

# Research Uncovers Another Compelling Reason to Get Enough Folate During Pregnancy

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## STORY AT-A-GLANCE

- › New research shows folate supplementation during pregnancy helps protect against lead's neurotoxic effects and reduce autistic-like behaviors in children exposed to lead during gestation
- › While synthetic folic acid supplements are safe when taken in the recommended dose, excessive regular intake (over 1 mg daily) could be harmful. Natural folate from foods like leafy greens is safer
- › Studies indicate that high folic acid combined with vitamin B12 deficiency negatively impacts brain development, affecting neural growth and network formation in developing brains
- › One in 3 children globally have dangerous blood lead levels above 5 micrograms per deciliter, which causes reduced IQ, shortened attention spans and organ damage
- › Reduce your lead exposure by checking your homes for lead paint, installing water filters, avoiding contaminated products and getting your blood lead levels tested regularly

Folate (vitamin B9) is an essential nutrient during pregnancy; in fact, women who are hoping to become pregnant are even advised to start getting enough folate, even before they conceive. It's vital for brain and spine development, helping reduce the risk of birth defects.<sup>1</sup>

New research, however, sheds light as to why you need to get enough folate during pregnancy – not only does it help mitigate the toxic effects of lead, but it also reduces autistic-like behaviors in children.

## **Folate Helps Protect Against Lead's Neurotoxic Effects**

An October 2024 study published in the Environmental Health Perspectives journal<sup>2</sup> found that supplementing with folic acid, a synthetic version of folate, during pregnancy helps mitigate lead's neurotoxic effects.

Researchers from the Simon Fraser University used data from a Canadian pregnancy and birth cohort study, called the Maternal-Infant Research on Environmental Chemicals study, which ran from 2008 to 2011.<sup>3</sup> According to the researchers:

*"We measured BLLs [blood lead levels] and plasma total folate concentrations during the first and third trimesters of pregnancy. We also estimated gestational FA supplementation via surveys and genotyped the maternal MTHFR 677C>T single nucleotide polymorphism (SNP)."*<sup>4</sup>

Using the Social Responsiveness Scale (SRS), a tool that documents autistic-like behaviors, they assessed the toddlers (ages 3 and 4) born to these women. The higher the SRS score, the more autistic-like behaviors detected.

They found that pregnant women who did not get the recommended amount of folate had more significant blood levels of lead and had children who had higher SRS scores – meaning they exhibited more autism behaviors – during their toddler years.<sup>5</sup>

*"[T]he association between gestational lead exposure and autistic-like behaviors in preschool-age children was stronger when gestational plasma total folate concentrations or FA supplementation were lower,"* said the study authors.

*"The benefits of prenatal FA supplementation for reducing the risk of a neural tube defect are well documented, and our results suggest that FA*

*supplementation during pregnancy may have additional benefits in mitigating the effects of lead exposure."*<sup>6</sup>

The link between autism and exposure to toxic heavy metals and pesticides has long been documented by previous studies. During pregnancy, the effects of these hazardous chemicals tend to be stronger when the expectant mother does not have sufficient levels of folate in her system.

*"Our work builds on a body of research that suggests that folate may be useful for mitigating the neurotoxic effects of chemicals,"* the researchers concluded.<sup>7</sup>

## **Folate Versus Folic Acid – What's the Difference?**

Take note that the featured study made use of folic acid, which is entirely different from folate. Folate is the nutrient that's naturally found in whole foods, including dark green leafy vegetables, fruits, beans and peas. Meanwhile, folic acid is a synthetic form of folate. It's found in many prenatal vitamins and fortified foods like pasta, bread, cornmeal, rice and cereal.<sup>8</sup>

The advice to take folic acid supplements began in the early 1990s, when U.S. health officials recommended women to take 400 micrograms of folic acid to reduce the risk of neural tube defects in babies.

However, since the neural tube closes early on during pregnancy – about 28 days after conception – some women miss the vulnerable period during which folate is critical. Hence, the U.S. Food and Drug Administration (FDA) began fortifying foods with folic acid in 1998.<sup>9</sup>

But while there's no health risk associated with getting too much folate from foods, the same cannot be said for folic acid, as too much of this synthetic nutrient has detrimental effects.

# High Folic Acid Supplementation Does Not Provide Added Benefits

The U.S. Centers for Disease Control and Prevention (CDC) claims that folic acid supplementation has helped reduce the cases of neural tube defects (NTDs) in babies, saying that "Since mandatory fortification began in 1998, about 1,300 babies are born each year without an NTD who might otherwise have been affected."

But while neural tube defects have declined, other health conditions have increased. The featured study also touches on this, stating that high folic acid supplementation, or around more than 1 milligram per day, did not have any extra benefit.<sup>10</sup>

In fact, they found that women with the highest folic acid levels actually showed a slightly stronger connection between their first-trimester blood lead levels and their children's autism-like behaviors. It shows that when it comes to this supplement, more isn't necessarily better – and could even be unsafe.

## Too Much Folic Acid Harms Brain Development

In 2023, researchers from UC Davis conducted an animal study<sup>11</sup> and found that excessive folic acid intake, along with vitamin B12 deficiency, leads to neurodevelopmental risks. Ralph Green, a professor from UC Davis' Department of Pathology and Laboratory Medicine and one of the study authors, said:

*"There's no doubt the introduction of folic acid diet fortification has been beneficial, substantially lowering the incidence of neural tube defects. However, too much folic acid may have detrimental impacts on brain development, and that's something we need to sort out."*<sup>12</sup>

Published in Communications Biology journal,<sup>13</sup> the study looked at how these two micronutrients affected brain development in test subjects. The researchers divided the subjects into five groups: a control group, a high folic acid group, a low B12 group, a high

folic acid + low B12 group and a group that was given a different form of folate supplement.

They found that the groups with high folic acid, low vitamin B12 or both experienced more altered brain development. In a UC Davis press release, Konstantinos Zarbalis, a professor of pathology and laboratory medicine and co-senior author, said:

*"With high levels of folic acid or B12 deficiency, there was a change in neural development. Cortical neurons that usually emerge during a later stage of brain development were produced over a longer period of time and required a longer period to settle in and assume their proper position in the developing brain. In addition, both high folic acid and B12 deficiency appear to cause many neurons to develop fewer interconnections."<sup>14</sup>*

Basically, high folate levels and low B12 levels affected their brain cells' growth and network formation. While the authors stress that animal models are different from humans, their findings could provide helpful insight as to how these two nutrients affect human biology.

*"Our findings point to neurodevelopmental risks associated with insufficient amounts of prenatal B12, particularly in association with high levels of FA intake, suggesting that the neurodevelopmental program is sensitive to an imbalance in the status of these interacting micronutrients."<sup>15</sup>*

## **Get Natural Folate Instead**

Interestingly, the animal study involved another type of folate supplement – folinic acid, or 5-formyltetrahydrofolate (5-FTHF). This natural folate supplement, even when given at the same dosage as folic acid, did not result in any adverse effects on the test subjects' brains.

*"[R]eplacing high amounts of FA by high amounts of 5-FTHF does not produce neurodevelopmental changes and milder folate cycle metabolic changes," the authors said.<sup>16</sup>*

Perhaps the reason for this is that folinic acid is a form of folate that's also naturally found in foods. When ingested, it is converted into other active forms of folate.<sup>17</sup> This highlights the importance of getting natural folate, and the best way to do this is by increasing your intake of folate-rich foods including:

Asparagus	Brussels sprouts	Broccoli
Spinach	Other dark green leafy vegetables	Peas
Beans	Bananas	Lemons
Oranges	Melon	Strawberries

In addition, you must boost your levels of vitamin B12, which is found almost exclusively in animal food sources. I recommend reading my article, "[Vitamin B12 Is Key for Optimal Tissue Regeneration](#)," for tips on improving your vitamin B12 status.

## 1 in 3 Children Now Have High Lead Levels

In the featured study, the researchers highlighted the risks of lead exposure, saying that although exposure is decreasing, there's still no safe threshold or safe level identified.

What's more, a significant number of children today (1 in 3) have dangerously high blood levels of lead — above 5 micrograms per deciliter (ug/dL). A report from UNICEF and Pure Earth also stressed that children worldwide are suffering from lead poisoning on a "massive and previously unknown scale."<sup>18</sup>

This is alarming because lead is a powerful neurotoxin. It's been associated with reduced IQ scores, shortened attention spans and even a higher risk of violent and criminal behavior later in life.<sup>19</sup>

Lead also damages your other organs, including the heart, lungs, kidneys and nervous system. Children under 5 years of age have the highest risk of suffering from its life-long

effects and, according to the World Health Organization (WHO), even blood lead concentrations as low as 3.5 ug/dL could lead to behavioral and neurological effects.<sup>20</sup>

## Strategies to Reduce Your Lead Exposure

Considering all these dire effects from this neurotoxin, it goes without saying that taking measures to reduce your and your child's lead exposure is vital. You must be aware of the common sources of lead to minimize your exposure, especially if you're pregnant or planning to get pregnant. Consider these strategies:

- **Check your home for lead paint** — If your home was constructed before 1978, have it inspected for any lead-based paint. A certified professional needs to do this, as the dust is highly toxic. See the U.S. EPA's "Lead-Based Paint Resources"<sup>21</sup> for more information.
- **Have your water tested** — Millions of old water service lines in the U.S. are made with lead and could be bringing contaminated water in your home daily. I recommend installing a high-quality whole-house water filter that's rated for lead removal.

Ideally, filter the water at the point of entry into your home, which is the main water supply line, and at points of use, meaning your kitchen and bathroom sinks and showers. Always use filtered water for drinking, cooking or mixing infant formula.

- **Avoid lead-tainted household objects** — Children's toys, cosmetics and pottery are some products in your home that could be tainted with lead. For more information about lead-containing products and recalls, check out the Consumer Products Safety Commission's website.<sup>22</sup>
- **Have your and your children's blood lead levels tested** — If you live in an older home, your children must be tested at ages 1 and 2, and again at ages 3 and 4. It's also advisable to have them tested whenever there's concern about exposure. If you have heart disease, make sure to get tested for lead. Having a level of 3.5 mcg/dL or higher is considered a risk factor.<sup>23</sup>

If you have elevated levels, you need to carefully eliminate it from your body to avoid doing more harm in the process. One strategy is to use N-acetylcysteine (NAC), a glutathione precursor that helps with detoxification.

## Sources and References

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