

## R-FACTOR

### Drug resistance pre-dates antibiotics

With the advent of the antibiotic era came what some scientists interpreted as a new and related phenomenon—the ability of certain organisms to resist the deadly effects of the antibacterial drugs. In the last decade in particular, there has been increasing evidence and concern about the ability of bacteria to pass resistance from organism to organism by transmitting what is known as the R-factor.

Resistance, however, may not have evolved as a consequence of human use of antibiotic drugs. It is more likely, according to Dr. Charles Davis and Jeraldine Anandan, that resistant bacteria evolved as a result of contact with antibiotic compounds in nature. In the Jan. 15 issue of *THE NEW ENGLAND JOURNAL OF MEDICINE*, the investigators from the University Hospital of San Diego County report on a study of 128 individuals from Miruru, an isolated community in North Borneo.

In 1959, a few persons in the antibiotic-free community received a total of 19 injections of penicillin. Otherwise, there is no known evidence of any member of the village receiving antibiotics. Nevertheless, studies in 1968 of 128 persons revealed 50 bacterial isolates resistant to two or more antibiotics, including ampicillin, tetracycline, chloramphenicol and streptomycin, even though no one in Miruru had ever taken any of these drugs.

## PHOTOSYNTHESIS

### Three reactions for two systems

One theory explaining the process of photosynthesis, by which chloroplasts in green leaves convert sunlight into chemical energy, states that there are two separate but parallel systems operating in the initial phases.

Support for this view comes from two scientists at the University of California at Berkeley. In the November *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES*, Drs. David B. Knaff and Daniel I. Arnon report that photosynthesis is initiated by three simultaneous chemical reactions. One system, activated by light from the short-wavelength part of the spectrum, utilizes two reactions. Short-wavelength light, they find, boosts electrons from chlorophyll molecules to two electron-accepting substances—Component 550 and cytochrome b-559. These sequential reactions yield the energy compounds ATP (adenosine triphosphate) and NADPH (reduced nicotinamide adenine dinucleotide phosphate). While this process is going on, another system is producing ATP through a pathway in which long-wavelength light boosts chlorophyll electrons to electron-accepting ferredoxin molecules and then to ATP.

Plants then use these compounds to produce sugar molecules and other growth substances.

## RESISTANT STRAINS

### Rifampin for tuberculosis

Antibiotics have, by and large, rendered tuberculosis a controllable disease. Nevertheless, cases develop in which the tuberculin organisms resist the effects of

available antituberculosis drugs, particularly isoniazid.

At the twenty-ninth Veterans Administration-Armed Forces Pulmonary Disease Research Conference in Cincinnati, Dr. William Lester reported encouraging results in treating resistant patients with rifampin, a new antibiotic from a closely related class of compounds that includes anti-viral rifampicin (SN: 11/1, p. 413). The scientist from the National Jewish Hospital and Research Center in Denver says that of 30 patients suffering from advanced, multiple drug-resistant tuberculosis, 70 percent were cleared of the disease organism after rifampin therapy.

The drug, prepared by a fermentation process from the soil bacteria *Streptomyces mediterranei*, has only recently been released for experimental use in the United States, although it has been used in foreign countries for several years.

## FDA

### Hearings on vitamins to end

In 1967 the Food and Drug Administration moved to ban what it considered needless vitamins from a host of foods, and to restrict sale of over-the-counter multiple vitamins (SN: 2/11/67, p. 146).

Since that time, in a hearing room in Washington, an FDA examiner has been listening to testimony for and against the proposed action. According to regulation, all affected parties have a right to be heard. However, after almost three years, time is running out.

In one of his first moves as new FDA Commissioner, Dr. Charles Edwards has directed the hearing examiner to conclude testimony and submit a report by June 1. Such protracted hearings, the commissioner says, are a waste of Government money and of time.

## IMMUNOLOGY

### Alcohol suppresses leukocytes

Alcohol is known to increase susceptibility to infections in experimental animals. It does so by impairing the function of leukocytes that would otherwise mount an attack against infectious organisms.

Alcohol has the same effect on man. In the Jan. 15 issue of *THE NEW ENGLAND JOURNAL OF MEDICINE*, four scientists from the New York Hospital-Cornell Medical Center report studies showing that alcohol temporarily impairs the mobilization of white blood cells in normal individuals. The test subjects were specifically identified as being free of liver disease or nutritional deficiencies and not being chronically heavy imbibers. Previously, increased susceptibility to pneumonia and other chest diseases has been linked to alcoholics but has been tied to a generally poor state of health.

Drs. Robert G. Brayton, Peter E. Stokes, Melvin S. Schwartz and Donald B. Louria found that leukocyte counts were lowest during the first four hours after alcohol consumption. After six hours, leukocyte accumulation apparently increases at an accelerated rate to restore normal levels.

Though the mechanisms by which alcohol acts on leukocytes are unclear, laboratory experiments indicate that alcohol increases concentrations of hydrocortisone, a hormone that inhibits leukocyte activity.