EXT1 Gene

Subjects: Genetics & Heredity
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Exostosin glycosyltransferase 1

Keywords: genes

1. Normal Function

The *EXT1* gene provides instructions for producing a protein called exostosin-1. This protein is found in a cell structure called the Golgi apparatus, which modifies newly produced enzymes and other proteins. In the Golgi apparatus, exostosin-1 attaches (binds) to another protein, exostosin-2, to form a complex that modifies heparan sulfate. Heparan sulfate is a complex of sugar molecules (a polysaccharide) that is added to proteins to form proteoglycans, which are proteins attached to several sugars. Heparan sulfate is involved in regulating a variety of body processes including blood clotting and the formation of blood vessels (angiogenesis). It also has a role in the spreading (metastasis) of cancer cells.

2. Health Conditions Related to Genetic Changes

2.1 Hereditary Multiple Osteochondromas

About 480 mutations in the *EXT1* gene have been identified in people with hereditary multiple osteochondromas type 1, a condition in which people develop multiple benign (noncancerous) bone tumors called osteochondromas. Most of these mutations are known as "loss-of-function" mutations because they prevent any functional exostosin-1 protein from being made. The loss of functional exostosin-1 protein prevents it from forming a complex with the exostosin-2 protein and adding heparan sulfate to proteins. It is unclear how this impairment leads to the signs and symptoms of hereditary multiple osteochondromas.

2.2 Trichorhinophalangeal Syndrome Type II

The *EXT1* gene is located in a region of chromosome 8 that is deleted in people with trichorhinophalangeal syndrome type II (TRPS II). TRPS II is a condition that causes bone and joint malformations including multiple osteochondromas (described above); distinctive facial features; intellectual disability; and abnormalities of the skin, hair, teeth, sweat glands, and nails. As a result of this deletion, affected individuals are missing one copy of the *EXT1* gene in each cell. A shortage of exostosin-1 protein causes the osteochondromas in people with TRPS II. The deletion of other genes near the *EXT1* gene likely contributes to the additional features of this condition.

3. Other Names for This Gene

- exostoses (multiple) 1
- exostosin 1
- EXT
- EXT1_HUMAN
- Glucuronosyl-N-acetylglucosaminyl-proteoglycan 4-alpha-N- acetylglucosaminyltransferase
- N-acetylglucosaminyl-proteoglycan 4-beta-glucuronosyltransferase

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