Rubinstein-Taybi syndrome

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 noncancerous and cancerous tumors, including certain kinds of brain tumors. Cancer of blood-forming tissue (leukemia) also occurs more frequently in people with Rubinstein-Taybi syndrome.

Rarely, Rubinstein-Taybi syndrome can involve serious complications such as a failure to gain weight and grow at the expected rate (failure to thrive) and life-threatening infections. Infants born with this severe form of the disorder usually survive only into early childhood.

Frequency

This condition is uncommon; it occurs in an estimated 1 in 100,000 to 125,000 newborns.

Genetic Changes

Mutations in the *CREBBP* gene are responsible for some 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 fetal development. If one copy of the *CREBBP* gene is deleted or mutated, cells make only half of the normal amount of CREB binding protein. Although a reduction in the amount of this protein disrupts normal development before and after birth, researchers have not determined how it leads to the specific 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* mutations inactivate one 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 in people with *EP300* mutations are similar to those with mutations in the *CREBBP* gene; however, studies suggest that *EP300* mutations may be associated with milder skeletal changes in the hands and feet.

Some cases of severe Rubinstein-Taybi syndrome have resulted from a deletion of genetic material from the short (p) arm of chromosome 16. Several 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.

About half of people with Rubinstein-Taybi syndrome do not have an identified mutation in the *CREBBP* or *EP300* gene or a deletion in chromosome 16. The cause of the condition is unknown in these cases. Researchers predict that mutations in other genes are also responsible for the disorder.

Inheritance Pattern

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

Diagnosis & Management

Genetic Testing

- Genetic Testing Registry: Rubinstein-Taybi syndrome
  https://www.ncbi.nlm.nih.gov/gtr/conditions/C0035934/

Other Diagnosis and Management Resources

- GeneReview: Rubinstein-Taybi Syndrome
  https://www.ncbi.nlm.nih.gov/books/NBK1526
- MedlinePlus Encyclopedia: Rubinstein-Taybi syndrome
  https://medlineplus.gov/ency/article/001249.htm

General Information from MedlinePlus

- Diagnostic Tests
  https://medlineplus.gov/diagnostictests.html
- Drug Therapy
  https://medlineplus.gov/drugtherapy.html
- Genetic Counseling
  https://medlineplus.gov/geneticcounseling.html

- Palliative Care
  https://medlineplus.gov/palliativecare.html
- Surgery and Rehabilitation
  https://medlineplus.gov/surgeryandrehabilitation.html

Additional Information & Resources

MedlinePlus

- Encyclopedia: Rubinstein-Taybi syndrome
  https://medlineplus.gov/ency/article/001249.htm
- Health Topic: Cancer
  https://medlineplus.gov/cancer.html
- Health Topic: Developmental Disabilities
  https://medlineplus.gov/developmentaldisabilities.html

Genetic and Rare Diseases Information Center

- Rubinstein-Taybi syndrome
  https://rarediseases.info.nih.gov/diseases/7593/rubinstein-taybi-syndrome

Educational Resources

- Disease InfoSearch: Rubinstein-Taybi syndrome
  http://www.diseaseinfosearch.org/Rubinstein-Taybi+syndrome/6372
- MalaCards: rubinstein-taybi syndrome
  http://www.malacards.org/card/rubinstein_taybi_syndrome
- Orphanet: Rubinstein-Taybi syndrome
  http://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=783

Patient Support and Advocacy Resources

- National Organization for Rare Disorders (NORD)
  https://rarediseases.org/rare-diseases/rubinstein-taybi-syndrome/
- Resource list from the University of Kansas Medical Center
  http://www.kumc.edu/gec/support/rubinste.html

GeneReviews

- Rubinstein-Taybi Syndrome
  https://www.ncbi.nlm.nih.gov/books/NBK1526

ClinicalTrials.gov

- ClinicalTrials.gov
  https://clinicaltrials.gov/ct2/results?cond=%22rubinstein-taybi+syndrome%22

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?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

OMIM

- RUBINSTEIN-TAYBI SYNDROME 1
  http://omim.org/entry/180849

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