Biomedicine

Resistant staph microbe reappears

Doctors in the United States recently identified three cases of staph infection that resist vancomycin, the only antibiotic thought still to be effective against such stubborn infections.

In 1996, a Japanese infant became the first to contract a *Staphylococcus aureus* infection that resisted vancomycin. The boy was cured with a combination of other drugs. Now, two studies in the Feb. 18 NEW ENGLAND JOURNAL OF MEDICINE describe three more cases—in Michigan, New Jersey, and New York.

All three had received kidney dialysis and died from kidney failure or a combination of ills. Although the staph infection's role in the deaths was unclear, these cases indicate that any dialysis patient with an *S. aureus* infection who doesn't promptly respond to vancomycin should be tested for resistance, says Michele L. Pearson, an epidemiologist at the Centers for Disease Control and Prevention in Atlanta.

Of 222 people known to have come into contact with any of the three patients, none contracted the resistant strain.

The patients had received vancomycin intermittently for about 4 months. Such repeated exposure to antibiotics can induce resistance. The cases represent another warning against doctors overprescribing antibiotics, says Pearson, a coauthor of one of the new studies. —*N.S.*

Iron pots help fend off anemia

Ethiopian children eating food cooked in iron pots are less likely to have iron-deficient blood than their playmates who eat similar foods prepared in aluminum pots, a team led by researchers at McGill University in Montreal reports in the Feb. 27 LANCET.

After cooking Ethiopian foods in the lab, the scientists found that some iron from iron pots had leached into the food.

They compared 195 children who ate food cooked in aluminum pots with 207 children whose food was cooked in iron pots supplied by the researchers. After 1 year, blood tests showed that the iron-deficiency, or anemia, rate fell from 57 to 13 percent in the group with iron pots but only from 55 to 39 percent in the other. The children whose families used iron pots also grew slightly more, and none suffered from iron overload.

If larger studies show similar results, "real gains in child, adolescent, and maternal health should be possible at low cost," says Bernard Brabin of the Liverpool (England) School of Tropical Medicine. —*N.S.*

Screening cuts colon cancer deaths

People whose stools are tested regularly for traces of blood are less likely to die of colorectal cancer than those who don't submit samples for testing, an 18-year Minnesota study finds.

Starting in the late 1970s, researchers enrolled 46,551 healthy volunteers, age 50 to 80, into three roughly equal groups to evaluate such screening. One group submitted fecal samples from three consecutive stools once a year, another group did so every other year, and the third control group submitted none. When a stool sample showed traces of blood, the volunteer underwent a colonoscopy—in which a doctor visually checks the colon for precancerous lesions or tumors. Patients were then treated accordingly, says study coauthor John H. Bond, a gastroenterologist at the University of Minnesota in Minneapolis and the Minneapolis Veterans Affairs Medical Center.

Overall death rates among the three groups were similar, but 177 people in the control group died of colorectal cancer compared with 148 of those whose stools were analyzed biennially and 121 in the annual group, the researchers report in the March 3 JOURNAL OF THE NATIONAL CANCER INSTITUTE.

Those getting annual stool tests were diagnosed with about half as many advanced colorectal cancers as the controls.

"We didn't know if screening would be helpful," Bond says. "This reconfirms the validity of this approach." —*N.S.*

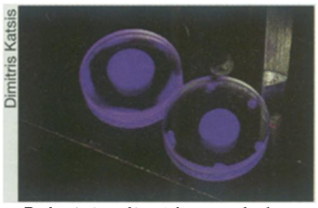
Materials Science

Liquid crystal emits polarized light

Sunglasses designed to cut down glare typically use polarizing lenses to prevent unwanted light waves from reaching the eyes. Many electronic-display technologies use similar filters to polarize light and create crisp, vibrant images. Because they achieve this effect by subtracting out more than half of incoming light, however, these filters end up wasting much energy.

Now, Shaw H. Chen of the University of Rochester (N.Y.) and his colleagues have created a material that generates a type of polarized light without the need for filters. They predict that it could be used to make more energy-efficient monitors, stereoscopic three-dimensional displays, and information-storage devices.

The material combines a transparent liquid-crystal film with a dye that glows blue under ultraviolet illumination. The liquid-crystal molecules line up in horizontal planes, which are stacked with each plane slightly rotated with respect to the one below. The dye molecules are embedded between the liquid-crystal molecules. As light emitted by the dye molecules traverses the planes, it becomes circularly polarized—the light's electric field rotates either clockwise or counterclockwise along its direction of travel.



Polarizing liquid crystal glows blue under ultraviolet light.

Armed with the new material, "we'd like to explore the unique features of circularly polarized light for new applications," says Chen. He and his colleagues report their findings in the Feb. 11 NATURE.

The material's novel molecular structure challenges the typical notion of a liquid crystal, says Chen. "Conventional liquid crystals are fluid at room temperature. This is a glassy solid." Yet the material also does not fit the usual definition of a glass. Instead of assuming an amorphous structure, the molecules arrange themselves in an orderly fashion. Perhaps now researchers will have to broaden the definition of a glass to include any noncrystalline material, Chen suggests. —*C.W.*

Light hardens bone-like polymer

Severe bone fractures sometimes need more help than a simple plaster cast can provide. Now, a new polymer that can act as a temporary bone replacement might offer doctors another tool to repair orthopedic defects. The material is not only hard and strong, but it also gradually breaks down in the body, allowing natural bone to regrow in its place.

The polymer starts out as a putty and hardens when exposed to blue light. In this way, the material can be spread into an area of missing bone and then triggered to solidify in the needed shape.

This polymer is one of the first systems that combines biodegradability with a light-triggered setting mechanism, says Robert Langer of the Massachusetts Institute of Technology. He, his MIT colleague Venkatram R. Shastri, and Kristi S. Anseth of the University of Colorado at Boulder report their findings in the February NATURE BIOTECHNOLOGY.

The researchers demonstrated the utility of the light-hardening process in the laboratory by molding the polymer into bone screws, which are often used to hold together fractures. Shining light on just the head of a 4-centimeter-long screw caused the entire piece to solidify.

They also tested the polymer by surgically creating a hole 2 millimeters in diameter in a leg bone of a rat and filling it with the putty. After exposure to light, the restoration bonded to the existing bone without causing inflammation in the surrounding tissue. —*C.W.*