17q12 duplication

17q12 duplication is a chromosomal change in which a small piece of chromosome 17 is copied (duplicated) abnormally in each cell. The duplication occurs on the long (q) arm of the chromosome at a position designated q12.

Signs and symptoms related to 17q12 duplications vary significantly, even among members of the same family. Some individuals with the duplication have no apparent signs or symptoms, or the features are very mild. Other individuals can have intellectual disability, delayed development, and a wide range of physical abnormalities.

Intellectual and learning ability in people with 17q12 duplications ranges from normal to severely impaired. Many affected individuals have delayed development, particularly involving speech and language skills and gross motor skills such sitting, standing, and walking. Seizures are also common. Behavioral and psychiatric conditions that have been reported in people with 17q12 duplications include autism spectrum disorder (which affects social interaction and communication), schizophrenia, aggression, and self-injury. About half of affected individuals have an unusually small head (microcephaly).

Less commonly, 17q12 duplications have been associated with abnormalities of the eyes, heart, kidneys, and brain. Some individuals with this chromosomal change have subtle differences in facial features, although these are not consistent.

Frequency

17q12 duplications appear to be uncommon. Several dozen people with this chromosomal change have been described in the medical literature.

Causes

Most people with 17q12 duplications have an extra copy of about 1.4 million DNA building blocks (base pairs), also written as 1.4 megabases (Mb), at position q12 on chromosome 17. This duplication affects one of the two copies of chromosome 17 in each cell.

The duplicated segment is surrounded by short, repeated sequences of DNA that make the segment prone to rearrangement during cell division. The rearrangement can lead to extra or missing copies of DNA at 17q12. (A missing copy of this segment causes a related chromosomal condition called 17q12 deletion syndrome.)

The segment of 17q12 that is most commonly duplicated includes at least 15 genes. It is unclear which of these genes, when present in more than one copy, contribute to intellectual disability, delayed development, and the other signs and symptoms described above. Because some people with a 17q12 duplication have no obvious
intellectual or physical problems, researchers suspect that additional genetic factors may influence whether a person has signs and symptoms related to the chromosomal change.

Inheritance Pattern

17q12 duplications have an autosomal dominant pattern of inheritance, which means one copy of the duplication in each cell is sufficient to cause the signs and symptoms. Most 17q12 duplications are inherited from a parent. In these cases, the parent most often has only mild signs and symptoms or no related features at all. Less commonly, 17q12 duplications represent a new (de novo) chromosomal change and occur in people with no history of the duplication in their family.

Other Names for This Condition

• 17q12 duplication syndrome
• 17q12 microduplication
• 17q12 microduplication syndrome
• 17q12 recurrent duplication
• chromosome 17q12 duplication syndrome
• recurrent duplication of 17q12

Diagnosis & Management

Genetic Testing Information

• What is genetic testing?
/primer/testing/genetictesting
• Genetic Testing Registry: Chromosome 17q12 duplication syndrome

Other Diagnosis and Management Resources

• GeneReview: 17q12 Recurrent Duplication
https://www.ncbi.nlm.nih.gov/books/NBK344340

Additional Information & Resources

Health Information from MedlinePlus

• Encyclopedia: Autism Spectrum Disorder
https://medlineplus.gov/ency/article/001526.htm
• Encyclopedia: Microcephaly
https://medlineplus.gov/ency/article/003272.htm
• Encyclopedia: Schizophrenia
  https://medlineplus.gov/ency/article/000928.htm

• Health Topic: Developmental Disabilities
  https://medlineplus.gov/developmentaldisabilities.html

• Health Topic: Seizures
  https://medlineplus.gov/seizures.html

• Health Topic: Speech and Language Problems in Children
  https://medlineplus.gov/speechandlanguageproblemsinchildren.html

Additional NIH Resources
• National Human Genome Research Institute: Chromosome Abnormalities
  https://www.genome.gov/11508982/

Educational Resources
• MalaCards: 17q12 recurrent duplication
  https://www.malacards.org/card/17q12_recurrent_duplication

• Orphanet: 17q12 microduplication syndrome
  https://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=261272

• Unique: 17q12 Microduplications
  https://www.rarechromo.org/media/information/Chromosome%202017/17q12%20microduplications%20FTNW.pdf

Patient Support and Advocacy Resources
• Chromosome Disorder Outreach
  https://chromodisorder.org/

• National Alliance on Mental Illness
  https://www.nami.org/

• The Arc: For People with Intellectual and Developmental Disabilities
  https://www.thearc.org/

• Unique: The Rare Chromosome Disorder Support Group (UK)
  https://www.rarechromo.org/

Clinical Information from GeneReviews
• 17q12 Recurrent Duplication
  https://www.ncbi.nlm.nih.gov/books/NBK344340
Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%2817q12%5BTIAB%5D%29+AND+%28%28duplication%5BTIAB%5D%29+OR+%28microduplication%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D

Catalog of Genes and Diseases from OMIM

- CHROMOSOME 17q12 DUPLICATION SYNDROME
  http://omim.org/entry/614526

Sources for This Summary

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/25691423

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/23307502

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/26925472
  Free article on PubMed Central: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2265663/

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/17924346
  Free article on PubMed Central: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2265663/

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/26420380
  Free article on PubMed Central: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2987224/

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/19844256
  Free article on PubMed Central: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2987224/
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/27409573

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/16906162

Reprinted from Genetics Home Reference: 
https://ghr.nlm.nih.gov/condition/17q12-duplication

Reviewed: April 2017
Published: January 8, 2019

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