

Vaccines to Prevent Pneumonia

Two years ago medical scientists at the University of California at San Francisco injected a controversial test vaccine into 77 children and young adults who share a rare defect. All have nonfunctioning spleens, rendering them highly vulnerable to infection by *Streptococcus pneumoniae*, a type of oval-shaped bacteria that kills about 25,000 persons in the United States each year.

The results of that study, closely monitored by officials at the National Institute of Allergy and Infectious Diseases, were recently released: none of the 77 immunized persons contracted pneumonia, while 10 persons in a control group of 106 closely matched, unimmunized children became infected, 2 of them dying.

This latest study bolsters earlier data that showed recently developed vaccines to be 80 percent effective on 14,900 American and 12,000 South African adults. More important, the West Coast study clears the last major obstacle for such vaccines, proving them safe for children older than two years of age. Early next year drug manufacturers will probably begin producing vaccines for those individuals most susceptible to bacterial infection: persons in closed populations, such as school children, military personnel and those on Indian reservations, and persons older than 50 years of age, especially those with systemic health problems, such as heart and lung disease and diabetes. Epidemiologists estimate that 28 percent of this elderly, chronically-ill group eventually succumb to pneumococcal pneumonia.

But perhaps the highest risk group is represented by the 77 California cases. All of these youngsters have sickle cell anemia, rendering them 200 to 300 times more vulnerable to pneumonia, middle ear infection and meningitis (a dangerous inflammation of tissues enveloping the brain) than average persons. Sickle cell anemia is progressive and genetic. The one out of every 400 blacks victimized by it lacks the crucial spleen function that develops antibodies for trapping and neutralizing bacteria. As was hoped, the vaccine proved "immunogenic," triggering antibody production in the children.

In an editorial accompanying the official report of the California inoculations, published in the Oct. 27 *NEW ENGLAND JOURNAL OF MEDICINE*, Robert Austrian of the University of Pennsylvania traces efforts to develop such vaccines back to the early 1900s. By the 1930s, he writes, researchers were on the verge of perfecting such drugs, but their impetus was slowed because sulfa drugs and antibiotics were deemed more promising.

Such optimism for "curative" drugs was premature. While it is true coccal

bacteria are not the pandemic killers they once were, it is equally true that they are killing more people now than they were ten years ago. Part of the problem is that the microscopic, highly adaptable microorganisms have lately begun to evolve strains resistant to a wide variety of antibiotics. Earlier this year South African officials reported a strain that defied all but the most potent and expensive drugs used against it.

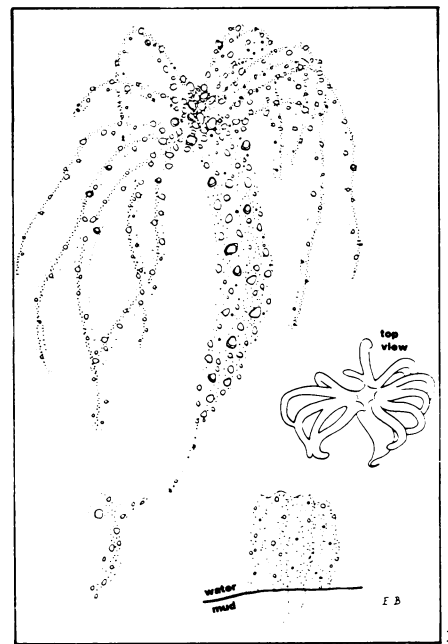
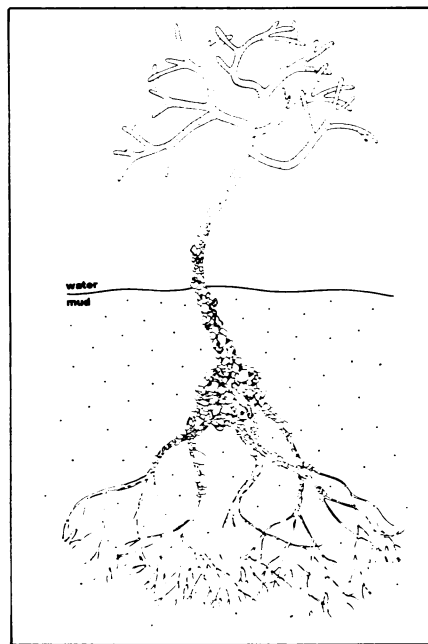
With the new vaccines, however, doctors will have a most attractive alternative. Instead of searching for new drugs to outflank evolving coccal strains, they can "teach" the body how to prevent infection altogether. As with most other vaccines, the new sera act as low-level antigens that evoke a defense response in the body. Having "seen" the enemy in this initial skirmish, the body is better prepared when the bacteria appear again under normal conditions, mostly in cold, wet, overcrowded and unclean environs. The distinguishing molecules in the pneumococcus vaccines are complex sugars, or polysaccharides, which are

found on the outer membrane of the bacteria and which are biochemically "remembered" by the body's immune system.

The vaccine used in the adult tests contains the distinctive polysaccharides of 14 of the 86 strains of pneumococcus now known. Since these 14 strains account for approximately 80 percent of all coccal infections, this vaccine will probably be the one licensed by the government's Bureau of Biologics for production in early 1978.

It is extremely unlikely, however, that any of the new vaccines will soon join the list of routine childhood immunizations. Sensitized by criticism of swine flu safeguards in 1975, the federal health apparatus will pay strict attention to two caveats before recommending the vaccine to all comers: the tests in California produced pain and swelling in 35 percent and high temperatures in 3.4 percent of those immunized, and children less than two years old—particularly sensitive to the effects of drugs—have not yet been tested conclusively. □

Sand-covered, tree-shaped sea creatures



Newly discovered animals stand in mud below an icy sea (the more abundant is on left).

From deep below the ice of the Ross Sea in Antarctica, scuba divers last winter recovered two animals never before seen by humans. One is a greyish-brown, one-celled creature, 1 to 2 inches tall, that resembles a tree. The other, a less abundant type, has a trunk and arms that droop. Both wear an armor of sand grains cemented to their surfaces by an organic glue.

Jere H. Lipps and Ted E. Delaca of the University of California at Davis and Robert R. Hessler of Scripps Institution of Oceanography at La Jolla report their discovery in the October *ANTARCTIC JOURNAL*. As yet, the animals have no names, although they have been identified as "agglutinated arborescent foraminifera." Today there are more than 4,000 kinds of foraminifera alive in the