**Wheat Gluten, Desirable or Dangerous Genes**

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**Abstract**

My opinion is issued to collect and broaden the information about gluten, or more precisely, whether its presence and properties should raise concerns. Knowledge about gluten has expanded considerably over the last dozen or so years. It is known that it is a large polymer consisting of a mixture of proteins. Gluten occurs in popular cereals such as wheat, spelt, barley, rye and oat, of which 80% are gluten proteins [2,3]. The biological role of gluten is to supply elements (carbon, nitrogen and sulfur) to germinating seeds [4]. The composition of gluten proteins in grains affects the technological quality of common wheat. The quantity and composition of gluten proteins such as gliadins and glutenins is responsible for flour baking quality in the bakery industry. These proteins constitute the "skeleton" of a kneaded dough and are responsible for physicochemical properties of gluten. Gluten in cakes is primarily responsible for flexibility and cohesion [2,3]. As it turned out, gluten brings so much positive properties in the production process of bakery products may be the cause of many health problems.

**Introduction**

Gluten is a polymer composed of a mixture of at least 50 proteins [1]. There are about 20% of proteins in the endosperm of mature cereal grains such as wheat, rye, barley, triticale and oat, of which 80% are gluten proteins [2,3]. The biological role of gluten is to supply elements (carbon, nitrogen and sulfur) to germinating seeds [4]. The composition of gluten proteins in grains affects the technological quality of common wheat. The quantity and composition of gluten proteins such as gliadins and glutenins is responsible for flour baking quality in the bakery industry. These proteins constitute the “skeleton” of a kneaded dough and are responsible for physicochemical properties of gluten. Gluten in cakes is primarily responsible for flexibility and cohesion [2,3]. As it turned out, gluten brings so much positive properties in the production process of bakery products may be the cause of many health problems.

Gluten consumed by humans most often in the form of bread and pasta is a high-calorie food. This caloric value together with the increase of glucose and insulin in the body contributes to the formation and deposition of visceral fat, most often in the regions of the abdomen, thighs and buttocks as well as diabetic complications and diseases [5].

The biochemical effect of visceral fat on the body carries a number of adverse changes. Among other things, it leads to an increase in low density lipoprotein (LDL cholesterol) responsible for the accumulation of atherosclerotic plaque, hypertension, heart diseases [6-9]. In the nervous system, it is responsible for the occurrence of temporal epilepsy [10], dementia [11], ataxia, neuropathy, gluten encephalopathy [12], worsening of autistic indices [13] and aggravation of schizophrenia [14]. In the digestive system, apart from intolerance, allergy and celiac disease, gluten [15] is the cause of increased hepatic enzyme secretion, may lead to liver inflammation, primary biliary cirrhosis and colitis and Crohn’s disease [16]. Skin symptoms of the negative effect of gluten are primarily herpetic dermatitis (Duhring’s disease) [17], acne [18], paraneoplastic syndrome, erythema nodosum, psoriasis, dermatomyositis and exacerbation of the genetic ichthyosis vulgaris (ichthyosis) [17]. It was also shown that gluten affects hair loss [19]. The influence of gluten in the female reproductive system may contribute to infertility, increased risk of low birth weight of a newborn, premature labor or habitual miscarriage [20] and increased prolactin production [21]. In addition, women suffering from celiac disease are predisposed to a shorter fertility period, caused by the later age of menstruation and a faster menopause [22]. In the case of men, gluten proteins may lead to erectile dysfunction and gynecomastia [23], caused by disturbances of estrogen production by visceral fat [24].

Symptoms in the sense organs include retinopathies, cataracts and dry eye syndrome [25], while systemic symptoms are anemia and vitamin deficiencies [26].
Unfortunately, consumption of bread and flour products carries the risk of body acidification [27]. Acidosis contributes to bone fragility, osteopenia, fractures and osteoporosis [28].

Gluten proteins contained in the endosperm of cereals also contribute to tumor formation in the human body. They may be a factor contributing to the formation of breast, prostate, lung and gastrointestinal cancers, especially gastrointestinal tumors, colon cancer and pancreatic cancer [29,30].

People with autoimmune gluten intolerance may have other co-existing autoimmune diseases such as type 1 diabetes, hyperthyroidism, vitiligo, primary biliary cirrhosis, rheumatoid arthritis [31], iron deficiency anemia, osteopenia and osteoporosis, hypogosplenism or IgA nephropathy [32].

Despite the many negative effects of gluten consumption, its introduction to the infant diet does not cause adverse effects in their psychomotor development [33]. Gliadin, on the other hand, contributes to the enhanced action of the human immune system through the influence on monocytes and their cytokine production [34].

![Table 1: The overall cognitive effect of gluten.](image)

The review of many scientific publications has expanded our knowledge on this subject (Table 1), and not only medical knowledge, but also of agricultural genetics, which in the last 50 years has transformed traditional wheat into a hybrid product-profitable, robust and efficient, but little related to the original. One should remember that biological and genetic modifications of wheat were introduced with good intentions. At the turn of the 1960s, there was a fear of world overcrowding and hunger in in the West. It was decided to increase cereal cultivations; the US and other highly developed countries began to invest huge amounts in research aimed at improving plants and increasing yields. Breeding programs existing to this day, based on wheat genetics and biotechnology, have achieved success, and currently we have highly fertile wheat with good grain quality parameters (group A, B). A wide breeding program taking into account all directions, based on global gene resources, provides annually new, better forms of common wheat.
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