

Autism

WHILE THE CAUSE OF AUTISM IS UNKNOWN, SCIENTISTS ARE EXPLORING THE COMPLEX INTERACTION OF GENETICS AND ENVIRONMENTAL FACTORS, SUCH AS EXPOSURE TO PESTICIDES.

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[Autism](#) is a spectrum of conditions characterized by deficits in social communication and restricted, repetitive patterns of behavior. While the cause is unknown, genetics likely play a role. Scientists are exploring the complex interaction of genetics and environmental factors, such as [exposure to pesticides](#).

Definitions

Persons with Autism Spectrum Disorder ([ASD](#)) have difficulties with social interactions and often display repetitive behaviors and a narrow range of interests. The diagnosis for autism has changed over time and now includes different conditions. Today it represents a “spectrum” from mild to severe symptoms. The number of children with ASD is increasing, partly because of better recognition and diagnosis of the disorder.

Today, for a pesticide to be legally sold and used across the globe, specific and stringent tests are required to evaluate the potential for

it to cause effects on developmental disorders like ASD and much more.

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The term “pesticides” is also a widespread term referring to a group of products – both synthetic and natural or biological – which, by definition, are harmful to a target plant, insect, fungus or rodent. Today, for a pesticide to be legally sold and used across the globe, specific and stringent tests are required to evaluate the potential for it to cause effects on developmental disorders like ASD and much more.

Autism Spectrum Disorder in Society

As scientists study ASD, they have determined that different types may have different causes. ASD may develop during pregnancy, immediately after birth or later in childhood. Genetic factors are strongly indicated. ASD is more common in boys than girls and from those with older mothers.

[Advocacy organizations](#) promote approaches to support the families and improve the quality of life for persons with ASD. They also work to reduce the stigma and human rights violations often associated with autism.

Classification

Regulatory bodies such as the European Food Safety Authority (EFSA), United States Environmental Protection Agency, and Australian Pesticides and Veterinary Medicines Authority evaluate specific pesticides in animals for potential [developmental neurotoxicity](#) in humans. But not all conditions involved with ASD can be tested in laboratory animals. Nevertheless, required tests provide insight into the interaction between biological processes and pesticides. They are conducted at levels of exposure that farm workers or people at large, including pregnant women, would never ordinarily experience. Personal exposures to [pesticide handlers](#) can be further reduced by wearing protective clothing and following label directions.

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It is important to draw conclusions on consistent results across multiple studies rather than from individual studies.

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Evidence in Human Studies

To study ASD, researchers look among groups of children (population or epidemiological studies) that have the same diagnosis and compare their experiences to children without the diagnosis. The hypothesis that ASD is linked to some vaccinations has been proposed, but the available evidence clearly does not support it. Some of these studies also try to determine if a specific pesticide is used more frequently by parents in the group with

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- **FACTS** ASD and mothers living near pesticide applications during pregnancy.¹

However, further research is required since it is not clear from this study if exposure actually occurred, if other factors might have generated a spurious association or that it could cause disease.² It is important to draw conclusions on consistent results across multiple studies rather than from individual studies.

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One of the difficulties in studying ASD is its range of conditions – each of which may have different causes or risk factors. A review by the EFSA of pesticides and their potential impact on mental and psychomotor development outcomes, including ASD, recommends “cautious interpretation” of epidemiological studies and concluded “there is no evidence to suggest a robust association between pesticide exposure and these outcomes.”³

In general, pesticides are not an established cause of ASD. Studies continue to be conducted in humans, animals (*“in vivo”*) and cellular systems (*“in vitro”*) to better understand factors related to this disorder.

¹ Shelton JF, Geraghty EM, Tancredi DJ, Delwiche LD, Schmidt RJ, Ritz B, Hansen RL, Hertz-Picciotto I. Neurodevelopmental disorders and prenatal residential proximity to agricultural

pesticides: the CHARGE study. *Environ Health Perspect* 2014;122(10):1103-9.

2 Chang ET, Adami HO, Bailey WH, Boffetta P, Krieger RI, Moolgavkar SH, Mandel JS. Validity of geographically modeled environmental exposure estimates. *Crit Rev Toxicol* 2014;44(5):450-66.

3 Ntzani EE, Ntritsos GCM, Evangelou E, Tzoulaki I, 2013. Literature review on epidemiological studies linking exposure to pesticides and health effects. *EFSA Supporting Publications* 10, 159 pp.

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