X-linked agammaglobulinemia

Description

X-linked agammaglobulinemia (XLA) is a condition that affects the immune system and occurs almost exclusively in males. It is part of a group of disorders called primary immunodeficiencies (or inborn errors of immunity), in which part of the immune system does not function as it should. People with XLA have very few B cells, which are specialized white blood cells that help protect the body against infection. B cells can mature into the cells that produce special proteins called antibodies or immunoglobulins. Antibodies attach to specific foreign particles and germs, marking them for destruction. Individuals with XLA are more susceptible to infections because their body makes very few antibodies.

Children with XLA are usually healthy for the first 1 or 2 months of life because they are protected by antibodies acquired before birth from their mother. After this time, the maternal antibodies are cleared from the body, and the affected child begins to develop recurrent infections. .cf0{font-style:italic;font-family:Segoe UI;font-size:9pt;}Children with XLA generally take longer to recover from infections, and infections often occur again, even in children who are taking antibiotic medications.

The most common bacterial infections that occur in people with XLA are lung infections (pneumonia and bronchitis), ear infections (otitis), pink eye (conjunctivitis), and sinus infections (sinusitis). Infections that cause chronic diarrhea are also common. Recurrent infections can lead to organ damage. .cf0{font-style:italic;font-family:Segoe UI;font-size:9pt;}Treatments that replace antibodies can help prevent infections, improving the quality of life for people with XLA.

Frequency

XLA occurs in approximately 1 in 200,000 newborns.

Causes

Variants (also called mutations) in the *BTK* gene cause XLA. This gene provides instructions for making the BTK protein, which is important for the development of B cells and normal functioning of the immune system. Most variants in the *BTK* gene prevent the production of any BTK protein. The absence of functional BTK protein blocks B cell development and leads to a lack of antibodies. Without antibodies, the

immune system cannot properly respond to foreign invaders and prevent infection.

Learn more about the gene associated with X-linked agammaglobulinemia

- BTK

Inheritance

This condition is inherited in an X-linked recessive pattern. The gene associated with this condition is located on the X chromosome, which is one of the two sex chromosomes. In males (who have only one X chromosome), one altered copy of the gene in each cell is sufficient to cause the condition. In females (who have two X chromosomes), a variant would have to occur in both copies of the gene to cause the disorder. Because it is unlikely that females will have two altered copies of this gene, males are affected by X-linked recessive disorders much more frequently than females.

An affected person's mother may carry one altered copy of the *BTK* gene. Individuals with only one altered copy of this gene do not have the immune system abnormalities associated with XLA, but they can pass the altered gene to their children. Fathers cannot pass X-linked traits to their sons, but they can pass them to their daughters.

About half of affected individuals do not have a family history of XLA. In most of these cases, the affected individual has a new variant in the *BTK* gene that was not inherited from a parent.

Other Names for This Condition

- Agammaglobulinemia
- Bruton's agammaglobulinemia
- Congenital agammaglobulinemia
- Hypogammaglobulinemia

Additional Information & Resources

Genetic Testing Information

- Genetic Testing Registry: X-linked agammaglobulinemia (https://www.ncbi.nlm.nih.gov/gtr/conditions/C0221026/)

Genetic and Rare Diseases Information Center

- X-linked agammaglobulinemia (https://rarediseases.info.nih.gov/diseases/1033/index)

Patient Support and Advocacy Resources

- National Organization for Rare Disorders (NORD) (https://rarediseases.org/)

Clinical Trials

- ClinicalTrials.gov (https://clinicaltrials.gov/search?cond=%22X-linked agammaglobulinemia%22)

Catalog of Genes and Diseases from OMIM

- AGAMMAGLOBULINEMIA, X-LINKED; XLA (https://omim.org/entry/300755)

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28X-linked+agammaglobulinemia%5BTIAB%5D%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+1080+days%22%5Bdp%5D)

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Last updated March 17, 2023