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Opinion
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Necessity to Identify the Clinical Usefulness of Compounds Extracted from Natural Substances in Dementia-Related Neurons Induced By Aluminum, a Dementia Inducer

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Opinion

Dementia is roughly classified into vascular dementia and Alzheimer disease, and the rate of dementia varies according to race or gender [1]. Asians are more prevalent in vascular dementia than westerners and women have a higher prevalence of Alzheimer dementia than men [2].

Aging of neuronal cells can cause Alzheimer dementia, which can lead to daily life by totally relying on the help of others by lowering human mental ability and intellectual function [3]. In addition, modern people are exposed to vascular dementia easily due to severe workload and mental stress caused by high industrialization, resulting in decreased brain function and cerebrovascular disorder [4-6]. A common feature of Alzheimer dementia or vascular dementia is that it causes neuronal death or cell degeneration. In particular, Alzheimer dementia is characterized by pathologic features such as neurofibrillary tangles or senile plaques due to β-amyloid proteins [7].

The etiologies of dementia include aging, stress, drugs such as alcohol [8], heavy metals [9], and oxidation [1,10]. In modern times, various environmental pollutants such as heavy metals, chemicals, and radiation pollute air and water quality. It accumulates in the body through the food chain and is reported to cause various diseases including dementia [9,11]. Aluminum is a silver heavy metal that is widely used as an important material in many industries such as paint manufacturing, electrical products, various paints, alloy processing, and amalgam [12]. Fumes or dusts from aluminum are mainly introduced into the human body through the respiratory tract in industry. When they accumulate in brain tissue, they have been reported to cause dementia by not only changing the blood-brain barrier of brain tissue but also interfering with neurotransmitter binding to neurotransmitters [13]. It is also known that aluminum inhibits the action of calcium or magnesium, which is important for the metabolism of neuronal cells, and interferes with the synthesis of calcium-regulating enzymes and proteins such as calmodulin [7,14].

It has been reported that natural substances extracted from plants and herbs contain a large amount of physiologically active substances effective for the treatment of diabetes and muscle nervous system diseases including dementia [15]. These ingredients have various pharmacological actions such as antioxidant, anti-inflammation and antibacterial. Therefore, it has been reported to be effective for treating various lesions [16-18]. In addition, since cell culture and *in vitro* methods have been developed and used, direct treatment of lesions, modeling of lesions for drug efficacy analysis, or quantitative analysis has become possible [19,20].

Therefore, for the prevention and treatment of dementia induced by heavy metals such as aluminum among the main causes of dementia, it is necessary to identify the clinical effect of the compound extracted from natural substances through cell culture and *in vitro* analysis.

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