

Pregnant mother's immunity tied to behavioral, emotional challenges for kids with autism

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Children with autism born to mothers who had immune conditions during their pregnancy are more likely to have behavioral and emotional problems, a UC Davis Health study has found. The study examined maternal immune history as a predictor of symptoms in children with autism.

"We tested the ability of maternal immune history to predict ASD symptoms and the possible role that the sex of the [offspring](#) plays," said Paul Ashwood, professor of microbiology and immunology and faculty member at the UC Davis MIND Institute.

Published Aug. 14 in *Translational Psychiatry*, the study found that offspring sex may interact with maternal immune conditions to influence outcomes, particularly in terms of a child's cognition.

Maternal immunity conditions and autism

Maternal immune conditions are caused by a dysfunction of the mother's immune system. They include allergies, asthma, [autoimmune diseases](#), autoinflammatory syndromes and immunological deficiency syndromes. Previous studies have shown that maternal immune conditions are more prevalent in [mothers](#) of children with [autism spectrum disorder](#) (ASD).

The researchers enrolled 363 mothers and their children (252 males and 111 females) from the Autism Phenome Project (APP) and Girls with Autism Imaging of Neurodevelopment (GAIN) study at the UC Davis MIND Institute. The median age of the children was three years.

The researchers measured the children's autism severity and assessed a set of behavioral and emotional problems such as aggression and anxiety. They also measured the children's development and cognitive functioning.

The study found that around 27% of the mothers had immune conditions during their pregnancy. Of these mothers, 64% reported a history of asthma, the most common immune condition. Other frequent conditions included Hashimoto's thyroiditis (hypothyroidism), Raynaud's disease (blood circulation disease), alopecia ([hair loss](#)), psoriasis (skin disease) and rheumatoid arthritis (joint tissue inflammation).

The study also found that maternal immune conditions are associated with increased behavioral and [emotional problems](#) but not reduced cognitive functioning in children with autism.

Does the sex of the offspring interact with the influence of maternal immune conditions on autism symptoms?

According to the Centers for Disease Control and Prevention (CDC), ASD is four times more common among boys than among girls.

"Our study explored whether offspring sex interacts with the presence of maternal immune conditions to influence behavioral outcomes in children," said Ashwood. "Maternal immune conditions may be one environmental factor which contributes to the higher male prevalence seen in ASD."

The study found that a history of maternal immune conditions was more common in male children with ASD (31%) compared to female (18%). Specifically, asthma was twice as common in mothers of male children with ASD than in mothers of female [children](#) with ASD.

The study also showed that in cases of ASD where maternal immune conditions are present, female offspring are less likely to be susceptible to adverse cognitive outcomes in response to maternal inflammation than

male offspring.

"This critical finding links offspring sex and maternal immune conditions to [autism](#)," said Ashwood. "It provides more evidence that male offspring are at higher risk of adverse outcomes due to maternal immunity activation compared to female offspring."

Future studies would include identifying the type, severity and gestational timing of immune conditions, and then examining offspring outcomes over time.

More information: Shrujna Patel et al, Maternal immune conditions are increased in males with autism spectrum disorders and are associated with behavioural and emotional but not cognitive co-morbidity, *Translational Psychiatry* (2020). [DOI: 10.1038/s41398-020-00976-2](https://doi.org/10.1038/s41398-020-00976-2)

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