

## Can dental fillings create drug resistance?

Numerous reports have proclaimed the safety of "silver" tooth fillings, which are made from a mix of silver, tin, copper, zinc, and mercury. Yet questions about the safety of this type of dental amalgam persist. A controversial new study now suggests that the mercury-laden fillings may play a role in the spread of drug-resistant bacteria.

For years, microbiologist Anne O. Summers had noticed that many people have a large number of intestinal bacteria resistant to the poisonous effects of mercury, a metal that is liquid at room temperature. Dental amalgam is, of course, a solid material.

However, the mercury in that amalgam can vaporize when people chew their food or brush their teeth. The end result is that mercury gets into saliva and is swallowed. Summers, who works at the University of Georgia in Athens, wondered if the mercury released by dental fillings somehow conferred drug resistance on certain bacteria.

To find out, Summers and her colleagues took a look at 356 people who had not taken antibiotics within the previous two weeks. The team examined fecal samples that contain bacteria that live in the human intestine. The team discovered a high prevalence of mercury-resist-

ant intestinal bugs in those samples. These same microbes also shrugged off the killing effects of several antibiotics.

That finding spurred another experiment, this one with six adult monkeys. To do the primate study, the U.S. group teamed up with Canadian researchers Murray J. Vimy and Fritz L. Lorscheider at the University of Calgary in Alberta. Vimy and Lorscheider have published extensively on the health effects of silver dental amalgam.

The researchers first obtained a baseline count of the bacteria living in each monkey's mouth and intestinal tract. Later, the team put the monkeys to sleep with a general anesthetic, then drilled each primate's teeth and packed them with silver dental amalgam.

Within two weeks, the team found a "statistically significant" increase in the number of mercury-resistant mouth and intestinal bacteria. More important, nearly all the mercury-impervious strains also proved resistant to several common antibiotics, including ampicillin.

The researchers then took four of the six monkeys and removed the silver fillings, replacing them with another type of dental amalgam that did not contain mercury. In some bacterial colonies, the proportion of mercury- and antibiotic-resistant bacteria

dropped off during the next two months. The U.S. and Canadian researchers report their data in the April *ANTIMICROBIAL AGENTS AND CHEMOTHERAPY*.

The genes that allow bacteria to fight off mercury's toxic effects lie on the same stretch of DNA as the genes that confer resistance to antibiotics, Summers notes. She believes that once a microbe gets exposed to mercury, it is primed to resist antibiotic therapy as well.

Summers says mercury-containing fillings may be responsible in part for what many believe is an increase in bacterial drug resistance. Antibiotics are still the physician's main weapon in the fight against many infections, she says.

"There's more than reasonable doubt about the safety of this material," Vimy adds.

The American Dental Association (ADA) disagrees. The data in the new paper fail to support the conclusion that humans may suffer antibiotic resistance due to the mercury in their dental fillings, asserts Terence E. Donovan, a researcher at the University of Southern California in Los Angeles. Donovan, speaking for the ADA, says Summers and her co-workers present no proof that mercury-based amalgam contributes to drug-resistant infections in humans.

"From the public's point of view, silver amalgam is the safest material we can use," he adds. — K.A. Fackelmann

### Taxol-making fungus found

Thirty years ago, scientists discovered a fungus that produced a complicated growth-stimulating compound also made by its host plant. So plant biologist Gary Strobel from Montana State University in Bozeman decided to look for a yew-tree fungus that might make the promising anticancer compound taxol.

Montana State organic chemist Andrea Stierle and her husband, Donald Stierle, collected bark from 25 Pacific yews found in 20 places in Montana. The researchers grew fungi from the bark and extracted and analyzed the compounds each fungus produced.

Of 200 organisms surveyed, one, which they named *Taxomyces andreanae*, makes taxol and a related molecule in small amounts, they report in the April 9 *SCIENCE*.

This fungus comes from the pinkish inner bark of a yew found in an old-growth cedar forest, says Strobel. Its taxol kills cancer cells just as the yew's taxol does, he adds. He is confident that genetic manipulation and culturing techniques can increase the yield significantly.

More important, the discovery may prompt more scientists to consider fungi in their search for useful compounds, he adds. □

## Prospecting for seeping, buried oil wells

What do you do when you can see the effects of crude oil spilling from buried wells but haven't a clue as to their locations? That's the dilemma Charles K. Eger faced last year, when he was named coordinator for the cleanup of unmapped, abandoned wells in the Boyd's Creek region of south central Kentucky.

A geologist in the Environmental Protection Agency's Atlanta office, Eger tackled the problem with geophysical tools he had previously reserved for hunting buried toxic wastes, such as drums of pesticides. The approach paid off with the discovery of four long-forgotten wells, he reported in Tampa, Fla., last week at the 1993 International Oil Spill Conference. Surface accumulations of leaking oil — such as a 100-yard-long, 10-yard-wide crude-oil pool atop Houchins' Spring — helped pinpoint four more wells. Eger's team has since plugged them all.

The group surveyed a 6-acre meadow at regular intervals, scouting for spots that responded "anomalously" to three types of geophysical probes. They fed data from each assay into a computer program that mapped the contours of areas responding similarly to measures of soil conductivity, magnetic-field values, or the ground's ability to transmit low-frequency radio waves. The soil-conductivity and magnetic-field maps both



Oil is still bubbling up this wood-cased well, discovered under 2 feet of soil.

proved useful in identifying "odd" areas warranting additional analysis — and sometimes excavation.

Drilling at Boyd's Creek, the birthplace of Kentucky's oil industry, commenced in the early 1860s. Within a few years, wildcatters began abandoning the less-productive wells without plugging their still-flowing streams of crude. Unscrupulous drillers are still abandoning unplugged wells, Eger notes.

Eger tapped the new Oil Pollution Act (OPA) for money to plug 27 abandoned wells last year in Kentucky. Because OPA was written in the wake of the *Exxon Valdez* spill — and with marine contam-