

The Gut-Brain Axis: Experience From Celiac Disease

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Celiac disease is an autoimmune enteropathy triggered by the ingestion of gluten-containing grains including wheat, rye and barley in genetically susceptible individuals. The disease can manifest itself with wide variety of clinical presentations including the typical malabsorption syndrome and a range of less common associated neurologic and psychiatric symptoms, including cerebellar ataxia, cerebral atrophy and dementia, cerebral vasculitis, brain stem encephalitis, epilepsy, schizophrenia, ADHD, and behavioral changes. One of the most controversial and, yet, fascinating co-morbidities is the association between celiac disease and autistic spectrum disorders. The common denominator between the two conditions appears to be the impaired intestinal barrier function causing an uncontrolled passage of non-self antigens, including gluten, through the gut mucosa. Gluten may trigger an exaggerate immune response as well as it may exert a direct interference with central nervous system functions in subjects genetically susceptible to develop autism. The direct interference with brain functions can be associated to the passage through a leaky blood brain barrier of gluten peptides reach in glutamine (that represents ~38% of gluten amino acid composition), an amino acid that in the brain is transformed in glutamate by the enzyme glutaminase. The recent report of a link between autism and *Neurexin 1*, a gene coding for proteins involved in building glutamate synapses, together with the role played by glutamate in wiring the brain during early development and in causing other syndromes involving mental retardation, are suggestive of a potential gut-brain axis linking celiac disease to autism.