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## Autism and legitimacy of a gluten-free diet

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### ABSTRACT

Gluten is a widely used ingredient which causes viscosity and elasticity of the dough. The toxic effects of gluten found in humans are mainly based on immune reactions. Celiac disease is the most common gluten-dependent disease based on these reactions. One of the commonly used methods of diagnosis of celiac disease is a gluten provocation. Autism is becoming more and more recognized readily form of disability diagnosed in children. It is suggested that this impairment affects 1 in 68 children and is one of the five most common disability in the world. Autism spectrum disorders increasingly focuses scientific interest and raises discussions. Until now, autism often has been considered as a disease and autistic people are wrongly judged as geeks locked in their own world. On the Internet and the social media can be found films showing examples of people behavior affected by this disorder. There are various forums where parents and caregivers of people with autism exchange experiences about diet and treatments described as the "miracle cure". Immediately after the diagnosis of autism parents often decide to introduce their children a variety of diets, including gluten-free diet. They often live in the strong stress and alone in their efforts, and also they are almost deprived of specialist medical care. So the diet is often a selection of desperate parent or guardian, not a treatment supported by medical facts.

**Keywords:** autism, autism spectrum disorder, gluten-free, diet, behavior, *Dermatitis herpetiformis*

### 1. INTRODUCTION

Gluten is a widely used ingredient in many food products and raw materials, such as wheat, barley, rye and grains, such as oats, spelled, kamut and triticale. Foods containing

gluten are consumed very often. Wheat accounts for over 50% coverage of caloric intake of the population in both highly developed countries and developing countries.

Gluten fulfills a specific function in the dough. After dissolving the flour containing gluten, gliadins and glutenins, the main components of gluten, are suitable viscosity and elasticity of the dough. These proteins are resistant to digestion in the human digestive tract. They increase the permeability of the enterocytes in the small intestine by several mechanisms [12].

Gluten-free diet is the reduction diet, used among other things in celiac disease and a number of gluten-dependent diseases. Its strict adherence is currently the only treatment for celiac disease. The patient must be under the constant supervision of a dietician to ensure proper nutrition and the prevention of a number of nutrient deficiency, in which the poor can be this diet. These are the B vitamins, calcium, vitamin D, iron, zinc, magnesium and fiber, and its deficiency can be extremely harmful to health.

Acceptable and unacceptable products in the gluten-free diet have been collected in Table 1 [5]. Often with celiac disease, lactose intolerance is observed, and in this case dairy products should be excluded from the diet [5]. Exclusion of oats is controversial. It has been demonstrated that the addition of oat not contaminated with other cereals do not cause differences to the gluten-free diet without oats [10].

**Table 1.** Allowed and disallowed Products on a gluten-free diet [5].

<b>Type of food with gluten-free diet</b>	<b>Examples of food</b>
elimination of cereals	wheat, rye, barley, oats (controversial)
ingredients of allowed foods	soya flour, rice, corn, tapioca, potatoes, sorghum, amaranth, millet, cassava, quinoa, gluten-free wheat starch
drinks prohibited	grain and soluble coffee, coffee containing barley malt or barley, oat drinks
permitted drinks	mineral water, fruit nectars, fruit and vegetable juices, tea, herbal infusions, natural coffee
acceptable alcoholic drinks	wines, grappa, brandies, rums, tequilas
unacceptable alcoholic drinks	beers, rye spirits, whiskey, gin
in case of lactose intolerance	It is exclusion of dairy products from the diet

Deficiencies of the above components, confirmed by tests, are usually caused by a poor selection of foods and exhibiting abnormal eating patterns by patients [11].

## 2. GLUTEN - MECHANISM OF ACTION

The toxic effects of gluten found in humans are mainly based on immune reactions, the role played by the lack of appropriate adaptation gastro - intestinal response [3].

Pathogenesis of these diseases was divided into three surfaces: an autoimmune disease (based on this mechanism is celiac disease, ataxia, gluten-dependent disease and Duhring disease (*Dermatitis herpetiformis*)), allergic conditions, which stands out various allergic diseases to wheat and diseases with non-allergic and autoimmune diseases, or non-celiac gluten-related disorders [1].

Celiac disease is the most common gluten-dependent disease based on autoimmune reactions. Is characterized by abnormal T cell immune response that causes inflammation and damage to the intestinal villi at the predestined units. In individuals suffering from celiac disease is detectable haplotype HLA-DQ2 and/or HLA-DQ8 [1]. It is estimated that the prevalence of celiac disease in the world is from 0.6 to 1% of the population [12].

### 2. 1. Symptoms, detection and epidemiology of NCNG

Gluten intolerance, or non-celiac gluten-related disorders (NCNG) is a disease described at the latest of all known gluten-dependent diseases. It can be suspected in patients exhibiting symptoms such as bloating, abdominal pain, insomnia, skin lesions, diarrhea or constipation after eating foods containing gluten, but with excluded celiac disease. In this disease there is no destruction and increased permeability of the small intestine mucosa, and are not present anti-endomysial (EMA), anti-tissue transglutaminase (TGA) and anti deamidated peptides gliadin (dagA), which are present in patients with celiac disease. The diagnosis of this disease is to exclude celiac disease and food allergies in a patient with induced symptoms after ingestion of gluten.

### 2. 2. Gluten provocation

One of the commonly used methods of diagnosis of celiac disease is a gluten provocation. This is adding to the diet of the examined person products containing gluten to see the symptoms of the disease, if present. This method must be applied under medical supervision and only if the intestinal biopsy did not show enough specific results. Often, gluten provocation is required to confirm the diagnosis, and in the case of pediatric patients should wait at least until the age of six years, in order not to damage tooth enamel, which would be irreversible. It is also recommended not to apply this method in adolescence, lest stop the normal course of the process [4].

## 3. AUTISM SPECTRUM DISORDER (ASD)

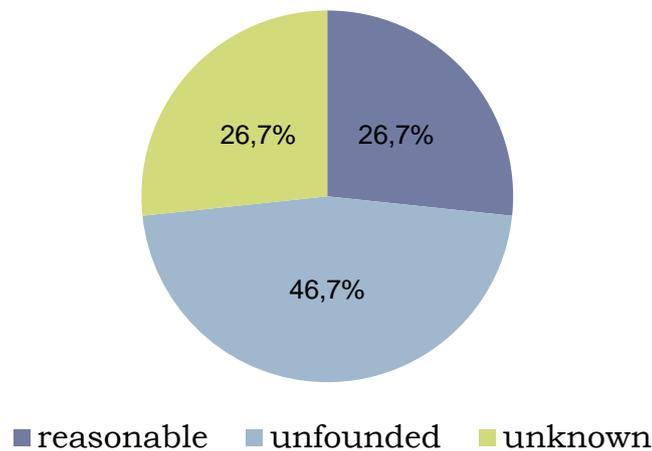
Autism spectrum disorders increasingly focuses scientific interest and raises discussions. Since the first mention about it, views on the genesis of autism underwent numerous changes. According to available data, it is estimated that, at present 1 to 68 children suffers from this disorder. After many years of testing and research we were able to reject some hypotheses about the formation of this disorder, and the updated American classification of psychiatric DSM-V reveals new diagnostic criteria. On the one hand, autism is perceived,

even by some "experts" as the end of the world, on the other hand can be seen in the parents, watching unusual behavior of their children, rush to get a diagnosis. Until now, autism is often called a disease and autistic people wrongly judged as locked in their own world. On the Internet and the social media, you can easily find a video showing examples of behavior of people affected by this disorder, or a variety of forums where parents and caregivers of people with autism exchanging experiences regarding diet and treatment of their wards and sometimes describe the "miracle cure." Immediately after the diagnosis of autism parents often decide to introduce their children a variety of diets, including gluten-free diet.

### 3. 1. Autism and gluten-free diet

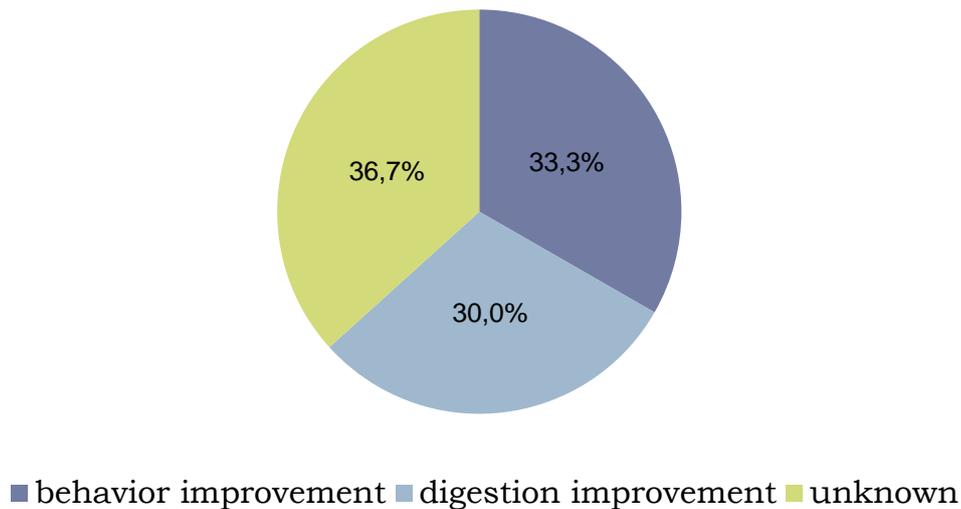
In this paper the authors set themselves the goal of a brief summary of the scientific facts and showing the universality hackneyed and still present in the society myths about autism and gluten-free diet and its consequences. For this purpose, an anonymous survey was conducted. The sheets were specially developed and available on the Internet. Their voice could give the volunteers, who had not had a chance to encounter this disorder.

According to respondents, most people believe that the introduction of a gluten-free diet after receiving a diagnosis of autism is unfounded (Fig. 1). However, despite this, respondents argue that the role of introduced diet is to improve the behavior or improvement of the digestion (Fig. 2).



**Figure 1.** The legitimacy of the introduction of a gluten-free diet after receiving a diagnosis of autism.

From the literature, data suggest that effective action by diet is generally wide-spread myth in society, which has been proven by scientists. In a controlled, randomized, double-blinded trial, attended by 74 children with autism spectrum disorders, and with severe maladaptive behavior, problems with the digestive system and increased urinary protein I-FABP in urine it has been shown that after one week of increased dietary supplementation of products containing casein and gluten, it turned out that there has been no impact on behavioral change, additional severity of autistic behaviors, problems with digestive system and increasing the excretion of protein I-FABP [7].



**Figure 2.** The purpose of the introduction of a gluten-free diet after receiving the diagnosis of autism.

#### 4. CONCLUSIONS

Caregivers of people with ASD often lives in the strong stress, alone in their efforts, and also they are almost deprived of specialist medical care. Having a child with disturbed mental development, disorder almost unknown etiology and often unresponsive to any treatment offered by conventional medicine increases the tendency for the bestowal of trust proposing “alternative” therapies, whose effectiveness has not been confirmed in reliable research. Without documentation of design in the pharmacological treatment of autism they are used numerous medications and dietary supplements [8].

Based on the available literature data, the assessment is believed to enrich the diet of people with autism spectrum disorder does not affect the behavior or not contribute to digestive problems of these people. However, studies on the effects of long-term enrichment the diet with products containing gluten or other factors causing damage to the enterocytes among people suffering from autism spectrum disorders should be conducted.

In the light of recent systematic reviews of the literature, implementation of gluten-free diet for most patients, except those with identified food intolerances and celiac disease, is a selection of desperate parent or guardian, not a treatment supported by medical facts [8].

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