

Diseases, Disorders and Injuries

Alzheimer's Disease and Aluminum Exposure

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What is Alzheimer's disease?

Alzheimer's Disease (AD) is the most common cause of senile brain disease. It begins with learning memory deficits and progresses to involve all aspects of intellectual activity including judgement, calculation, and language.

Does aluminum exposure cause Alzheimer's disease?

Whether aluminum can cause Alzheimer's disease is a controversial question.

Post-mortem examinations of humans with Alzheimer's disease sufferers show that many have higher amounts of aluminum than normal in their brains. Aluminum is not normally found in healthy brain tissue and researchers do not know how or why the metal accumulates in the brain. It is still unclear if the presence of aluminum causes or affects the progression of Alzheimer's disease.

It is known that aluminum is toxic to nerves in animals, and likely has a similar effect on human nerve cells and brain tissue. Early research into aluminum exposure and Alzheimer's disease in animal models suggested that the two could be linked. Injection of aluminum salts into the brains of test animals triggered changes similar to the ones found in human sufferers.

In conclusion, the cause of Alzheimer's disease and any association with aluminum is still unknown. There have been conflicting findings. The Alzheimer Society of Canada lists the following as risk factors that are related to dementia (which includes Alzheimer's disease):

- Age
- Gender

- Genetics
 - High blood pressure
 - Smoking
 - Diabetes
 - Obesity and lack of physical activity
 - Poor diet
 - Excessive alcohol consumption
 - Low levels of cognitive engagement
 - Depression
 - Traumatic brain injury
 - Air pollution
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What are the sources of aluminum exposure?

Workers can be exposed to aluminum during production, processing, or use of this metal and its alloys. In addition to workplace exposure, people can come into contact with aluminum in many other ways.

Aluminum is found in food, drinking water and in some medications.

The Alzheimer Society of Canada notes that the ingestion of aluminum in cookware and other products as a route of exposure is considered to be a very small percentage of the average person's intake of aluminum, and that it would be difficult to avoid this exposure.

Are there exposure limits when working with aluminum?

In the workplace, the American Conference of Governmental Industrial Hygienists (ACGIH) has assigned an occupational exposure limit based on respirable particle size.

The 2022 ACGIH recommended Threshold Limit Value Time-Weighted Average (TLV-TWA) exposure limit for aluminum in the air is 1 mg/m³ for aluminum metal (CAS number 7429-90-5) and insoluble compounds.

Aluminum metal and insoluble compounds of respirable particle size are also categorized by ACGIH for carcinogenicity as A4 - Not classifiable as a Human Carcinogen; agents which cause concern that they could be carcinogenic to humans but which cannot be assessed conclusively because of a lack of data.

The TLV-TWA is the time-weighted average airborne concentration for a normal 8-hour workday and a 40-hour workweek to which it is believed that nearly all workers may be exposed repeatedly, day after day, without adverse health effects.

In many Canadian jurisdictions, exposure limits are the same as or similar to the ACGIH TLVs. Since the manner in which exposure limits are established, interpreted and implemented can vary, the appropriate [government agency](#) in each jurisdiction should be consulted.

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