Rothmund-Thomson Syndrome

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Rothmund-Thomson syndrome is a rare condition that affects many parts of the body, especially the skin.

genetic conditions

1. Introduction

People with this condition typically develop redness on the cheeks between ages 3 months and 6 months. Over time the rash spreads to the arms and legs, causing patchy changes in skin coloring, areas of thinning skin (atrophy), and small clusters of blood vessels just under the skin (telangiectases). These skin problems persist for life and are collectively known as poikiloderma.

Rothmund-Thomson syndrome is also characterized by sparse hair, eyebrows, and eyelashes; slow growth and small stature; abnormalities of the teeth and nails; and gastrointestinal problems in infancy, such as chronic diarrhea and vomiting. Some affected children develop a clouding of the lens of the eye (cataract), which affects vision. Many people with this disorder have skeletal abnormalities including absent or malformed bones, fused bones, and low bone mineral density (osteopenia or osteoporosis). Some of these abnormalities affect the development of bones in the forearms and the thumbs, and are known as radial ray malformations.

People with Rothmund-Thomson syndrome have an increased risk of developing cancer, particularly a form of bone cancer called osteosarcoma. These bone tumors most often develop during childhood or adolescence. Several types of skin cancer, including basal cell carcinoma and squamous cell carcinoma, are also more common in people with this disorder.

The varied signs and symptoms of Rothmund-Thomson syndrome overlap with features of other disorders, namely Baller-Gerold syndrome and RAPADILINO syndrome. These syndromes are also characterized by radial ray defects, skeletal abnormalities, and slow growth. All of these conditions can be caused by mutations in the same gene. Based on these similarities, researchers are investigating whether Rothmund-Thomson syndrome, Baller-Gerold syndrome, and RAPADILINO syndrome are separate disorders or part of a single syndrome with overlapping signs and symptoms.

2. Frequency

Rothmund-Thomson syndrome is a rare disorder; its incidence is unknown. About 300 people with this condition have been reported worldwide in scientific studies.

3. Causes

Mutations in the *RECQL4* gene cause about two-thirds of all cases of Rothmund-Thomson syndrome. This gene provides instructions for making one member of a protein family called RecQ helicases. Helicases are enzymes that bind to DNA and temporarily unwind the two spiral strands (double helix) of the DNA molecule. This unwinding is necessary for copying (replicating) DNA in preparation for cell division, and for repairing damaged DNA. The RECQL4 protein helps stabilize genetic information in the body's cells and plays a role in replicating and repairing DNA.

RECQL4 mutations lead to the production of an abnormally short, nonfunctional version of the RECQL4 protein or prevent cells from making any of this protein. A shortage of the RECQL4 protein may prevent normal DNA replication and repair, causing widespread damage to a person's genetic information over time. It is unclear how a loss of this protein's activity leads to the specific features of Rothmund-Thomson syndrome.

In about one-third of individuals with Rothmund-Thomson syndrome, no mutation in the *RECQL4* gene has been found. The cause of the condition in these individuals is unknown; however, researchers suspect that these cases may result from mutations in a gene related to the *RECQL4* gene.

In some cases, chromosomal abnormalities have been identified in people with Rothmund-Thomson syndrome. These abnormalities include extra or missing genetic material, usually from chromosome 7 or chromosome 8, in some of an affected person's cells. Researchers believe that these chromosomal changes arise because of the overall instability of an affected person's genetic information; they do not cause the disorder.

3.1.The Gene Associated with Rothmund-Thomson Syndrome

- RECQL4

4. Inheritance

This condition is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. The parents of an individual with an autosomal recessive condition each carry one copy of the mutated gene, but they typically do not show signs and symptoms of the condition.

5. Other Names for This Condition

- congenital poikiloderma

- poikiloderma atrophicans and cataract
- poikiloderma congenitale
- poikiloderma congenitale of Rothmund-Thomson
- RTS

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