Life Sciences Notes

MOLECULAR BIOLOGY

New Methods Aid Drug Design

Whether a drug is cure or poison depends on the configuration that results when a small drug molecule binds to a larger protein molecule in the body. Precise definition of this configuration is now possible using nuclear magnetic resonance and computers.

In the October PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, Dr. Oleg Jardetzky and co-workers at Merck Sharp & Dohme, Rahway, N.J., describe experiments in which they used NMR equipment to pinpoint the specific binding sites on both drug and protein molecules. Computers interpreted the NMR information for the scientists who then determined what molecular structures occur when penicillin and other drugs interact with proteins.

By defining the structures formed at the binding sites, scientists can learn how drugs work at the molecular level. Then it will be possible to design drugs with only curative—no toxic—molecular configurations and, eventually, to develop ways of quickly determining which drug will work best in each individual patient. Up to now, drug design has been largely a matter of guesswork and trial-and-error.

MICROBIOLOGY

Scientists Design New Antimalarials

Two new compounds, designated U-24 and 729A, may be helpful in treating malaria, including those types which are resistant to the commonly used antimalarials chloroquine and DDS (diaminodiphenyl sulfone).

Dr. Charles Lewis of the Upjohn Company, Kalamazoo, Mich., who has tested these compounds in mice, says they probably act by inhibiting vital biochemical processess, such as protein synthesis, in malaria-causing organisms.

At the National Institutes of Health, Bethesda, Md., Dr. Kendall Powers verified the antimalarial potency of these new chemicals in rodents and finds them active in preliminary studies in monkeys.

U-24 and 729A are analogs of a commonly used antibiotic—lincomycin hydrochloride. By altering the molecular structure of the antibiotic, which has no antimalarial activity itself, scientists came up with these agents which may. No testing on humans has been done so far, but is expected as soon as additional animal studies are completed.

ANIMAL RESEARCH

The Diminishing Guinea Pig

Of the 36 million animals American scientists used as guinea pigs last year, less than 400,000 were real guineas.

Instead, 24 million mice and 10 million rats lead the list of the eight most popular species of research animals. Hamsters, with 890,000, took third place and the guinea pigs ranked fourth. Fifth in popularity were a quarter of a million rabbits, followed by dogs—less than 93,000 of them. Monkeys, the most expensive experimental animals, placed sixth with 60,000, and 33,000 cats took last place, according to the Institute of Laboratory Animal Research.

VACCINES

Recently Made Polio Vaccines Banned Temporarily

An outbreak of green monkey fever in West Germany has lead to a ban on the release of all polio live virus vaccine made in the United States since July. The fever has killed seven laboratory workers who removed the monkeys' kidneys to get tissue for culturing the viruses used in polio vaccine.

Dr. Roderick Murray, director of the Division of Biologics Standards at the National Institutes of Health, said the ban on vaccine will be temporary and will cause no hardship because stockpiles of vaccine made before July are high. Now, NIH scientists are tracking the whereabouts of the 2,000 green monkeys which have entered the United States since the outbreak of monkey fever in Germany. None of the animals came from Uganda, the source of the infected animals in the German labs.

From Atlanta, scientists at the National Communicable Disease Center are checking the 133 persons known to have handled the monkeys that were imported to the U.S. None has contracted the fever which is highly infectious and resistant to antibiotics, steroids and other treatments.

DRUG THERAPY

New Drug Against Tuberculosis

The Food and Drug Administration has approved a new anti-tuberculosis drug active against strains of the tubercle bacillus that are resistant to available drugs.

In spite of significant inroads against TB in the last 25 years, the disease still infects some 15 million to 20 million persons in the world and kills two million to three million every year. In 1964, TB killed 8,303 persons in the United States.

The new drug, called Myambutol by Lederle Laboratories, Pearl River, N.Y., where it was developed, will be used only in combination with isoniazid or streptomycin, the two drugs currently used against tuberculosis. In experiments with previously untreated patients, Myambutol given with one of these other drugs completely wiped out tubercle bacilli in 100 percent of cases, according to Dr. Marjorie M. Pyle of the Illinois State Tuberculosis Sanitorium, Chicago.

The bacilli are often resistant to streptomycin or isoniazid used alone.