

Auriculo-condylar Syndrome

Subjects: **Genetics & Heredity**

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Auriculo-condylar syndrome is a condition that affects facial development, particularly development of the ears and lower jaw (mandible).

genetic conditions

1. Introduction

Most people with auriculo-condylar syndrome have malformed outer ears ("auriculo-" refers to the ears). A hallmark of this condition is an ear abnormality called a "question-mark ear," in which the ears have a distinctive question-mark shape caused by a split that separates the upper part of the ear from the earlobe. Other ear abnormalities that can occur in auriculo-condylar syndrome include cupped ears, ears with fewer folds and grooves than usual (described as "simple"), narrow ear canals, small skin tags in front of or behind the ears, and ears that are rotated backward. Some affected individuals also have hearing loss.

Abnormalities of the mandible are another characteristic feature of auriculo-condylar syndrome. These abnormalities often include an unusually small chin (micrognathia) and malfunction of the temporomandibular joint (TMJ), which connects the lower jaw to the skull. Problems with the TMJ affect how the upper and lower jaws fit together and can make it difficult to open and close the mouth. The term "condylar" in the name of the condition refers to the mandibular condyle, which is the upper portion of the mandible that forms part of the TMJ.

Other features of auriculo-condylar syndrome can include prominent cheeks, an unusually small mouth (microstomia), differences in the size and shape of facial structures between the right and left sides of the face (facial asymmetry), and an opening in the roof of the mouth (cleft palate). These features vary, even among affected members of the same family.

2. Frequency

Auriculo-condylar syndrome appears to be a rare disorder. More than two dozen affected individuals have been described in the medical literature.

3. Causes

Auriculo-condylar syndrome can be caused by mutations in either the *GNAI3* or *PLCB4* gene. These genes provide instructions for making proteins that are involved in chemical signaling within cells. They help transmit information from outside the cell to inside the cell, which instructs the cell to grow, divide, or take on specialized functions.

Studies suggest that the proteins produced from the *GNAI3* and *PLCB4* genes contribute to the development of the first and second pharyngeal arches, which are structures in the embryo that ultimately develop into the jawbones, facial muscles, middle ear bones, ear canals, outer ears, and related tissues. Mutations in these genes alter the formation of the lower jaw: instead of developing normally, the lower jaw becomes shaped more like the smaller upper jaw (maxilla). This abnormal shape leads to micrognathia and problems with TMJ function. Researchers are working to determine how mutations in these genes lead to the other developmental abnormalities associated with auriculo-condylar syndrome.

In some people with the characteristic features of auriculo-condylar syndrome, a mutation in the *GNAI3* or *PLCB4* gene has not been found. The cause of the condition is unknown in these individuals.

3.1 The genes associated with Auriculo-condylar syndrome

- *GNAI3*
- *PLCB4*

4. Inheritance

This condition is inherited in an autosomal dominant pattern, which means one copy of the altered gene in each cell is typically sufficient to cause the disorder. In some 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.

Some people who have one altered copy of the *GNAI3* or *PLCB4* gene have no features related to auriculo-condylar syndrome. (This situation is known as reduced penetrance.) It is unclear why some people with a mutated gene develop the condition and other people with a mutated gene do not.

5. Other Names for This Condition

- auriculocondylar syndrome
- dysgnathia complex
- question-mark ear syndrome

References

1. Gordon CT, Vuillot A, Marlin S, Gerkes E, Henderson A, AlKindy A, Holder-Espinasse M, Park SS, Omarjee A, Sanchis-Borja M, Bdira EB, Oufadem M, Sikkema-Raddatz B, Stewart A, Palmer R, McGowan R, Petit F, Delobel B, Speicher MR, Aurora P, Kilner D, Pellerin P, Simon M, Bonnefont JP, Tobias ES, García-Miñaur S, Bitner-Glindzicz M, Lindholm P, Meijer BA, Abadie V, Denoyelle F, Vazquez MP, Rotky-Fast C, Couloigner V, Pierrot S, Manach Y, Breton S, Hendriks YM, Munnich A, Jakobsen L, Kroisel P, Lin A, Kaban LB, Basel-Vanagaite L, Wilson L, Cunningham ML, Lyonnet S, Amiel J. Heterogeneity of mutational mechanisms and modes of inheritance in auriculocondylar syndrome. *J Med Genet.* 2013 Mar;50(3):174-86. doi: 10.1136/jmedgenet-2012-101331.
2. Guion-Almeida ML, Kokitsu-Nakata NM, Zechi-Ceide RM, Vendramini S. Auriculo-condylar syndrome: further evidence for a new disorder. *Am J Med Genet.* 1999 Sep 10;86(2):130-3.
3. Guion-Almeida ML, Zechi-Ceide RM, Vendramini S, Kokitsu-Nakata NM. Auriculo-condylar syndrome: additional patients. *Am J Med Genet.* 2002 Oct 1;112(2):209-14.
4. Masotti C, Oliveira KG, Poerner F, Splendore A, Souza J, Freitas Rda S, Zechi-Ceide R, Guion-Almeida ML, Passos-Bueno MR. Auriculo-condylar syndrome: mapping of a first locus and evidence for genetic heterogeneity. *Eur J Hum Genet.* 2008 Feb;16(2):145-52.
5. McGowan R, Murday V, Kinning E, Garcia S, Koppel D, Whiteford M. Novel features in auriculo-condylar syndrome. *Clin Dysmorphol.* 2011 Jan;20(1):1-10. doi: 10.1097/MCD.0b013e32833e56f5.
6. Rieder MJ, Green GE, Park SS, Stamper BD, Gordon CT, Johnson JM, Cunniff CM, Smith JD, Emery SB, Lyonnet S, Amiel J, Holder M, Heggie AA, Bamshad MJ, Nickerson DA, Cox TC, Hing AV, Horst JA, Cunningham ML. A human homeotic transformation resulting from mutations in *PLCB4* and *GNAI3* causes auriculocondylar syndrome. *Am J Hum Genet.* 2012 May 4;90(5):907-14. doi:10.1016/j.ajhg.2012.04.002. Erratum in: *Am J Hum Genet.* 2012 Aug 10;91(2):397. *Am J Hum Genet.* 2012 Jun 8;90(6):1116.
7. Storm AL, Johnson JM, Lammer E, Green GE, Cunniff C. Auriculo-condylar syndrome is associated with highly variable ear and mandibular defects in multiple kindreds. *Am J Med Genet A.* 2005 Oct 1;138A(2):141-5. Review.

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