

## Relationship of Heavy Metal Chronic Poisoning Exposure and Diabetes

For 2017, the American Diabetes Association lists diabetes the seventh leading cause of American deaths, admitting that this long term killing disease may be under reported. Over 30 million Americans were afflicted by diabetes in 2015, with about 23% of this figure classed as “undiagnosed.” An eye-popping 25% of the 30 million population are over 65 years of age. Adding the diabetic burden costs to our annual health care dollar spent in 2013, we are looking at a staggering sum of over \$245 billion. (1)

Noting the above, what are the researchers finding as to the possible contributing causes to this disease state in the human population while not ignoring the animal kingdom of dogs, cats, etc? Ideally, if we continue to see similar results from different researchers, the causative factor or factors become extremely suspect. Since 2009, PubMed listings of published scientific papers throughout the world gives us a good snap shot of their findings.

Human and animal studies began pointing fingers at the poisonous heavy metal cadmium as a contributor to diabetic nephropathy (kidney disease); plus blood glucose alternations with sub-chronic (low constant exposure) cadmium while harming the pancreas as reported in *Toxicology and Applied Pharmacology* with “Cadmium, diabetes and chronic kidney disease.” (2)

Another study in 2013, pointed to dietary sources because of the always present cadmium metal in our environment. Again, acute and chronic low cadmium exposure causing organ toxicity, reaching the top of the research findings. (3)

The same year, *Diabetes Care* published a study following almost 4000 young adult Americans for 18 years looking for diabetic problems. Using toenail clippings and life style factors, diabetes diagnosis paralleled mercury findings from their toenails. (4)

In 2015, Chinese researchers reported findings from over 2000 adults located in Wuhan for 23 metals (aluminum, lead, nickel, copper, cadmium, antimony, etc.) altering fasting plasma glucose (FPG) in their bodies. They concluded the multiple metals in urine increases diabetic risk. (5)

The Chinese magnified their research efforts with an additional 42,000 people the same year regarding diabetes and pre-diabetes associated with metal exposure to three occupational groups: office workers (low risk), mining (medium risk), and smelting and/or refining (high level risk). Conclusions reached by the researchers: the higher the exposure to the toxic metals, the greater the risk of developing diabetes and pre-diabetes. (6)

Perhaps alerted by the previous first study, the Chinese looked closer at urinary metals and the possibility of developing type 2 diabetes in their coke furnace workers published in 2016. Urinary copper, zinc, manganese, barium and lead showed positive association to developing diabetes in this study. Arsenic, cadmium and several other metals were also noted in the diabetes group. (7)

Last year, the Journal *Diabetes* published “Metals in Urine and Diabetes in U.S. Adults.” Looking at over 9,000 patients, researchers calculated the urine odds ratio of developing diabetes associated with metal exposure in the following order (highest to

lowest): barium, cadmium, cobalt, cesium, molybdenum, lead, antimony, thallium, tungsten, and uranium. (8)

Another 2016 U.S. study in *Current Diabetes* noted sub-chronic dosing of cadmium and the disruption of normal glucose metabolism again. (9)

The reader needs to be aware of a general study published in 2011 as well, noting the influence of other environmental pollutants, besides toxic heavy metals (5 times heavier than water), and their disruption in beta cell function within the pancreas and subsequent possible contributors to type 2 diabetes. (10) The jury is still out. Meanwhile, the strong evidence presented by the researchers against the poisonous heavy metals can no longer be denied.

## References

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