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# Gut microbiota profiles of autism spectrum disorder and attention deficit/hyperactivity disorder: A systematic literature review.

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## Abstract

### Objective:

Accumulating evidence has implicated an involvement of the gut-brain axis in autism spectrum disorder (ASD) and attention-deficit hyperactivity disorder (ADHD), however with highly diverse results. This systematic review aims to describe and evaluate studies investigating the gut microbiota composition in individuals with ASD or ADHD and to evaluate if variations in gut microbiota are associated with these disorders.

### Method:

Twenty-four articles were identified in a systematic literature search of PubMed and Embase up to July 22, 2019, using the data bases PubMed and Embase. The included studies are original studies performed in humans, diagnosed with ASD or ADHD. Data were focusing on demographics, diagnostic methodology, microbiota assessment methodology, bacterial richness, diversity, and taxonomic bacterial composition. Quality assessment of the included studies was evaluated, using the Newcastle-Ottawa Scale (NOS) for case-control studies

### Results:

They consisted of 20 studies investigating ASD and four studies investigating ADHD. For ASD, several studies agreed on an overall difference in  $\beta$ -diversity, although no consistent bacterial variation between all studies was reported. For ADHD, the results were more diverse, with no clear differences observed. Several common characteristics in gut microbiota function were identified for ASD compared to controls. In contrast, highly heterogeneous results were reported for ADHD, and thus the association between gut microbiota composition and ADHD remains unclear. For both disorders, methodological differences hampered the comparison of studies.

### Conclusion:

This systematic review has demonstrated that ASD and ADHD cases are associated with a gut microbiota different from controls without neurodevelopmental disorders. However, studies varied widely concerning methodology, resulting in highly heterogeneous gut

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microbiota compositions between studies. A specific ASD or ADHD-associated gut microbiota could therefore not be established

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