hours after the pneumonia germs.

Dr. Rockwell emphasized that 16 cases are not enough on which to base final conclusions, but he believes his results suggest that charcoal should be used in treating pneumonia. He also emphasized that the charcoal aids but does not replace anti-pneumonia serum.

A hint that sulfanilamide, chemical remedy which has already proved successful in treating many cases of gonorrhea, may some day play a part as preventive of this widespread ailment appeared in the report of Drs. Grant Morrow and George Packer Berry, of the University of Rochester School of Medicine and Dentistry.

Only Hinted At

Sulfanilamide for prevention of gonorrhea was only hinted at and the Rochester scientists said nothing of such practical application of their research. They succeeded, however, in growing gonorrhea germs on the chorio-allantoic membrane of the chick embryo. This is an achievement in itself. The study of gonorrhea and search for a cure have been hampered heretofore by lack of any animal other than the human which is susceptible to the infection. With the germs of the ailment growing on the living tissues of chick embryos, scientists can now test various reme-

dies, possible preventives of gonorrhea.

When a bit of the drug was dropped on the embryo 24 hours before inoculation with the gonorrhea germs, no infection occurred, Drs. Morrow and Berry reported. In other words, the drug prevented infection with gonorrhea germs. The drug "cured" the condition, eradicating the germs, in other embryos inoculated before the drug was given.

Doctors have already found sulfanilamide useful in treating gonorrhea, and many spectacular cures have been reported. The reason for its success as a remedy now appears to be its ability to act somewhat as an antitoxin, inactivating the so-called toxin of gonorrhea germs. This inactivation of gonococcal toxin was reported by Drs. C. M. Carpenter, G. M. Barbour and P. L. Hawley, of the University of Rochester School of Medicine and Dentistry.

Antitoxic Action

"Toxin" prepared from gonorrhea germs isolated from the knee joint of a patient suffering with gonococcal arthritis was injected into 116 mice. All these mice died. Then some of the "toxin" was mixed with sulfanilamide. Of 295 mice given this mixture, only one-fourth died. The others apparently were protected by the antitoxic action of the sulfanilamide.

Certain plant diseases caused by filterable viruses can be mistaken for the effects of heredity, Michael Shapovalov, pathologist of the U. S. Department of Agriculture, pointed out. They are transmitted from one generation to another by infection, just as faithfully as if they were hereditary traits carried by genes.

Some of their effects look astonishingly like those of the hereditary units. Thus, the effects of "shoestring" virus on tomatoes closely resemble those of the gene known as "wiry."

A test for disinfectants, which takes into account not only the germ-killing power of these agents but also their tendency to destroy or injure body tissues, was described by Dr. A. J. Salle, of the University of California. Collaborating with Dr. Salle in evolving the test were W. A. McOmie, I. L. Shechmeister and D. C. Foord.

Phenol or carbolic acid has heretofore been used as the standard for determining germ-killing powers of disinfectants. Comparing disinfectants with phenol, however, does not take into account the effects of possible injury to tissues.

When various germ-killers were tested by the new method, iodine and some of the chlorine compounds rated highest.

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