BIO-PROBE NEWSLETTER

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NEW RESEARCH - AMALGAM MERCURY CAUSES HARM!

Breakthrough research has just been published in a highly respected medical scientific journal, the renowned *FASEB Journal* [*see* abstract in Science section of this issue.]! The study was led by Dr. Diana Echeverria, Dr. H. Vasken Aposhian, and Dr. James S. Woods. To evaluate the effect of recent exposure to mercury and of mercury body burden on central nervous system function, a battery of neurobehavioral tests was administered to dental personnel. Urine mercury levels were measured before and after the administration of the mercury chelating agent DMPS. The urine mercury levels prior to DMPS chelation were very low, in the 0-4 mcg/liter range found in the general population with mercury amalgam dental fillings.

The authors described four aspects of mercury intoxication found in the scientific literature: 1) psychosomatic symptoms (salivation, insomnia, and loss of appetite); 2) alterations in affect or emotional liability (mood swings, irritability, fatigue, loss of interest, withdrawal, and sweating and blushing); 3) motor effects (in the arms, progressing to uncoordination, imbalance, and cerebella ataxia and tremor); and 4) insidious loss of mental capacity (progressively affecting memory, logical reasoning, or intelligence). Although these effects had previously been associated with higher levels of urine mercury, this study demonstrated the effects in the study group which had very low levels of urine mercury.

The study could not determine a toxic threshold, even at the low urine mercury levels. The authors stated (p. 977): "Questions remain unanswered concerning the lower threshold of Hg^0 exposure for behavioral effects, as we found no indication of a lower boundary in any or our subjective or objective results."; and "Persistent symptoms that appear over a year were selectively associated with Hg body burden; this finding suggests that symptoms may remain undetected in evaluations that rely solely on prechelation urinary measurements of Hg0 exposure."

In conclusion, the authors stated (p. 979): "Concern for very low level Hg^0 toxicity is supported by our observations of associations at HgU levels well below the proposed biological standard of 25 mcg/l and below urinary levels that would be expected at the OSHA permissible exposure limit of 50 mcg Hg^0/m^3 in air. The low Hg^0 exposures between 0 and 4 mcg/l were partially attributable to the number of Hg amalgam fillings in the dental group." They also stated: "It is clear from the present study that comparing associations with pre- and post-chelation urinary Hg levels revealed patterns of previously unobserved effects. These would not have been identified if they had been evaluated in relation to the traditional pre-chelation urinary Hg levels alone."

The two main arguments used in defense of the use of mercury dental fillings are 1) dentists are as healthy as is the general population, so patients with amalgam fillings could not be suffering harm; and 2) urine mercury levels in patients with amalgam fillings are well below levels found in humans known to be harmed by mercury exposure. This study clearly destroys both of those arguments.

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LAB TESTING FOR PERIODONTAL AND ENDODONTIC INFECTION!

[This article is courtesy of Dr. Boyd Haley and Dr. Curt Pendergrass; Affinity Labelling Technologies, Inc.]

REVISED and IMPROVED GCF-TOXICITY REPORT: To date we have analyzed well over 1,500 gingival crevicular fluid (GCF) samples and have made some observations which have allowed us to improve our GCF toxicity test. ALT's toxicity test now includes **four markers of toxicity instead of one.** These four markers of toxicity provide clear evidence of bacterial infection at the site of GCF collection and include the following.

*** Inhibition of purified enzymes by bacterial toxins present in the GCF.**

* Presence of human inflammatory proteins in the GCF.

* Presence of bacterial proteins in the GCF

* Presence of microbial proteases in the GCF.

In future ALT tests, determination of an increased level of toxicity in a GCF sample resulting from bacterial infection will be based on these four markers of toxicity. We now know that the presence of microbial and inflammatory proteins (since they are less mobile than the toxins) are very useful for determining the focal site of infection. For a more thorough discussion of these four markers of GCF toxicity along with the scientific basis and rational for their inclusion in the ALT toxicity assay please refer to Appendix II.

CONTROL GCF SAMPLES: ***In the future we request that all control samples be taken from the buccal region of an incisor or bicuspid.*** The rational for this is as follows. Our GCF test usually shows maximum toxicity and presence of bacterial proteins in the GCF of avital teeth. However, some GCF toxicity assays have given results that indicate that some of the control sites also contained significant anaerobic bacteria and toxicity (especially in the molar regions). This surprised us since we did not expect to see such toxicity or bacterial proteins associated with the GCF of healthy looking teeth and gingiva. We therefore collected and analyzed the data from the control GCF samples and did a thorough review of the periodontal literature. We also consulted with some research periodontists concerning the results found with the control GCF samples. What we learned is that virtually all GCF will harbor a resident population of subgingival anaerobic bacteria if a single infected site exists within the mouth. These bacteria also produce volatile toxins (e.g. hydrogen sulfide) which spread rapidly throughout the mouth and produce a measurable level of toxicity detectable by the ALT assay. This is especially true of the large molars toward the back of the mouth where air exchange is less, allowing volatile toxins to build up and anaerobic bacteria to flourish. Good dental hygiene prevents these bacteria from colonizing and setting up severe conditions, but they are there and constantly being reseeded by the major infected site, usually an avital tooth. The buccal region of incisors and bicuspids are more exposed to air which decreases growth of anaerobic bacteria and should represent the best area to get a "control GCF sample". For further discussion please read Appendix I.

BIOCALEX STUDY: There appears to be a lack of a consensus method for treating or reducing the level of toxicity in infected teeth once a problem has been identified. The choices appear to be to do, or redo, the root canal or extract the tooth. The debate rages in this area. The field of treating periodontal disease and endodontic infections is a very active area in dental research and it would be great if root canal treatments could last longer and be less likely to spread infection. However, as best we can determine from talking with many dentists, there is no consensus "best protocol" for treating infected teeth. ALT has been involved in testing the toxicity of extracted teeth with root canals. Some of these teeth were Biocalex filled root canal teeth which, as a group, showed a dramatic reduction in toxicity compared to that observed with gutta percha filled teeth. These results lead us to believe that replacing gutta percha filled root canal teeth with Biocalex may serve to limit bacterial infection and allow the patient to keep their teeth with less danger of infection. Biocalex is a calcium oxide based material which forms calcium hydroxide and calcium carbonate upon contact with water and carbon dioxide, respectively, in the root of an endodontically treated tooth. It thus has the possibility to maintain the canal in an alkaline environment (basic pH) which hinders bacterial growth and may possibly fill the dentinal tubules and limit the spread of bacteria back into the canal. Calcium hydroxide based disinfectants are widely used in endodontics to kill bacteria in infected roots before filling. We have recently tested the GCF from a root canal tooth filled with gutta percha both before and after replacement of the gutta percha with Biocalex. Two weeks after replacement with the Biocalex there was almost a 50% reduction in the level of toxicity measured in the GCF surrounding this tooth. We will have to retest the GCF of this tooth over a period of months to determine if this reduction in toxicity persists. However preliminary, these results with Biocalex do appear promising. What remains to be determined is whether or not the body's immune system can clean up the external infection in the periodontal ligament and surrounding bone tissues.

As a result of the above observations, ALT is now beginning a research study into the effects of replacement of gutta percha filled root canal teeth with Biocalex. Please note that we have absolutely no financial involvement in Biocalex and would be happy to test