Rubinstein-Taybi syndrome

Description

Rubinstein-Taybi syndrome is a condition characterized by short stature, moderate to severe intellectual disability, distinctive facial features, and broad thumbs and first toes. Additional features of the disorder can include eye abnormalities, heart and kidney defects, dental problems, and obesity. These signs and symptoms vary among affected individuals. People with this condition have an increased risk of developing particular types of noncancerous brain and skin tumors.

Frequency

Rubinstein-Taybi syndrome is uncommon; it occurs in an estimated 1 in 100,000 to 125,000 newborns.

Causes

Mutations in the *CREBBP* gene cause about half of cases of Rubinstein-Taybi syndrome. The *CREBBP* gene provides instructions for making a protein that helps control the activity of many other genes. This protein, called CREB binding protein, plays an important role in regulating cell growth and division and is essential for normal development before birth. Because one copy of the *CREBBP* gene is deleted or mutated in people with Rubinstein-Taybi syndrome, their cells make only half of the normal amount of CREB binding protein. A reduction in the amount of this protein disrupts normal development before and after birth. Abnormal brain development is thought to underlie intellectual disability in people with Rubinstein-Taybi syndrome. Researchers have not determined how *CREBBP* gene mutations lead to other signs and symptoms of Rubinstein-Taybi syndrome.

Mutations in the *EP300* gene cause a small percentage of cases of Rubinstein-Taybi syndrome. Like the *CREBBP* gene, this gene provides instructions for making a protein that helps control the activity of other genes. It also appears to be important for development before and after birth. *EP300* gene mutations result in the loss of one functional copy of the gene in each cell, which interferes with normal development and causes the typical features of Rubinstein-Taybi syndrome. The signs and symptoms of this disorder caused by *EP300* gene mutations are typically milder than those caused by mutations in the *CREBBP* gene.

Several cases of severe Rubinstein-Taybi syndrome have resulted from a deletion of genetic material from the short (p) arm of chromosome 16. Multiple genes, including the *CREBBP* gene, are missing as a result of this deletion. Researchers believe that the loss of multiple genes in this region probably accounts for the serious complications associated with severe Rubinstein-Taybi syndrome. Some researchers suggest that these cases are a separate condition called chromosome 16p13.3 deletion syndrome. However, a few studies indicate that some people with large deletions in the same region of chromosome 16 have characteristic features of Rubinstein-Taybi syndrome rather than a more severe condition.

Nearly 30 to 40 percent of people with Rubinstein-Taybi syndrome do not have an identified mutation in the *CREBBP* or *EP300* gene or a chromosome 16 deletion. The cause of the condition is unknown in these cases. Researchers predict that mutations in other genes can also cause the disorder.

Learn more about the genes and chromosome associated with Rubinstein-Taybi syndrome

- CREBBP
- EP300
- chromosome 16

Inheritance

This condition is considered to have an autosomal dominant pattern of inheritance, which means one copy of the altered gene in each cell is sufficient to cause the disorder. Most 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

- Broad thumb-hallux syndrome
- RSTS
- RTS

Additional Information & Resources

Genetic Testing Information

- Genetic Testing Registry: Rubinstein-Taybi syndrome due to CREBBP mutations (https://www.ncbi.nlm.nih.gov/gtr/conditions/C4551859/)
- Genetic Testing Registry: Rubinstein-Taybi syndrome due to EP300 haploinsufficiency (https://www.ncbi.nlm.nih.gov/gtr/conditions/C3150941/)

Genetic and Rare Diseases Information Center

- Rubinstein-Taybi syndrome (https://rarediseases.info.nih.gov/diseases/7593/index)

Patient Support and Advocacy Resources

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

Clinical Trials

- ClinicalTrials.gov (https://clinicaltrials.gov/search?cond=%22Rubinstein-Taybi syndrome%22)

Catalog of Genes and Diseases from OMIM

- RUBINSTEIN-TAYBI SYNDROME 1; RSTS1 (https://omim.org/entry/180849)
- RUBINSTEIN-TAYBI SYNDROME 2; RSTS2 (https://omim.org/entry/613684)

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28Rubinstein-Taybi+Syndrome%5BMAJR%5D%29+AND+%28Rubinstein-Taybi+syndrome%5BTIAB%5D%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+1800+days%22%5Bdp%5D)

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