Ornithine transcarbamylase deficiency


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Ornithine Transcarbamylase Deficiency (OTCD) is caused by a mutation in the gene encoding ornithine transcarbamylase enzyme. Originally documented in 1962 in two female cousins, who failed to thrive and had increased ammonia levels in the blood. Estimated to be present at a frequency of 1/14,000 to 1/77,000. More common and severe in males. Typically diagnosed in newborns but can present at any time in life.
Genetics: OTCD is a X-linked, recessive disease

- It is unlikely for a female to have two mutated X chromosomes, so females usually still have a source for functional protein and have less severe symptoms.
- If males have their X chromosome mutated, they have no way of making up for the deficiency and their symptoms are usually much more severe than for females.

[Diagram showing genetic relationships and inheritance patterns for carriers and affected individuals.]

X-linked Inheritance

Biochemical Features

- Converting ammonia to urea requires five different enzymes, which assist chemical reactions in the body.

- One of these enzymes is ornithine transcarbamylase.

- A deficiency in ornithine transcarbamylase is a roadblock in the urea cycle and causes a buildup of ammonia.

Other symptoms include:

- Difficulty breathing, sweating, and convulsions
- High levels of ammonia cause liver malfunction, leading to brain damage during what is called an encephalopathic episode
Secondary DNA sequencing to find the OTCD-associated mutation

Newborn screening

Identifying a buildup of ammonia and carbamoyl phosphate as well as a depletion of arginine and citrulline


Secondary DNA sequencing to find the OTCD-associated mutation

Digital image retrieved Oct. 23, 2018 from jamanetwork.com/journals/jamapediatrics/fullarticle/2525944
Prognosis

- Dietary restriction of protein
- May experience cognitive impairment
- Encephalopathic episodes can lead to coma and brain damage
- Late onset males have less severe symptoms and a longer life expectancy than males diagnosed at birth

- Dietary restriction of protein
- May experience cognitive impairment
- Encephalopathic episodes can lead to coma and brain damage
- Higher chance of survival compared to males
- Varying quality of life based on level of enzyme activity
Therapy

- Low protein diet together with dietetic support as nutrition requirements change throughout human growth and development
- Supplemental arginine, sodium benzoate, and phenylbutyrate to help remove excess nitrogen from the body
- Liver transplantation, if necessary

Protein content in three types of meals
Support and Resources

Read Brooke's Story
Sodium Benzoate – Possible Medication
Low-Protein Diet: Tips and Tricks
Children with Metabolic Disease Support Group
National Urea Cycle Disorders Foundation
About Newborn Screening
More Information About the Urea Cycle

*Click on the links!
# Our Teams

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