Cyclic neutropenia

Description

Cyclic neutropenia is a disorder that causes frequent infections and other health problems in affected individuals. People with this condition have recurrent episodes of neutropenia during which there is a shortage (deficiency) of neutrophils. Neutrophils are a type of white blood cell that plays a role in inflammation and in fighting infection. The episodes of neutropenia are apparent at birth or soon afterward. For most affected individuals, neutropenia recurs every 21 days and lasts about 3 to 5 days.

Neutropenia makes it more difficult for the body to fight off pathogens such as bacteria and viruses, so people with cyclic neutropenia typically develop recurrent infections of the sinuses, respiratory tract, and skin. Additionally, people with this condition often develop open sores (ulcers) in the mouth and colon, inflammation of the throat (pharyngitis) and gums (gingivitis), recurrent fever, or abdominal pain. People with cyclic neutropenia have these health problems only during episodes of neutropenia. At times when their neutrophil levels are normal, they are not at an increased risk of infection and inflammation.

Frequency

Cyclic neutropenia is a rare condition and is estimated to occur in 1 in 1 million individuals worldwide.

Causes

Mutations in the *ELANE* gene cause cyclic neutropenia. The *ELANE* gene provides instructions for making a protein called neutrophil elastase, which is found in neutrophils. When the body starts an immune response to fight an infection, neutrophils release neutrophil elastase. This protein then modifies the function of certain cells and proteins to help fight the infection.

ELANE gene mutations that cause cyclic neutropenia lead to an abnormal neutrophil elastase protein that seems to retain some of its function. However, neutrophils that produce abnormal neutrophil elastase protein appear to have a shorter lifespan than normal neutrophils. The shorter neutrophil lifespan is thought to be responsible for the cyclic nature of this condition. When the affected neutrophils die early, there is a period in which there is a shortage of neutrophils because it takes time for the body to

replenish its supply.

Learn more about the gene associated with Cyclic neutropenia

- ELANE

Inheritance

Cyclic neutropenia is inherited in an autosomal dominant pattern, which means one copy of the altered gene in each cell is sufficient to cause the disorder.

In most cases, an affected person inherits the mutation from one affected parent. Other cases result from new mutations in the gene and occur in people with no history of the disorder in their family.

Other Names for This Condition

- Cyclic hematopoesis
- Cyclic leucopenia
- Periodic neutropenia

Additional Information & Resources

Genetic Testing Information

- Genetic Testing Registry: Cyclical neutropenia (https://www.ncbi.nlm.nih.gov/gtr/conditions/C0221023/)

Genetic and Rare Diseases Information Center

- Cyclic neutropenia (https://rarediseases.info.nih.gov/diseases/6229/index)

Patient Support and Advocacy Resources

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

Clinical Trials

- ClinicalTrials.gov (https://clinicaltrials.gov/search?cond=%22Cyclic neutropenia%22)

Catalog of Genes and Diseases from OMIM

- CYCLIC NEUTROPENIA (https://omim.org/entry/162800)

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28Neutropenia%5BMAJR%5D%29+AND+%28cyclic+neutropenia%5BTIAB%5D%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D)

References

- Bellanne-Chantelot C, Clauin S, Leblanc T, Cassinat B, Rodrigues-Lima F,Beaufils S, Vaury C, Barkaoui M, Fenneteau O, Maier-Redelsperger M, Chomienne C, Donadieu J. Mutations in the ELA2 gene correlate with more severe expression ofneutropenia: a study of 81 patients from the French Neutropenia Register. Blood. 2004 Jun 1;103(11):4119-25. doi: 10.1182/blood-2003-10-3518. Epub 2004 Feb 12. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/14962902)
- Germeshausen M, Deerberg S, Peter Y, Reimer C, Kratz CP, Ballmaier M. Thespectrum of ELANE mutations and their implications in severe congenital andcyclic neutropenia. Hum Mutat. 2013 Jun;34(6):905-14. doi: 10.1002/humu.22308.Epub 2013 Apr 2. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/23463630)
- Horwitz MS, Duan Z, Korkmaz B, Lee HH, Mealiffe ME, Salipante SJ. Neutrophilelastase in cyclic and severe congenital neutropenia. Blood. 2007 Mar1; 109(5):1817-24. doi: 10.1182/blood-2006-08-019166. Epub 2006 Oct 19. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/17053055) or Free article on PubMed Central (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1801070/)
- Makaryan V, Zeidler C, Bolyard AA, Skokowa J, Rodger E, Kelley ML, Boxer LA, Bonilla MA, Newburger PE, Shimamura A, Zhu B, Rosenberg PS, Link DC, Welte K, Dale DC. The diversity of mutations and clinical outcomes for ELANE-associatedneutropenia. Curr Opin Hematol. 2015 Jan;22(1):3-11. doi:10.1097/MOH.0000000000000105. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/25427142) or Free article on PubMed Central (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4380169/)
- Sera Y, Kawaguchi H, Nakamura K, Sato T, Habara M, Okada S, Ishikawa N, KojimaS, Katoh O, Kobayashi M. A comparison of the defective granulopoiesis inchildhood cyclic neutropenia and in severe congenital neutropenia. Haematologica. 2005 Aug;90(8):1032-41. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/16079102)
- Skokowa J, Dale DC, Touw IP, Zeidler C, Welte K. Severe congenitalneutropenias. Nat Rev Dis Primers. 2017 Jun 8;3:17032. doi: 10.1038/nrdp.2017.32. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/28593997)

Last updated October 1, 2018