NSD2 gene

nuclear receptor binding SET domain protein 2

Normal Function

The *NSD2* gene provides instructions for making at least three very similar proteins known as MMSET I, MMSET II, and RE-IIBP. These proteins are active both before and after birth in many of the body's cells and tissues. They appear to play an important role in normal development.

At least two of the proteins produced from the *NSD2* gene, MMSET II and RE-IIBP, likely help regulate the activity of other genes. Studies suggest that these proteins function as histone methyltransferases, which are enzymes that modify proteins called histones. By adding a molecule called a methyl group to histones, histone methyltransferases can turn off (suppress) the activity of certain genes. Scientists are working to identify the genes targeted by the MMSET II and RE-IIBP proteins.

Health Conditions Related to Genetic Changes

Wolf-Hirschhorn syndrome

The *NSD2* gene is located in a region of chromosome 4 that is deleted in people with Wolf-Hirschhorn syndrome. The features of this condition include a characteristic facial appearance, delayed growth and development, intellectual disability, and seizures.

As a result of this deletion in chromosome 4, affected individuals are missing one copy of the *NSD2* gene in each cell. A loss of the *NSD2* gene probably disrupts the regulation of several other genes, although these genes have not been identified. Research shows that abnormal gene regulation during development contributes to some of the features of Wolf-Hirschhorn syndrome.

Cancers

A chromosomal rearrangement (translocation) involving the *NSD2* gene has been associated with multiple myeloma, a cancer that starts in bone marrow cells. This rearrangement is found in 15 to 20 percent of all multiple myelomas. The translocation abnormally fuses the *NSD2* gene on chromosome 4 with part of another gene on chromosome 14. The fusion of these genes overactivates the *NSD2* gene, which appears to promote the uncontrolled growth and division of cancer cells.

Other Names for This Gene

- FLJ23286
- IL5 promoter REII region-binding protein
- KIAA1090
- MGC176638
- MMSET
- multiple myeloma SET domain protein
- NSD2_HUMAN
- Nuclear SET domain-containing protein 2
- Probable histone-lysine N-methyltransferase NSD2
- Protein trithorax-5
- REIIBP
- trithorax/ash1-related protein 5
- TRX5
- WHSC1
- Wolf-Hirschhorn syndrome candidate 1

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of NSD2 (https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=7468[geneid])

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28%28WHSC1%5BTIAB%5D%29+OR+%28Wolf-Hirschhorn+syndrome+candidate+1%5BTIAB%5D%29+OR+%28MMSET%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

- MYELOMA, MULTIPLE (https://omim.org/entry/254500)
- NUCLEAR RECEPTOR-BINDING SET DOMAIN PROTEIN 2; NSD2 (https://omim.org/entry/602952)

Gene and Variant Databases

- NCBI Gene (https://www.ncbi.nlm.nih.gov/gene/7468)
- ClinVar (https://www.ncbi.nlm.nih.gov/clinvar?term=NSD2[gene])

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Genomic Location

The *NSD2* gene is found on chromosome 4 (https://medlineplus.gov/genetics/chromosome/4/).

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