

## 'Comfort stops' may have cancer benefits

Urinating frequently may reduce your chance of developing bladder cancer, particularly if you smoke, according to a new study of dogs.

Beagles that urinated every four hours had one-third the cancer-causing substances in the bladder lining compared with a beagle that voided only every eight hours, reports a team led by Fred F. Kadlubar of the National Center for Toxicological Research in Jefferson, Ark., which included scientists from MIT. The findings appear in the Aug. 15 *CANCER RESEARCH*.

The investigators gave each of four beagles a pill containing 4-aminobiphenyl (ABP), a chemical prevalent in cigarette smoke. They continuously drained one beagle's bladder through a catheter, and allowed the other three to urinate normally. Two of these dogs voided every four hours on average; the third urinated every eight hours.

In earlier work, Kadlubar and his co-workers had shown that the liver breaks down ABP into a carcinogen that eventually forms cancer-causing adducts, which result when a chemical bonds to DNA. The new study, they say, demonstrates that the adducts form in cells of the bladder wall once the ABP carcinogen is filtered from the blood by the kidneys, and accumulates in urine stored inside the bladder.

"Exposure to [the ABP carcinogen] is directly proportional to the length of time the urine resides in the bladder," they report. They also suggest that other carcinogens may act on the bladder through a similar pathway. Further, because bladder cancer in dogs mirrors the disease in humans, the team concludes that "the frequency of urination should be a critical determinant in human urinary bladder carcinogenesis."

## Spices keep old spuds from sprouting

Cinnamon, mint oil and thyme make foods taste better — and they also keep potatoes fresher longer, according to new laboratory findings.

Left in storage, potatoes tend to sprout. When they send up a green shoot, they soften, shrivel and eventually spoil. At the same time, their starches convert to sugars that darken during cooking, creating brown spots on french fries and potato chips. Synthetic chemicals can delay the sprouting, but researchers with the U.S. Department of Agriculture have now developed a host of natural alternatives.

Oils extracted from peppermint and other plants seem to suppress the growth of the green shoots, says plant physiologist Steven F. Vaughn at the National Center for Agricultural Utilization Research in Peoria, Ill. And almonds, cinnamon, cumin and thyme contain aromatic aldehydes and alcohols that destroy the potato eye — the growth spot where roots and stems form. Other cells in the potato survive, explains Vaughn, but they convert their starch to sugar more slowly.

These natural sprouting inhibitors also kill a fungus that causes dry rot in potatoes, he says, including a strain that has become resistant to fungicides.

The USDA scientists found that washing and cooking remove all traces of the spices. They have applied for two patents on the use of these substances as sprouting inhibitors, says Vaughn, and at least one company is considering developing them.

He described the new laboratory findings last week at the annual meeting of the Potato Association of America in Spokane, Wash. The researchers say they now plan to try the sprout inhibitors on potatoes stored in large commercial bins.



Spiced potato (left) grows no sprouts.

Chris Pizzello/Peoria Journal Star

## Mice reveal three epilepsy genes

Scientists are slowly unraveling the secrets of epilepsy, the most common human neurological affliction next to stroke. This complex disorder, often characterized by repeated seizures, comes in several forms with varying degrees of severity. A Boston research team now has linked areas of three chromosomes to a specific type of epilepsy in mice.

Within these areas lie three genes, not yet isolated, that appear to play a major role in temporal lobe epilepsy, Thomas N. Seyfried of Boston College and his colleagues report in the Aug. 9 *SCIENCE*. This type of epilepsy, common among humans, involves seizures that originate in the temporal lobe and spread throughout the brain. After breeding normal mice back and forth with mice susceptible to these seizures, the researchers performed a statistical analysis of seizure frequencies and discovered a connection with genes on the mouse chromosomes 2, 4 and 9.

Chromosome 9 holds the "major gene" that indicates the presence of temporal lobe epilepsy, says Seyfried. The other two genes apparently modify the severity of the disorder. He notes that several other genes located near the major gene code for proteins that bind to heavy metals such as copper, zinc and iron. This observation, along with other research linking zinc deprivation to epilepsy, suggests a possible cause for some types of the disorder, including the temporal lobe variety. "Abnormalities in [the brain's] metal levels could contribute to epileptic seizures," Seyfried says.

With the new findings, "we can now predict on the human genome where an epilepsy gene could exist," he asserts. Despite their obvious differences, mice and humans share about 38 percent of the same genetic code, he says. In fact, many areas of the mouse chromosome 9 — including the place where the Boston team discovered the major gene — are very similar to the human chromosome 3. Researchers should therefore include chromosome 3 in any studies of the genetic basis of human epilepsy, Seyfried says.

The researchers also point out that previous mouse studies have implicated the modifier gene on chromosome 4 in audiogenic seizures, another form of epilepsy. This raises the intriguing possibility that a single gene influences a wide range of seizures, says V. Elving Anderson, a geneticist at the University of Minnesota in Minneapolis.

Isolation of epilepsy genes and their products could lead to more specific drugs for the disorder, the Boston researchers suggest. Current anticonvulsant drugs often have severe side effects and sometimes do not even work, Seyfried says. A drug designed to correct specific gene defects should work much more effectively, he says. However, such drugs remain a long way off. The mechanisms of epilepsy in mice and humans may differ significantly, and researchers still need to identify similar epilepsy genes in humans. Moreover, both Seyfried and Anderson note that additional epilepsy genes may still await detection.

## Aloe vera: Healing or hurting?

The healing touch of aloe vera extract — a soothing substance derived from the aloe plant for use in burn ointments and skin lotions — apparently has its limitations. Researchers who applied an aloe vera skin gel to infected surgical incisions as an adjunct to standard treatment have discovered, to their surprise, that adding the gel significantly delayed healing.

In the study of 21 women, detailed in the July *OBSTETRICS AND GYNECOLOGY*, "the [aloe-treated] incisions did not close as quickly as those with standard care [alone]," reports physician Jeffrey S. Greenspoon of Cedars-Sinai Medical Center in Los Angeles. Vertical incisions, for instance, healed after an average of 48 days with standard treatment, but the aloe treatment extended that time to 84 days.