

SCIENCE NEWS OF THE WEEK

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.

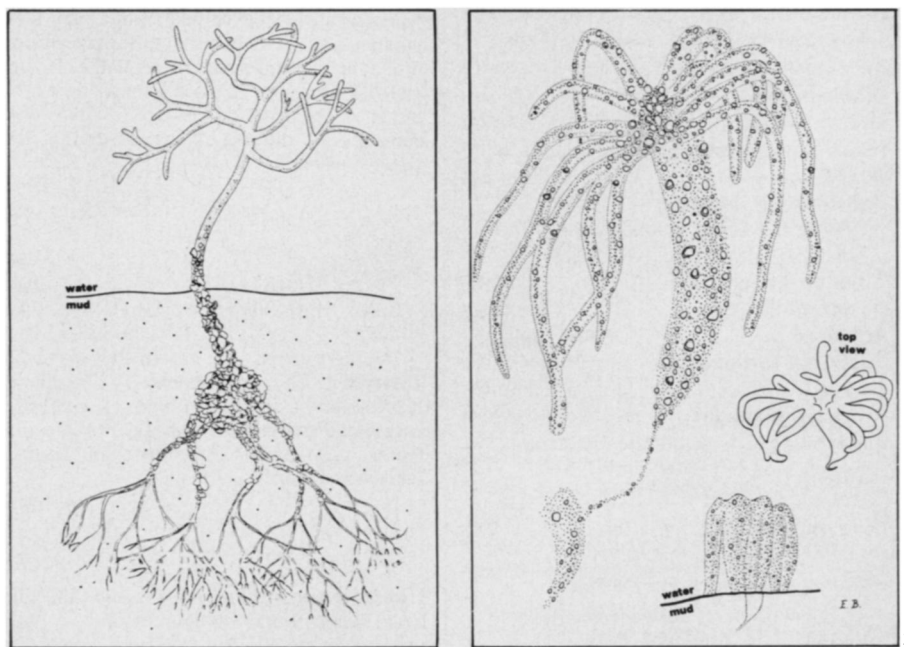
With the new vaccines, however, doctors will have a most attractive alternative. Instead of searching for new drugs to outflank evolving coccal strains, they can "teach" the body how to prevent infection altogether. As with most other vaccines, the new sera act as low-level antigens that evoke a defense 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

oceans of the world, Lipps says, and a total of 35,000 types if fossils are included.

The researchers have examined the anatomy and habits of the new live specimens. The bulge in the main trunk of the more abundant animal contains a single nucleus, and protoplasm streams up the trunk. The organic cement, which holds the sand grains, also gives the animal structural support. The area standing above the mud is coated with very fine sand grains, the area in the mud with larger grains. "It must pick up each sand grain with its pseudopods and arrange them," Lipps suggests.

"The animals have no eyes and no mouth," Lipps says. "They just stand erect in the mud and wait for food to come by." The researchers have seen the animals extend thin filaments of protoplasm to capture diatoms, a type of algae. The animals appear to digest the algae extracellularly. Lipps says, "They also have a root-like system which may absorb nutrients from the mud they live in—much like a tree."

Lipps does not think that the foraminifera are usually eaten by other animals. "There is not much protoplasm in the branches. They probably taste like sand," he says. They are abundant even though they live alongside clams, sponges, worms and fish.

The animals were caught in waters 85 to 100 feet deep at a temperature of about -1°C. Scuba divers collected the organisms by pressing a plastic tube around individuals. The samples were then flown by helicopter to Antarctica's McMurdo scientific station and later brought to the United States in special cooling containers. The animals are still alive in Lipps's laboratory refrigerator, subsisting on algae, but by now are not doing very well. "They have recently fallen over in the dishes," Lipps reports.

The researchers will soon be returning to the New Harbor area to learn more about the small creatures. "The main aim this year is to collect a few more of these things and to observe in the field what they eat and what is eating them. We would especially like to catch one while it is reproducing and learn how they go about eating food and whether they use their roots for nutrition," Lipps says. Information about these animals may help other scientists analyze any other organisms that may be recovered from the area.

Lipps guesses that the specimens they collected are many years old, because of the large size. He says that other foraminifera have lived up to three years in laboratories to die, not of old age, but during a refrigerator breakdown.

Biologically the Ross Ice Shelf Project is off to a good start. One of the goals of drilling through the ice is to sample "life forms never before seen by man" (SN: 10/22/77, p. 264). Now the project can chalk up two newly discovered animals before the drilling has even been completed. □

Ethics and the sensual psychologist

A nationwide survey has disclosed that more than one in twenty male, Ph.D. psychologists have had sexual intercourse with their patients, and more than one in ten have had other "erotic contact" with patients. Among female Ph.D.s, just slightly more than one in two hundred reported having intercourse with patients, and about one in 50 admitted to erotic contact.

These results come from anonymous written responses of 666 randomly selected psychologists (347 men) practicing various types of psychotherapy around the country. The figures reveal that patient-therapist sex is fairly widespread, despite a formal American Psychological Association decree that "Sexual intimacies are unethical Psychologists [must] avoid exploiting their [the clients'] trust and dependency."

The sex-with-patient rate is roughly equivalent to that among psychiatrists. Jean Corey Holroyd of the University of California at Los Angeles and Annette M. Brodsky of the University of Alabama report in the October AMERICAN PSYCHOLOGIST. In comparing their findings with those of a 1973 survey of male physicians in the Los Angeles area, the researchers note that both psychologists and psychiatrists reported lower rates of sexual intercourse with patients than did surgeons, obstetrician-gynecologists and general practitioners (where the rates were as high as 7 percent).

Holroyd and Brodsky also report that 7.2 percent of male psychologists and 0.6 percent of the female psychologists had intercourse with patients within three months after terminating therapy; that 80 percent of the respondents who said they had intercourse said they had done so with more than one patient; and that the number of times they had intercourse ranged from one to 200, with a mean of 29 times.

The study was designed to elicit psychotherapists' beliefs regarding the benefits of physical contact with clients, as well as the frequency of both erotic and nonerotic contact. Only 4 percent of the respondents thought that erotic contact—defined as "that which is primarily intended to arouse or satisfy sexual desire"—might be beneficial to patients. Behavior modification and rational-cognitive therapists tended to engage in erotic kissing and holding to a greater extent than did practitioners in other schools of psychology, according to the survey.

Nonerotic contact—including friendly hugging, kissing and affectionate touching—was practiced *occasionally* by 27 percent of the psychologists, and *frequently or always* by 7 percent. Nearly one in four humanistic psychologists said they did so frequently or always, compared with fewer than 10 percent among eclectic

therapists and fewer than 5 percent of psychodynamic, behavior modification and rational-cognitive practitioners.

"Erotic contact and intercourse are almost always between male therapists and female clients," the researchers note. "The consistency between male psychiatrists and male psychologists indicates that a steadfast, small minority of therapists believe in the therapeutic benefits of erotic contact and practice it in selected situations."

Those respondents who thought erotic contact might be beneficial cited various reasons, including: "If a person were crippled by inferiority feelings based on the conviction of being unacceptable to anyone for anything . . . if one is having severe doubts of sexual identity, and if a person truly does not know the mechanics of sexual intercourse"; "Nor should psychotherapy per se exclude the obvious, i.e., the need/desire to touch, stimulate and explore the boundaries of contact and intimacy"; "The use of sexual energy, up to and including actual intercourse between therapist and client, can have considerable healing effect for the client."

But the vast majority of comments were against sexual contact. Wrote one psychologist: "I feel without qualification that erotic patient-therapist contact is unethical at best and devastating at worst—it reflects pathological needs on the part of the therapist." Concludes another therapist: "When is the wedding between psychology and prostitution going to take place?"

Whether the incidence of erotic contact and intercourse among psychologists and their patients "should be considered frighteningly high or comfortingly low depends on one's interpretation of the harm done by such practices," say Holroyd and Brodsky. Previous reviews of case histories involving such contact indicate that the negative effects outweigh the positive, they note. The negative effects for the patient may include excessive conflict, psychological pain and a destructive experience; for the therapist they may involve excessive personal conflict and the desire to terminate the sexual relationship. Some therapeutic outcomes may foster feelings of growth, deep emotional/spiritual connections and respect for each other, according to case reviews.

"Since the majority of psychologists (96 percent to 99 percent) believe that erotic contact would *never* benefit a patient . . . professional issues remain to be addressed," the psychologists conclude. "The concern of feminist psychologists and of the APA Task Force on Sex Bias and Sex Role Stereotyping . . . that erotic contact with patients is based on therapist needs for power or sexual gratification justified. Therapists [must] learn how to stay within the boundaries of acceptable professional practice." □