

Vitamin D Deficiency and Autism

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Abstract

Autism is neurodevelopmental disorders characterized by impaired in social skills, repetitive behaviors, speech and nonverbal communication, in addition to unique strengths and differences. There were different reasons for induced autism which include genetics and environmental factors. Many vitamins may be play important role in induced of autism. The major vitamin is vitamin D. Deficiency of vitamin D influence on the development of autism. The main method in treatment of autism the treatment with vitamin D supplements.

Keywords: Autism; Vitamin D; Vitamin D deficiency

Autism

Definition of autism

Autism disorder is neurodevelopmental disorder characterized by impaired in social skills, repetitive behaviors, speech and nonverbal communication, in addition to unique strengths and differences. There were different reasons of autism which depend on the environmental, genetics influence or combination between them. These reasons were included infection during pregnancy period and consumption of some drugs and alcohols [1].

Epidemiology

Prevalence of autism is 1–2 per 1,000, also occurs in 11 per 1,000 children in the United States. Generally, autism effects on 24.8 million people in 2015. In 2012, the NHS assessed that prevalence of autism in group of 18 years adult was 1.1% [2]. In 2016, the Centers for Disease Control and Prevention hand out their prevalence report of ADDM autism, which decided that the rising of autism prevalence to 1 in every 68 births in the United States – approximately twofold as compared as the 2004 rate of 1 in 125. The risk of autism correlated with gender which is higher in boys than in girls. The ratio is an average of 4.3:1.1

Even though the researchers do not indicated the relation between pregnancy and autism, the autism risk is associated with age of parent, and with bleeding, diabetes, and use of drugs in pregnancy period [3-6]. Older fathers have bigger risk than older mothers; this may be due to increase in alteration burden in older sperm. Numerous other conditions are common in Autism children.

Causes of autism

The exact cause of ASD is unknown, but it's thought that several complex genetic and environmental factors are involved [7-9]. Genetic mutation play important role in development of autism. Also, environmental factors may be causes autism through gene mutation. Exposure of pregnancy women to heavy metals which present in air pollution may increase the risk of autism [10].

Autism classification

There were five classes from autism, which are characterized by different abnormalities in social [11,12]

Diagnosis of autism

Autism diagnosis occur through Diagnostic Interview for Social and communication Disorders, Autism Diagnostic Interview – Revised, and Autism Diagnostic Observation Schedule [13].

Vitamin D

Definition of Vitamin D

Vitamin D is one of the most important vitamins is a fat-soluble steroids which is responsible for increase the rate of absorption of calcium, iron, magnesium, phosphate, and zinc in intestine. Most important vitamin D types are Cholecalciferol (vitD3) and Ergocalciferol (vit D2) [14] (Figure 1).

Vitamin D is made in the skin from cholesterol through a chemical reaction that is dependent on exposure to the sun. Vitamin D presents in their forms in inactive source; activation process of vitamin D requires some of enzymes which present in liver and kidney In view of that the Dietary Reference of vitamin D Intake assumes no synthesis occurs and all of a person's vitamin D is obtain from food. Vitamin D has a significant role in calcium homeostasis and metabolism. Its discovery was due to effort to find the dietary substance lacking in rickets (the childhood form of osteomalacia) [15].

A diet deficient in vitamin D in conjunction with inadequate sun exposure causes osteomalacia (or rickets when it occurs in children), which is a softening of the bones. In the developed world, this is a rare disease. A review article of 2016 reported that while there is increase rate of diabetes mellitus through vitamin D deficiency [16-18].

Dietary sources of vitamin D

Although vitamin D is not present naturally in most foods, it is commonly added into some manufactured foods, as fruit juices and fruit juice drinks, beverages, cheese and cheese products [19,20]. Value of Vitamin D in foods is reduced by cooking, such as by boiling, frying or baking. Boiled, fried and baked foods retained 69–89% of original vitamin D (Table 1) [21,22].

Mechanism of vitamin D in autism

Each cell has receptors for vitamin D. These receptors responsible

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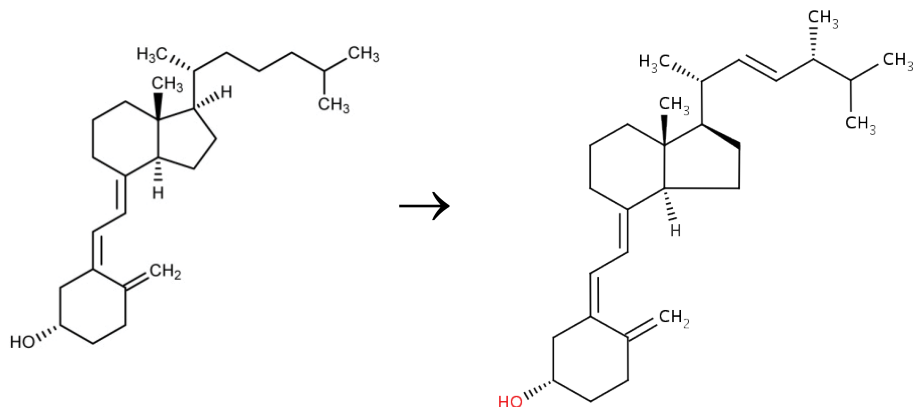


Figure 1: Vitamin D structure.

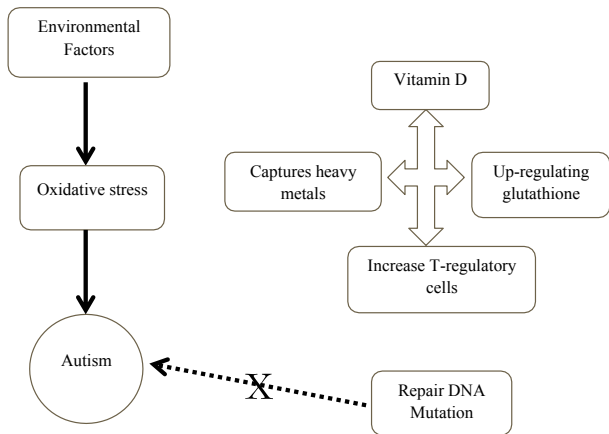


Figure 2: Vitamin D action mechanism.

Vitamin D2	Vitamin D3
Plant-based milks and yogurts	Fish liver oils
Mushrooms	Salmon
Plants	Mackerel
	Cooked egg

Table 1: Vitamin D values in food.

for control gene [23] Oxidative stress may be leads to early cell death. Some research reports indicated that vitamin D reduces oxidative stress. Environmental factors may cause DNA mutations and this increased risk for autism. Vitamin D play important role in protection of DNA from damage, if it occur vitamin D repair it once the damage occur. In addition to Vitamin D may also reduce the risk of autism through its effect on immune system through, increasing T-regulatory cells, Protecting the and by up- regulating glutathione, which also chelates heavy metals [24] (Vitamin D action mechanism Figure 2).

Conclusion

Vitamin D may play important role in protection from autism risk through inhibit oxidative stress and regulation of immunological process. So it's necessary for pregnant women to take vitamin D supplemental during pregnancy stage to protect their infant from the risk of autism.

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