

# A Review of Treatments for Gastrointestinal Symptoms in Children with Autism Spectrum Disorder

Initial Inquiry

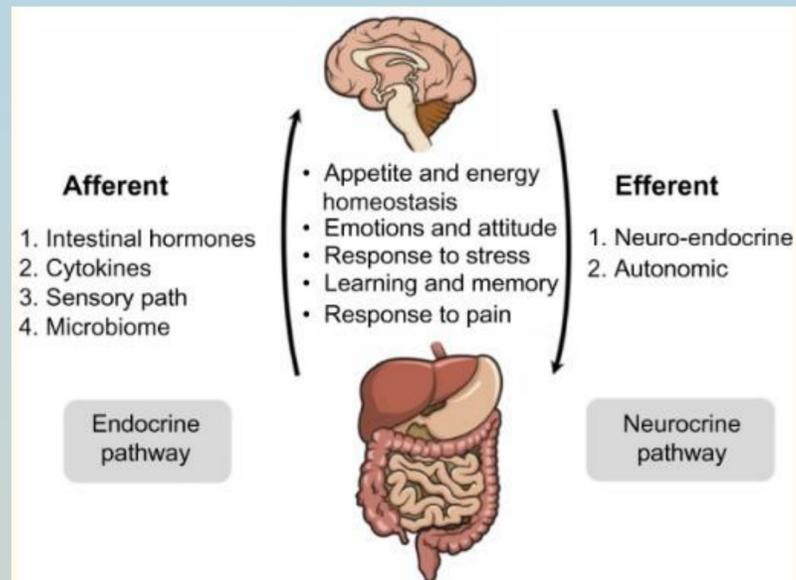
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## Background

I am currently a sophomore nursing major with a minor in nutrition and an interest in pediatrics and developmental disorders. With the help of my faculty advisor, I have been working to pursue a personal research project that fulfills all of these interests. Autism spectrum disorder (ASD) is defined as a genetically determined neurodevelopmental brain disorder that presents with repetitive patterns of behaviors, interests, and activities, or persistent deficits in social communication and social interaction.<sup>1</sup>

Children with ASD are at a greater risk for gastro-intestinal (GI) disorders. The most common GI symptoms include overproduction of gases, bloating, abdominal pain, diarrhea, burping, GERD, and constipation.<sup>5</sup> The literature suggests that there have been two nutritional approaches commonly recommended. These included restrictive diets, more commonly the GFCF diet, and the supplementation of probiotics. I was interested in exploring the literature on effective treatments for GI disorders in children with ASD.



Gut-brain axis.<sup>10</sup>

## Nutritional Deficiencies, GFCF Diet and Probiotics

- In recent decades, there has been a vast surge in studies conducted regarding microbiota and the connection of the brain to the health of one's gastrointestinal tract. They refer to the efferent and afferent pathways that connect the two entities as the gut-brain axis, which is why there have been studies regarding how alleviating gastrointestinal symptoms in children with ASD can reduce core behavioral symptoms.<sup>10</sup>
- While little is currently still known about the pathogenesis of ASD, current research is pointing out that adequate nutrition and digestive health are key components to the biomedical approach. Children with ASD have a different enteric microbiome than children without ASD. Most likely due to a more restricted diet and more exposure to antibiotics at an earlier age, they have a less diverse gut microbiome, lower levels of select beneficial bacteria and larger growths of less beneficial microorganisms can also contribute to GI symptoms.<sup>5</sup>
- Recent reports have shown that many children with ASD have food selectivity issues, which leads to nutritional deficiencies. Two of the micronutrients of greatest concern for children with ASD are calcium and vitamin D, which many children don't receive enough of even with supplementation. Regular screening for nutritional adequacy and supplement intake is highly recommended.<sup>3</sup> Due to these deficiencies or other reasons, children with ASD are 4 times as likely to experience gastrointestinal symptoms compared to children without ASD.<sup>6</sup> Two noteworthy treatments within the literature are the gluten-free casein-free (GFCF) diet and the use of probiotics.

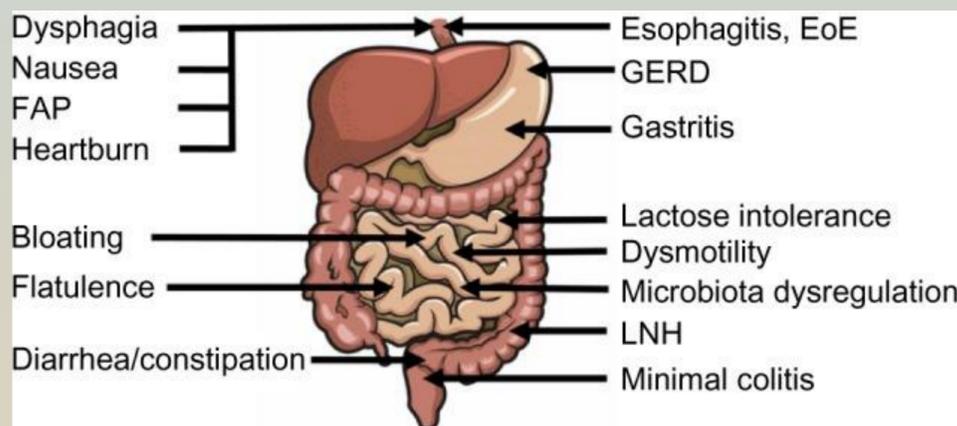
- The use of the GFCF diet comes from a concept known as the Opioid-Excess theory. Opioids are defined as a group of chemical compounds acting via opioid receptors and affect the brain and nervous system. Opioids affect our emotion and behavior.
- In the gastrointestinal tract, enzymes break down proteins into peptides and transform them into amino acids. The amino acids are then absorbed into the blood for transport. With this theory, the assumption is that ASD children suffer from increased gut permeability and improper production of digestive enzymes related to gluten and casein, which leads to a failure in transforming both into amino acids. The increased gut permeability enables these substances to pass through the blood-brain barrier, affecting signal transduction in the nervous system.<sup>7</sup> However, current research cannot state that the evidence supports GFCF or the Opioid Excess Theory.<sup>8</sup> In addition to weak evidence and research methods, the GFCF diet poses health risks for children. Children are at risk for lower plasma levels of essential amino acids and suboptimal bone development. Recent findings also suggest that GFCF diets reduce the number of beneficial bacteria and increase opportunistic bacteria. The fiber restriction can also exacerbate or cause chronic constipation.<sup>2</sup> Currently, it is recommended that gluten and/or casein are only removed from the diet if the child has an allergy or intolerance.<sup>4</sup>

- From this research, a new interest has developed in gut microbiota and the potential benefit of probiotic supplementation. There is evidence to show that probiotic supplementation can improve GI symptoms, GI microbiota, intestinal inflammation, and even some symptoms of ASD.
- There are three potential routes by which probiotics may help those with ASD: one based on the opioid excess theory, one on dietary protein intolerances present in some with ASD, and the last on gut dysbiosis observed in those with ASD.<sup>2</sup>
- As of 2018, only a few studies on the gut microbiota and probiotics in children with ASD could be identified, and they were identified to lack consistent measurements and were poorly controlled.<sup>9</sup> However, the results still showed potential for this as a future recommendation for reducing GI symptoms.

## Next Steps

This preliminary literature review will serve as the basis for the next step of the research process. I will conduct a more in-depth meta-analysis or systemic review of existing literature on the subject regarding all treatments for gastrointestinal symptoms in children with ASD.

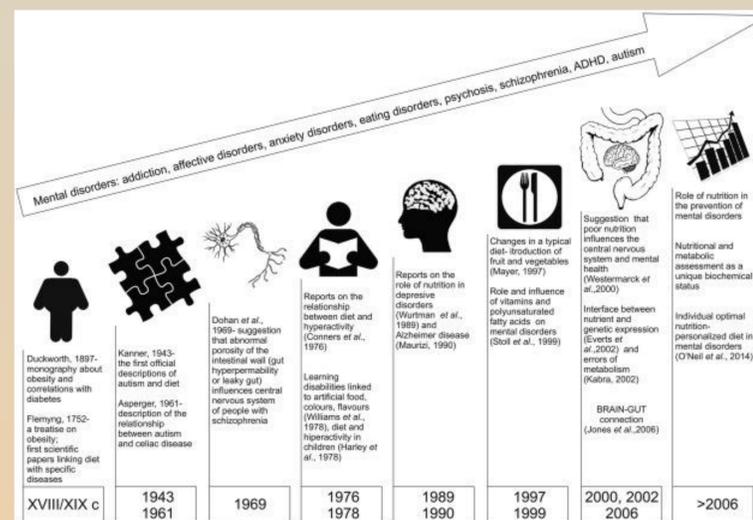
## Research Question: Are there effective treatments for the reduction of gastrointestinal symptoms in children with ASD?



GI symptoms (left side) and GI disorders (right side) described in children with autism spectrum disorder.<sup>10</sup>

## Review Process

My initial search had 12 articles. 4 articles were excluded. The final review of the literature was informed by 8 articles. The articles I have excluded from this were small studies done with small cohorts of children of ASD. While they were an important part of this process, their findings were not conclusive enough to discuss here due to small sample sizes and lack of consistency in methods used across the different studies. I conducted a preliminary review of the literature. I began by using the search terms "ASD nutrition children" in Google Scholar to formulate my initial inquiry question. After reading about nutrient insufficiencies, I was linked to an article regarding GF/CF diets and their proposed use for alleviating GI symptoms in children with ASD. From there I continued to a few other articles and I searched "ASD gastrointestinal children" and found more recent studies that had shifted more to the use of probiotics.



Selected milestones in the field of knowledge connected with nutritional strategies, and personalized diets and their influence on mental disorders.<sup>7</sup>