Lenz microphthalmia syndrome

Lenz microphthalmia syndrome is a condition characterized by abnormal development of the eyes and several other parts of the body. It occurs almost exclusively in males.

The eye abnormalities associated with Lenz microphthalmia syndrome can affect one or both eyes. People with this condition are born with eyeballs that are abnormally small (microphthalmia) or absent (anophthalmia), leading to vision loss or blindness. Other eye problems can include clouding of the lens (cataract), involuntary eye movements (nystagmus), a gap or split in structures that make up the eye (coloboma), and a higher risk of an eye disease called glaucoma.

Abnormalities of the ears, teeth, hands, skeleton, and urinary system are also frequently seen in Lenz microphthalmia syndrome. Less commonly, heart defects have been reported in affected individuals. Many people with this condition have delayed development or intellectual disability ranging from mild to severe.

Frequency

Lenz microphthalmia syndrome is a very rare condition; its incidence is unknown. It has been identified in only a few families worldwide.

Causes

Mutations in at least two genes on the X chromosome are thought to be responsible for Lenz microphthalmia syndrome. Only one of these genes, BCOR, has been identified.

The BCOR gene provides instructions for making a protein called the BCL6 corepressor. This protein helps regulate the activity of other genes. Little is known about the protein's function, although it appears to play an important role in early embryonic development. A mutation in the BCOR gene has been found in one family with Lenz microphthalmia syndrome. This mutation changes the structure of the BCL6 corepressor protein, which disrupts the normal development of the eyes and several other organs and tissues before birth.

Researchers are working to determine whether Lenz microphthalmia syndrome is a single disorder with different genetic causes or two very similar disorders, each caused by mutations in a different gene. They are searching for a second gene on the X chromosome that may underlie additional cases of the disorder.

Inheritance Pattern

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 mutation 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. A characteristic of X-linked inheritance is that fathers cannot pass X-linked traits to their sons.

Other Names for This Condition
- Lenz dysmorphogenic syndrome
- Lenz dysplasia
- Lenz syndrome
- MAA
- MCOPS1
- microphthalmia or anophthalmos with associated anomalies
- microphthalmia, syndromic 1

Diagnosis & Management

Genetic Testing Information
- What is genetic testing? /primer/testing/genetictesting

Research Studies from ClinicalTrials.gov
- ClinicalTrials.gov https://clinicaltrials.gov/ct2/results?cond=%22Eye+Diseases%2C+Hereditary+%22+OR+%22Lenz+microphthalmia+syndrome%22

Other Diagnosis and Management Resources

Additional Information & Resources
- Health Information from MedlinePlus
  - Health Topic: Eye Diseases https://medlineplus.gov/eyediseases.html
Genetic and Rare Diseases Information Center

- Lenz microphthalmia syndrome

Additional NIH Resources

- National Eye Institute: Facts About Anophthalmia and Microphthalmia
  https://nei.nih.gov/health/anoph/

Educational Resources

- MalaCards: microphthalmia, syndromic 1
  https://www.malacards.org/card/microphthalmia_syndromic_1
- Orphanet: Microphthalmia, Lenz type
  https://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=568

Patient Support and Advocacy Resources

- American Foundation for the Blind
  https://www.afb.org/
- Microphthalmia, Anophthalmia and Coloboma Support
  https://macs.org.uk/
- National Organization for Rare Disorders (NORD)
  https://rarediseases.org/rare-diseases/lenz-microphthalmia-syndrome/
- Resource list from the University of Kansas Medical Center
  http://www.kumc.edu/gec/support/anopthal.html

Clinical Information from GeneReviews

- Lenz Microphthalmia Syndrome
  https://www.ncbi.nlm.nih.gov/books/NBK1521

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28lenz+microphthalmia+syndrome%5BTA%5D%29%29+OR+%28lenz+microphthalmia%5BTA%5D%29%29+OR+%28lenz+dysplasia%5BTA%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22+AND+english%5Bla%5D+AND+human%5Bmh%5D

Catalog of Genes and Diseases from OMIM

- MICROPHTHALMIA, SYNDROMIC 1
  http://omim.org/entry/309800
Sources for This Summary

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/11426460

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/12116202

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/15004558

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/20301694

Reprinted from Genetics Home Reference:

Reviewed: May 2008
Published: August 20, 2019

Lister Hill National Center for Biomedical Communications
U.S. National Library of Medicine
National Institutes of Health
Department of Health & Human Services