

Meat, egg and dairy products necessary for brain development

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The deficiency of Asparagine synthetase caused by rare genetic disorder affects normal development of the human brain, researchers at the University of Montreal have discovered. This synthetase is naturally found in meat, eggs and dairy products.

As Asparagine is naturally produced by the human body, it was considered non-essential until now. However, researchers at the University of Montreal and its affiliated CHU Sainte-Justine Hospital have made a startling discovery that the amino acid plays a key role in normal brain development.

“The cells of the body can do without it because they use Asparagine provided through diet components including meat, eggs and dairy products. But it is not well transported to the brain via the blood-brain barrier,” senior co-author of the study Dr. Jacques Michaud stated.

In April 2009, a Quebec family experienced dismal tragedy as their year-old infant died of a rare genetic disorder which caused congenital microcephaly, intellectual disability, cerebral atrophy, and refractory seizures. The event was more tragic because it was Quebec family's third infant to die from the same disease in the same manner.

This led Dr. Michaud to discover the genetic abnormality responsible for this developmental disorder.

The team identified the gene affected by the mutation code for asparagine synthetase, the enzyme responsible for synthesising the amino acid asparagine.

Explaining why the disease hits in some individuals, Dr. Michaud says, “In healthy subjects, it seems that the level of asparagine synthetase in the brain is sufficient to supply neurons but in individuals having the disability, the enzyme is not produced in sufficient quantity, and the resulting asparagine depletion affects the proliferation and survival of cells during brain development.”

The potential solution is that knowledge about gene mutations can be used to develop treatments.

“The results not only open the door to a better understanding of the disease but they also give us valuable information about the molecular mechanisms involved in brain development, which is important for development of new treatments to cure the disease”, Dr. Michaud added.

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