

Biomedicine

Kathy A. Fackelmann reports from Washington, D.C., at the American Academy of Orthopaedic Surgeons' annual meeting

Bone loss tied to autoimmune reaction

Some call osteoporosis the "silent thief," because it reduces the density of bones, leaving them fragile and vulnerable to fracture. A preliminary study now hints that, at least in some cases, an autoimmune process causes osteoporosis.

Stephen D. Barnhill of the Medical College of Georgia in Augusta and his co-workers studied 27 women age 40 to 80 who were being evaluated for osteoporosis. The researchers discovered a direct relationship between loss of bone density and high concentrations of an enzyme linked to immune disorders and found in white blood cells.

Scientists know that most women lose bone mass during the five to 10 years after menopause. Certain women develop porous bones when their production of the female sex hormone estrogen declines. After menopause, Barnhill suggests, the estrogen receptors on cells, including bone cells, remain empty. This may trigger a complicated immune reaction that leads to the resorption of bone, he says.

"The initial data look very, very good," Barnhill adds. If additional research confirms the link between the immune system and osteoporosis, the team would like to try to block this rogue immune reaction, perhaps with a drug such as tamoxifen, which binds with estrogen receptors.

Early surgery: Boon for spinal injuries?

A new scientific study suggests that early surgery may benefit people suffering from spinal cord injuries. The finding may help resolve a continuing controversy about when to treat such patients.

Physicians at some medical centers believe that early surgery can exacerbate or cause neurological damage in patients with spinal cord damage. They advocate leaving the patient in traction for about a week until the swelling goes down. Others say there's no harm in performing surgery within days of the injury.

A study led by Walter F. Kregel III of the University of Washington in Seattle now provides data favoring early surgery. The researchers studied 38 people who had suffered a spinal cord injury in the neck area. Most of the injuries were caused by a diving accident, a fall or an automobile accident. Twelve patients received surgical treatment within 72 hours, and 26 went to surgery three days or more after their injury.

The early surgery group developed fewer complications compared with those who got later surgery. The early surgery group also spent less time in the intensive care unit and less time on ventilators, Kregel says.

In addition, the team discovered that, compared to the late surgery group, early surgery patients performed better on one test of neurological functioning. However, two other neurological and motor function tests showed no difference between the two groups of patients.

Rather than exacerbate neurological injury, early surgery may actually improve the outlook for spinal-cord-injury patients, Kregel says.

Does the study put an end to the controversy? Probably not, comments Alan M. Levine, an orthopedic surgeon at the University of Maryland in Baltimore. Kregel's study included only a small number of patients. A larger study is needed to definitively answer the question about when to treat spinal cord injuries, Levine says.

Still, the finding that early surgery seems to cause no harm is important, especially for spinal-cord-injury patients with multiple fractures, Levine says. Such patients need spinal cord surgery before physicians can fix their other injuries. This study suggests that an early trip to the operating room will do no damage — and will let doctors fix the patient's remaining problems as soon as possible, he adds.

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Earth Science

El Niño drenches southern California

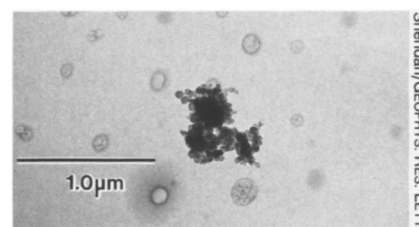
The long arms of El Niño have reached across the Pacific Ocean to play havoc with U.S. weather this winter. As warming intensified in the equatorial Pacific, it altered atmospheric wind patterns to send heavy rains in the direction of southern California, as well as to states bordering the Gulf of Mexico.

Parts of Los Angeles County received more than 8 inches of rain in three separate storms between Feb. 6 and Feb. 16, generating mudslides and floods that killed several people. Up to 15 inches of rain fell in some mountain areas in southern California, according to the National Weather Service's Climate Analysis Center in Camp Springs, Md. And from December through February, severe storms dropped over 25 inches of rain in south-central Texas.

Meteorologists had expected wetter-than-normal weather for Texas because records show the Gulf states tend to get above-average rainfall during El Niños. But California has proved a harder state to call. Some El Niños, such as the mammoth one in 1982-1983, have doused the state, while others have left it drier than normal, says Chester Ropelewski of the Climate Analysis Center. On the other side of the Pacific, Indonesia and Australia typically suffer dry spells during El Niños.

Debris from Kuwaiti fires travels far

Sulfur and soot from the Kuwaiti oil fires apparently floated clear around the globe, much farther than atmospheric researchers had thought likely, according to a team of scientists who detected unusual particles in the air over Wyoming last spring.



Clump of soot collected over Wyoming.

In the Feb. 21 *GEOPHYSICAL RESEARCH LETTERS*, Terry Deshler of the University of Wyoming in Laramie and David J. Hofmann of the National Oceanic and Atmospheric Administration in Boulder, Colo., report that between March and June, balloon-borne sensors detected broad sheets of microscopic particles in concentrations about 10 times higher than normal. The largest of the particles measured roughly 6 microns in diameter, about one-tenth the width of a human hair. They appeared in layers high in the atmosphere, between 7 and 12 kilometers in altitude.

In the same journal, Patrick J. Sheridan and Russell C. Schnell of the University of Colorado at Boulder and their colleagues report on electron microscopic analyses of some of the captured particles. Almost all were sulfuric acid droplets, while 1 percent were clumps of carbon-rich soot particles that resembled soot collected over Kuwait.

Researchers who traveled to Kuwait during the fires reported that smoke plumes rose only about 6 kilometers in height and that the particles were relatively large. Such factors led scientists to expect the debris would drop out of the atmosphere before traveling far — no more than a few thousand kilometers. But Deshler and his colleagues believe the particles they detected over Laramie did indeed come from the Kuwaiti fires. They note the blazes produced an enormous amount of sulfur dioxide, which turns into sulfuric acid in the atmosphere. Deshler suggests that thunderstorms over India could have lofted the fire particles into the upper atmosphere. From there, the particles could have ridden the jet stream in a quick trip across the Pacific. Deshler and Hofmann calculate that air sampled over Laramie on March 25 would have passed over Kuwait nine days previously.

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