



MTHFR Gene and Nitrous Oxide

MTHFR (methylenetetrahydrofolate reductase) is an enzyme that plays an important role in many of the body's processes involving folate (also known as folic acid). Most people have a normal amount of this enzyme. However, a very small percentage of the population has a decreased amount, which means they have a reduced ability to convert vitamin B12 to folate and to convert homocysteine to methionine.

Nitrous oxide can also interfere with how MTHFR works. Because of this, people with lower levels of MTHFR may, in theory, react more strongly to nitrous oxide. That said, there is only one reported case worldwide — from 1987 — involving an infant with a family history of severe, complex medical issues who received a 4.5-hour anesthetic with nitrous oxide. That case may have been associated with complications after surgery.

More recent studies in children have shown only a very small effect, and only when they were exposed to high concentrations of nitrous oxide for more than two hours. With millions of children receiving anesthesia every year, there have been no additional reports linking nitrous oxide directly to problems.

It's also important to know that the amount of nitrous oxide used in dental sedation is far less than what is used in an operating room. In dentistry, nitrous oxide — often called "magic air," "silly air," or even "candy-flavored air" — is given through a special mask to help your child relax or fall asleep before placing an IV. The dose used is much smaller and is not expected to affect MTHFR or related chemical processes.

If you have further questions, be sure to talk to the anesthesiologist caring for your child. And remember, many articles online make dramatic claims about nitrous oxide and MTHFR without solid scientific evidence. When reading these, look closely for direct patient data — and always discuss any concerns with your anesthesiologist.

Nitrous Oxide and Autism

MTHFR (methylenetetrahydrofolate reductase) is an enzyme that plays an important role in many of the body's processes involving folate (also known as folic acid). Most people have a normal amount of this enzyme. However, a very small percentage of the population has a decreased amount, which means they have a reduced ability to convert vitamin B12 to folate and to convert homocysteine to methionine.

Nitrous oxide can also interfere with how MTHFR works. Because of this, people with lower levels of MTHFR may, in theory, react more strongly to nitrous oxide. That said, there is only one reported case worldwide — from 1987 — involving an infant with a family history of severe, complex medical issues who received a 4.5-hour anesthetic with nitrous oxide. That case may have been associated with complications after surgery.

More recent studies in children have shown only a very small effect, and only when they were exposed to high concentrations of nitrous oxide for more than two hours. With millions of children receiving anesthesia every year, there have been no additional reports linking nitrous oxide directly to problems.

It's also important to know that the amount of nitrous oxide used in dental sedation is far less than what is used in an operating room. In dentistry, nitrous oxide — often called "magic air," "silly air," or even "candy-flavored air" — is given through a special mask to help your child relax or fall asleep before placing an IV. The dose used is much smaller and is not expected to affect MTHFR or related chemical processes.

If you have further questions, be sure to talk to the anesthesiologist caring for your child. And remember, many articles online make dramatic claims about nitrous oxide and MTHFR without solid scientific evidence. When reading these, look closely for direct patient data — and always discuss any concerns with your anesthesiologist.

References

1. Becker, D. E., & Rosenberg, M. B. (2008). *Nitrous Oxide and the Inhalation Anesthetics*. *Anesthesia Progress*, 55(4), 124–130.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2614651/>
 - Notes that the maximum nitrous oxide concentration achievable with a dental mask is typically **30–50%**.
2. American Academy of Pediatric Dentistry (AAPD). (2023). *Guideline on Use of Nitrous Oxide for Pediatric Dental Patients*.
https://www.aapd.org/media/policies_guidelines/g_nitrous.pdf
 - Recommends that nitrous oxide concentrations for analgesia/anxiolysis generally **not exceed 50%** and provides detailed safety protocols for pediatric use.
3. Nagele, P., Zeugswetter, B., Wiener, C., Burger, H., Hüpfel, M., Mittlböck, M., & Födinger, M. (2008). *Influence of Methylenetetrahydrofolate Reductase Gene Polymorphisms on Homocysteine Concentrations after Nitrous Oxide Anesthesia*. *Anesthesiology*, 109(1), 36–43. <https://doi.org/10.1097/ALN.0b013e318178820b>
 - Explores how MTHFR gene variants can influence homocysteine levels following nitrous oxide exposure.
4. Autism Speaks. (2014). *Is it safe to sedate our son during his dental appointment?*
<https://www.autismspeaks.org/blog/2014/01/10/it-safe-sedate-our-son-during-his-dental-appointment>
 - Provides parent-focused discussion of nitrous oxide and autism, emphasizing the lack of direct clinical evidence of harm.