

Biomedicine

Bone disease: The link with stroke

Older women with the bone disease osteoporosis have always had to worry about breaking a hip. A new study indicates that such women also face an increased threat of stroke.

A stroke occurs when the blood supply to part of the brain becomes insufficient, thus damaging or killing nerve cells. A 1991 study had hinted at a link between stroke and osteoporosis, a disorder in which bones lose tissue mass and become fragile and more subject to fractures.

To confirm that surprising association, Warren S. Browner at the University of California, San Francisco, and his colleagues studied 4,024 women age 65 and older. The team measured bone density at the start of the study and then monitored the women for two years. During that period, 83 of the women suffered a stroke.

A statistical analysis revealed an association between low bone density and an increased risk of stroke. Indeed, the connection was as strong as the well-established link between high blood pressure and stroke.

It is well known that there is a cause-effect relationship between high blood pressure and stroke. Elevated pressures can damage the artery wall and thus trigger the formation of a stroke-causing blood clot or a rupture in the vessel itself.

However, Browner and his colleagues believe bone density and stroke are linked in a different way.

"We don't think osteoporosis causes strokes," he says. Instead, the team suspects a common condition, such as decreased estrogen production after menopause, may lead to both osteoporosis and stroke.

Fluid intake tied to bladder cancer

Men who drink plenty of fluids, especially chlorinated tap water or beverages made with tap water, may increase their risk of bladder cancer, according to a new study.

Previous research suggested a connection between chlorinated drinking water and bladder cancer (SN: 7/11/92, p.23). The new study adds a twist to that story by indicating that the amount people drink may prove important, especially if they rely on municipal water treated with chlorine.

Epidemiologist John E. Vena at the State University of New York at Buffalo and his colleagues compared the drinking habits of 351 men diagnosed with bladder cancer and a "control" group of 855 men without the cancer.

Interviewers asked the men about their daily fluid intake, including their use of alcoholic beverages, soda, milk, coffee, tea, and water drawn directly from a faucet.

The results suggest that men who drink more than 14 cups of any type of fluid per day face a two to four times greater risk of bladder cancer than men who drink less than seven cups daily. The study appears in the just-released May/June ARCHIVES OF ENVIRONMENTAL HEALTH.

The finding runs counter to traditional thinking, which holds that drinking lots of fluids would dilute any carcinogens present in urine. Vena points out, however, that a high fluid intake expands the bladder and thus may expose more of the bladder's surface to cancer-causing chemicals.

Next, the team looked specifically at the consumption of tap and nontap water. They discovered that drinking tap water, including water used to brew coffee or make juice, is an independent risk factor for bladder cancer. They found no link between alcoholic beverages or bottled beverages and the risk of this cancer, Vena points out.

These results should not discourage people from drinking adequate amounts of fluids, especially in very hot weather, Vena advises. However, people worried about bladder cancer could switch to bottled beverages or consider installing a home water filtering system, he says.

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Computers

Ivars Peterson reports from Washington, D.C., at the Eleventh National Conference on Artificial Intelligence

Gearing up for a robot rodeo

The names of the diminutive, mobile robots told significant parts of the story: Sleepless in Washington, Insomnia, Not Yet, Pieces, Flimbot, Lemon, Snowball's Chance, and more. Assembled from LEGO parts and programmed in just three days (and nights), these remarkable machines competed in two events that required them to navigate around obstacles — in one case, to find a towering coffee pot, then push or pull it toward



I. Peterson

Champion robot Not Yet.

an image of a giant mug painted on the enclosure's floor; in the other, to escape from a room and reach an infrared beacon.

Organized by David Miller, Lynn Andrea Stein, and their co-workers at the Massachusetts Institute of Technology, the competition attracted more than 25 teams from colleges, various companies, and other institutions. All the participants attended a tutorial on the first day to learn the basics of building a robot from LEGO components — building blocks, gears, wheels, motors, simple sensors, a microprocessor unit, and a battery-operated power supply. They also learned a computer language known as Interactive C, which was used to program the robot's microprocessor.

From then on, it was a race against the clock to build the machines and program their movements for one or both of the tasks in the contest. Each team had its own strategy. Philip Fong and his group from the University of Waterloo in Ontario, who built Sleepless in Washington, went for speed. Though their robot used a mast-mounted infrared sensor that was fixed in place, the robot could turn itself quickly enough to lock onto its target. "This was completely new to us," Fong says. "We had lots of trouble with the hardware, and we didn't have enough time." Indeed, most participants were so busy with their robots they found little time to sample the conference's other offerings.

In both events, the robots competed in pairs, racing for the same goal. Once started, the robots were on their own, and if anything went wrong, their creators could only groan helplessly as the machines crashed repeatedly into barriers or twirled endlessly in futile searches for an escape. Sometimes, the pesky automatons got in each other's way. "The fact that the robots operated at all is amazing," Miller remarks.

Deathstar 2000, built by William W. Cohen and colleagues in the Artificial Intelligence Principles Research Department at AT&T Bell Laboratories in Murray Hill, N.J., won the "Escape From the Office" event. The team attributed its victory to keeping everything as simple as possible and to "rapid prototyping." In other words, an early version of the robot was running around much sooner than most of its competitors. This gave the team extra time to test, tweak, and debug the machine before the test courses became too crowded. Nonetheless, Deathstar 2000 got a real scare in the semifinals from Lemon, built by Ying Gu, Frank Wang, and Shilin Wang, undergraduate students at Randolph-Macon College in Ashland, Va.

Not Yet, assembled by Linda J.F. Williams and colleagues from Mitre Corp. in Houston, won the coffee-pot event. As in several other designs, ingenious engineering — including the incorporation of a remarkably effective magnetic gripper — made up for deficiencies in the software.

The competition served as a way of giving researchers involved in artificial intelligence a chance to test their knowledge and theories on a real-world problem and gain practical experience. "You can't hide anything here," one participant noted.

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