

The Risks of Copper Toxicity Contributing to Cognitive Decline in the Aging Population and to Alzheimer's Disease

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KEY POINTS FROM THIS AUTHOR:

- 1) "I wish to call attention to a major risk factor for damaging cognition that has crept up on developed societies without us being aware of it. That risk is copper toxicity from drinking water due to the widespread use of copper plumbing, and from copper in vitamin/mineral supplements that so many people take."
- 2) Alzheimer's Disease (AD) is epidemic in the U.S. and other developed countries.
- 3) The Alzheimer's disease epidemic is recent, exploding in the last 50-60 years.
- 4) Approximately 10% of people in their 60s, 20% in their 70s, and 30% in their 80s have Alzheimer's Disease (AD) in the U.S.
- 5) Alzheimer's disease (AD) was virtually unknown 100 years ago. Almost all populations have had some aged people, and prior to about 100 years ago, none developed clinical Alzheimer's disease or Alzheimer's disease brain pathology. Alzheimer's Disease is a new disease, beginning to make an appearance 100 years ago, and it only exists in developed countries.
- 6) "The epidemic of Alzheimer's Disease has occurred only in developed countries. The aged of India, African countries, etc. are spared this disease."
- 7) The Alzheimer's epidemic is associated with the use of copper plumbing, and the taking of copper in multi-mineral supplements.
- 8) "Alzheimer's only involves developed countries that use copper plumbing."
- 9) Food copper (organic copper) is processed by the liver and is transported and sequestered in a safe manner. Inorganic copper, such as that in drinking water and copper supplements, largely bypasses the liver and enters the free copper pool of the blood directly. This copper is potentially toxic because it may penetrate the blood/brain barrier, increasing production of destructive free radicals.

10) BASES FOR THE COPPER ALZHEIMER'S HYPOTHESIS:

- All the molecules involved with AD brain pathology bind copper, including the beta amyloid that forms the amyloid plaques and the tau protein which forms the neurofibrillary tangles, characteristic of the Alzheimer's disease brain.
- Apolipoprotein E4 (Apo E4) gene is a risk factor for AD. The Apo E4 gene is a genetic variant that is missing 2 cysteine amino acids. Cysteine binds to copper. Without these 2 cysteines, copper is not bound, and thus is a risk factor for AD.
- Homocysteine is a risk factor for Alzheimer's Disease. As homocysteine levels in blood increases, the risk of AD and the risk for atherosclerotic disease increases. Copper mediates oxidation of low-density lipoprotein by homocysteine, and oxidized low density lipoproteins are toxic to neurons.
- Free copper makes up about 5-15% of the total serum copper in the general population. The free copper is the toxic copper. AD patients have elevated free copper levels. Free copper levels are predictors of the rate of decline in cognition.
- Adding as little as 0.12 parts per million (ppm) of copper to the distilled drinking water of their AD rabbit model greatly enhanced amyloid plaque deposition in the brains and cognitive decline in the rabbits. "This copper concentration is less than one tenth of the copper concentration (1.3 ppm) allowed by the Environmental Protection Agency (EPA) in human drinking water!"
- Dramatic evidence of the damage copper can do to cognition in people was published in 2006: those in the highest fifth of dietary copper intake, plus a high fat diet, lost 19 years of cognition over the six year study; "they lost cognition at over three times the normal rate!" "How did people end up in the highest fifth of copper intake? Most of them because of taking copper supplements in the multi-vitamin mineral pill that so many people take."

11) "Copper in food is bound to organic molecules that are taken up by the liver, and the copper is processed and safely bound to molecules." Ingested inorganic copper largely bypasses the liver and contributes immediately to the free copper pool in the blood. Inorganic copper from drinking water and copper supplements bypasses the liver and enters the free copper pool in the blood, posing a risk to cognition.

12) Evidence "suggests that 20% or more of us are at risk of copper toxicity induced cognition loss from drinking water."

13) Evidence suggests that "at least 25% of those over age 50, maybe more," are poisoning themselves with copper from supplements. "These preparations often contain as much as 2.0 mg of copper."

- 14) "It is a mistake to include copper" in supplements. "I believe our minds are being poisoned by these pills."
- 15) "It is my hypothesis, shared by some colleagues, that the epidemics of mild cognitive impairment and Alzheimer's Dis. in our population over age 50 is primarily due to ingestion of inorganic copper in drinking water and copper supplements."
- 16) There has been an explosive growth in copper plumbing over the past century in developed countries, particularly over the last 50-60 years. "80% of U.S. homes have copper plumbing, which was unheard of 100 years ago, and can't be afforded in developing countries."
- 17) "Japan, a developed country, does not use copper plumbing because of fear of copper poisoning. And they have almost no AD! Yet when Japanese migrate to Hawaii, where copper plumbing is used, they get AD like everyone else."
- 18) The rapid increase in taking multi-vitamin mineral supplements over the last 50-60 years occurs primarily in affluent, developed countries, the same countries with the highest level of Alzheimer's disease.
- 19) "The evidence supporting the copper hypothesis that inorganic copper ingestion from drinking water and supplements is causing our epidemic of Alzheimer's disease and mild cognitive impairment is strong."
- 20) Do not take supplements with copper, especially if more than 1 mg.
- 21) A reverse osmosis filtration system will remove copper from tap water.
- 22) Bottled water may or may not contain copper.
- 23) Red meat contains copper, which is readily absorbed.
- 24) Those consuming five ounces of red meat per day increase mortality by 30%.
- 25) Consuming one hot dog per day increases mortality by 20% greater than consuming one or two hot dogs per week.
- 26) "This effect of meat eating on mortality may be due to high absorption of both copper and iron, both of which are transition elements and contribute to increasing oxidative stress."
- 27) It is possible to lower free copper levels by taking zinc supplements, but care is necessary to not produce copper deficiency. The zinc must be taken at least one hour before or after eating food to be effective.
- 28) "50 mg of zinc twice per day will definitely lower free copper and eventually produce copper deficiency."

29) The dose of supplemental zinc to lower free copper and not produce copper deficiency might range from 25 mg to 50 mg per day, depending on the person.

30) "It seems increasingly likely that copper toxicity, probably related to copper plumbing and ingestion of supplements containing copper, is at least partially causative of our epidemic of Alzheimer's disease."

31) "Copper toxicity may be causing a decline in cognition in the aging general population."