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PRESS RELEASE

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Faculty of MEDICINE

"Silver" Tooth Fillings are Implicated in the Spread of Antibiotic Resistant Bacteria - an Increasing Problem in Medicine Today.

Dental amalgams are commonly known as "silver" fillings, but they contain 50% mercury. The mercury released from these dental fillings is inhaled and swallowed. The biological effects of this released mercury can be seen by genetic changes in the common bacteria which normally inhabit the mouth and intestine of primates, including monkeys and humans. Most bacteria typically cannot survive in the presence of mercury, but those bacteria which continue to exist do so by acquiring a genetic resistance to the toxic effects of mercury.

In an investigation of 640 human subjects, a sub-group of 356 persons without recent exposure to antibiotics demonstrated that those with a high prevalence of mercury resistance in their intestinal bacteria were significantly more likely to also have bacteria resistant to 2 or more antibiotics. In a follow-up study using monkeys, a large proportion of their common mouth and intestinal bacteria had become resistant to mercury within 2 weeks after the installation of dental amalgam fillings. Of particular significance is the fact that nearly all of the mercury resistant bacterial strains from these monkeys were also resistant to one or more antibiotics (including, for example, ampicillin, chloramphenicol, tetracycline, streptomycin, or kanamycin), despite the fact that the monkeys were not exposed to antibiotics. From 12 to 50% of the multi-resistant bacteria examined could transfer their

resistance genes to an antibiotic-sensitive laboratory strain, indicating that the mercury and antibiotic resistance genes were carried by movable genetic agents called plasmids.

These studies are a collaboration between microbiologists Anne Summers and Joy Wireman and statisticians Lynn Billard and Sam Bennett at The University of Georgia (Athens, GA), dentist Murray Vimy and medical physiologist Fritz Lorscheider at The University of Calgary Faculty of Medicine (Calgary, Alberta, Canada), and microbiologists Stuart Levy and Bonnie Marshall at Tufts University School of Medicine in Boston. The work is reported in the current (April 1993) issue of the journal Antimicrobial Agents and Chemotherapy[1] published by the American Society for Microbiology, Washington, DC.

The report details three longitudinal studies ranging from 3-7 months, using six monkeys each of which received 16 small, occlusal (i.e. biting-surface) amalgam fillings. Since oral and intestinal bacterial populations are very complex and may differ considerably between individual animals, bacterial samples were obtained during the 2-6 weeks before and for as long as two months after the installation of amalgam fillings so that each animal served as its own longitudinal control. In two of the three studies, the amalgam fillings were replaced after two months with non-mercury composite resin fillings. The proportion of mercury and antibiotic resistant bacteria then declined in several of the bacterial populations during the subsequent two months.

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[1] Summers A.O., Wireman J., Vimy M.J., Lorscheider F.L., Marshall B., Levy S.B., Bennett S. and Billard L. Mercury released from dental "silver" fillings provokes an increase in mercury- and antibiotic-resistant bacteria in oral and intestinal floras of primates. Antimicrobial Agents & Chemotherapy, 37: 825-834, 1993.

The widespread occurrence of mercury and antibiotic resistant bacteria in humans had been observed by Summers in the early 1980's. These earlier data demonstrated a strong positive correlation between the occurrence of mercury resistance and multiple antibiotic resistance in the normal intestinal bacteria of humans. However, at that time no data were collected on dental fillings in the subjects because it was believed that mercury was not released from amalgam. This report and other recent animal studies by Vimy, Lorscheider, and others demonstrate that mercury does come out of fillings into the mouth after chewing, and does pass through the intestine in concentrations as high as 300 micrograms per gram as it leaves the body. Since dental amalgam is a greater source of mercury exposure for humans than any other non-occupational source (including food), it is likely that dental amalgam mercury is a selective agent which increases the prevalence of plasmid-associated mercury and antibiotic resistances in the oral and intestinal bacteria of humans. That such resistance plasmids can compromise the effectiveness of antibiotics used in the treatment of bacterial infections has been documented by many investigators during the last 25 years. Studies explicitly examining the effects of dental amalgams on the prevalence of antibiotic resistant bacteria in humans are currently under way.

The results of these bacteriological studies bring into question some conclusions reached by subcommittees of the U. S. Department of Health and Human Services, which reviewed dental amalgam safety in a document issued January 1993.

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