Is there concern that the rise of Neurodevelopmental and Psychiatric Disorders part of a larger rise in Immune Mediated Diseases and Disorders?

Yes, rising **neurodevelopmental and psychiatric disorders** are increasingly linked to a broader surge in **immune-mediated diseases**.

Is the rise of neurodevelopmental and psychiatric disorders part of a larger rise in immune mediated diseases and disorders?
Requires at least 5 papers that directly answer your question. Try adjusting your query to find more papers.

FIGURE 1 Research consensus on neurodevelopmental, psychiatric, and immune-mediated disease overlap

Multiple lines of evidence—epidemiological, genetic, and mechanistic—now indicate that neurodevelopmental and psychiatric disorders share inflammatory and immune-dysregulation pathways with classical immune-mediated inflammatory diseases (IMIDs), supporting the view that their rising prevalence reflects a shared biological trend rather than independent epidemics (Novellino et al., 2020; Pape et al., 2019; Gagliano et al., 2025).

Epidemiological Co-Occurrence Across Immune and Neuropsychiatric Conditions

Population-based studies consistently show elevated psychiatric disorder incidence in individuals with IMIDs. A Canadian cohort of nearly 20,000 IMID cases found increased incidence of depression (IRR 1.71), anxiety (IRR 1.34), bipolar disorder (IRR 1.68), and schizophrenia (IRR 1.32) compared with matched controls, with effects seen across IBD, MS, and RA (Marrie et al., 2017). Notably, this elevated psychiatric incidence begins as early as five years before IMID diagnosis, suggesting shared etiological factors rather than purely reactive comorbidity (Marrie et al., 2017).

Population	Finding	Key Metric
Adults with IMID (IBD, MS, RA)	Elevated psychiatric incidence post-diagnosis	Depression IRR **1.71** (Marrie et al., 2017)
Adults pre-IMID diagnosis	Elevated depression/anxiety 5 years before diagnosis	Depression IRR **1.54** (Marrie et al., 2017)
Pediatric IMID (nationwide Denmark)	Increased psychiatric risk before and after onset	aHR **1.6** post-diagnosis (Jansson et al., 2023)
Childhood-onset IMID (meta-analysis)	Higher anxiety and mood disorder prevalence	Anxiety **13%**, mood **20%** in RD (Jansson et al., 2022)

FIGURE 2 Psychiatric comorbidity rates across IMID populations and study designs

An umbrella review encompassing ~12.5 million participants confirmed strong associations between a broad range of mental disorders in youth and activated immune conditions including asthma, obesity, dermatitis, and autoimmune disease (Gagliano et al., 2025). Children of mothers with rheumatoid arthritis show higher risk of ASD, ADHD, bipolar disorder, and depression than children of affected fathers, supporting a maternal immune activation mechanism (Gagliano et al., 2025).

Shared Genetic Architecture and Mechanistic Pathways

Genome-wide analyses reveal substantial polygenic overlap between neurodevelopmental and immune disorders. Around 50–90% of genetic variants underlying immune disorders are shared with neurodevelopmental disorders, with 154 genome-wide significant loci identified in cross-trait meta-analysis (Xiu et al., 2024). Pathway analysis implicates neural signaling, inflammatory response, and PI3K-Akt signaling as common routes (Xiu et al., 2024).

- **Maternal immune activation (MIA)** during pregnancy—triggered by infection, obesity, autoimmune disease, or stress—disrupts fetal neurodevelopment via placental cytokine signaling, microglial hyperactivation, and aberrant synaptic pruning (Yong et al., 2025; Han et al., 2021; Lins, 2021).
- **Innate immune cells** including microglia, mast cells, and macrophages drive neuroinflammation that impairs neuronal pruning and connectivity during critical developmental windows (Novellino et al., 2020).
- **Pro-inflammatory cytokines** (IL-6, TNF-α, IL-1β) mediate communication between peripheral immune activation and CNS dysfunction, with Mendelian randomization confirming causal relationships between immune cells, inflammatory factors, and NDDs (Liu et al., 2025; Szabo et al., 2025).

Evidence Strength and Causal Inference

Evidence Stream	Strength	Key Caveat
MIA → NDD (epidemiological + preclinical)	Strong	Human evidence is disparate; timing and type of inflammation matter (Han et al., 2021; Szabo et al., 2025)
Genetic overlap NDD ↔ immune disease	Strong	Includes both positive and negative genetic correlations (Xiu et al., 2024)
IMID ↔ psychiatric comorbidity	Strong	Bidirectional; shared risk factors vs. causal direction unresolved (Marrie et al., 2017)
Autoimmune disease → NDD (Mendelian randomization)	Weak	One MR study found **no significant association** (Qin et al., 2025)
Immune biomarkers → neuropsychiatric conditions	Moderate	29 biomarkers prioritized but causality requires further validation (Dardani et al., 2024)

FIGURE 3 Evidence strength across immune-mediated and neuropsychiatric disease links

The field has crystallized around the term **immunoneuropsychiatry**, which challenges traditional neurological–psychiatric classifications by identifying subgroups that are phenotypically distinct but pathogenically related through shared immune mechanisms (Pape et al., 2019; Gagliano et al., 2025; Chen et al., 2022). Converging evidence from postmortem brain transcriptomics shows that over 60% of immune-related genes are differentially expressed across six major brain disorders, with shared alterations concentrated in innate immunity pathways (Chen et al., 2022).

A key nuance: while the overall pattern of co-occurrence and shared mechanisms is robust, not every individual link is confirmed. One Mendelian randomization analysis failed to find a significant causal association between autoimmune diseases (SLE, RA, T1D) and neurodevelopmental disorders, though it did identify pro-inflammatory mediators involved in NDDs (Qin et al., 2025). This suggests the relationship may operate through inflammatory mediators rather than through autoimmune disease diagnoses per se, and that the shared biology is broader than any single autoimmune condition. The evidence collectively supports the concern that rising neurodevelopmental and psychiatric disorders are part of a larger immune-mediated disease trend, while acknowledging that the causal architecture is multifactorial and not yet fully resolved.

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