INPLASY

Microbiota-Mediated Redox Signaling in the Gut-Brain Axis: A Systematic Review of Implications for Autism Spectrum Disorder

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ADMINISTRATIVE INFORMATION

Support - N/A.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 3 June 2025 and was last updated on 3 June 2025.

INTRODUCTION

Review question / Objective What is the role of gut microbiota in modulating redox signaling within the gut-brain axis, and how does this interaction contribute to the pathophysiology or increased susceptibility of Autism Spectrum Disorder (ASD)?

Condition being studied Autism Spectrum Disorder.

METHODS

Participant or population Humans or animals with ASD.

Intervention Studies that are focused on the gut microbiome, redox signaling or oxidative stress, and its association with Autism Spectrum Disorder diagnoses.

Comparator Control groups = people with ASD; comparison of those with redox/oxidative/microbiome dysregulation compared to those without.

Study designs to be included In vivo, in vitro, human observational, human interventional.

Eligibility criteria Studies involving humans with a clinical diagnosis of ASD or animal models exhibiting autism-like behaviors.

Information sources Pubmed, Embase, Web of Science, SCOPUS.

Main outcome(s) The main outcomes of this systematic review will focus on identifying and synthesizing evidence related to the role of gut microbiota in modulating redox signaling pathways and how these processes influence the development or progression of Autism Spectrum Disorder (ASD).

Additional outcome(s) Males vs females.

Quality assessment / Risk of bias analysis A Risk of Bias (RoB) analysis was performed to evaluate the quality and reliability of the studies included in this review, using the Joanna Briggs Institute (JBI) Critical Appraisal Tool checklist.

Strategy of data synthesis Data will be synthesized narratively, organized by study type (human, animal, in vitro) and key themes: microbiota alterations, redox signaling pathways, and ASD-related outcomes. Patterns, consistencies, and divergences across studies will be identified.

Subgroup analysis Males and females.

Sensitivity analysis N/A.

Country(ies) involved United States.

Keywords Redox signaling; gut microbiome; autism spectrum disorder; neuroinflammation; ROS; RNS; dysbiosis; oxidative stress.

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