GTF2H5 gene

general transcription factor IIH subunit 5

Normal Function

The *GTF2H5* gene provides instructions for making a protein called p8 or TTDA. This protein is one part (subunit) of a group of related proteins known as the general transcription factor 2 H (TFIIH) complex. The TFIIH complex has two major functions: it is involved in the process of gene transcription, which is the first step in protein production, and it helps repair damaged DNA.

DNA can be damaged by ultraviolet (UV) rays from the sun and by toxic chemicals, such as those found in cigarette smoke. DNA damage occurs frequently, but normal cells are usually able to fix it before it can cause problems.

One of the major mechanisms that cells use to fix DNA is known as nucleotide excision repair (NER). As part of this repair mechanism, the TFIIH complex opens up the section of double-stranded DNA that surrounds the damage. The TTDA protein helps with this process by stabilizing the TFIIH complex and maintaining its structure. Once the damaged region has been exposed, other proteins snip out (excise) the abnormal section and replace the damaged area with the correct DNA.

Health Conditions Related to Genetic Changes

Trichothiodystrophy

A few variants (also called mutations) in the *GTF2H5* gene have been found to cause trichothiodystrophy. This condition affects many parts of the body. The hallmark of trichothiodystrophy is hair that is sparse and easily broken.Variants in this gene cause the photosensitive form of the condition, which is characterized by an extreme sensitivity to UV rays from sunlight.

GTF2H5 gene variants that cause trichothiodystrophy result in the production of a nonfunctional version of the TTDA protein. A loss of this protein probably causes the TFIIH complex to become unstable, which greatly reduces the amount of this complex within cells. Without enough of the TFIIH complex, cells cannot effectively repair DNA damage caused by UV rays. These problems with DNA repair cause people with the photosensitive form of trichothiodystrophy to be extremely sensitive to sunlight. It is unclear how the loss of the TTDA protein leads to the other features of the condition,

such as slow growth, intellectual disability, and brittle hair.

Other Names for This Gene

- bA120J8.2
- C6orf175
- FLJ30544
- general transcription factor IIH, polypeptide 5
- TF2H5_HUMAN
- TFB5
- TFB5 ortholog
- TFIIH basal transcription factor complex TTD-A subunit
- TFIIH basal transcription factor complex TTDA subunit
- TGF2H5

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of GTF2H5 (https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=404672[geneid])

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28GTF2H5%5BTIAB%5D%29+OR+%28%28TFB5%5BTIAB%5D%29+OR+%28TTD-A%5BTIAB%5D%29+OR+%28TTDA%5BTIAB%5D%29%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+1800+days%22%5Bdp%5D)

Catalog of Genes and Diseases from OMIM

- GENERAL TRANSCRIPTION FACTOR IIH, POLYPEPTIDE 5; GTF2H5 (https://omim.org/entry/608780)

Gene and Variant Databases

- NCBI Gene (https://www.ncbi.nlm.nih.gov/gene/404672)
- ClinVar (https://www.ncbi.nlm.nih.gov/clinvar?term=GTF2H5[gene])

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Genomic Location

The *GTF2H5* gene is found on chromosome 6 (https://medlineplus.gov/genetics/chromosome/6/).

Last updated April 6, 2023