

STK11 gene

serine/threonine kinase 11

Normal Function

The *STK11* gene (also called *LKB1*) provides instructions for making an enzyme called serine/threonine kinase 11. This enzyme is a tumor suppressor, which means that it helps keep cells from growing and dividing too fast or in an uncontrolled way. This enzyme helps certain types of cells correctly orient themselves within tissues (polarization) and assists in determining the amount of energy a cell uses. This kinase also promotes a type of programmed cell death known as apoptosis. In addition to its role as a tumor suppressor, serine/threonine kinase 11 function appears to be required for normal development before birth.

Health Conditions Related to Genetic Changes

Breast cancer

Inherited changes in the *STK11* gene greatly increase the risk of developing breast cancer, as well as other types of cancer, as part of Peutz-Jeghers syndrome (described above). These mutations are thought to account for only a small fraction of all breast cancer cases.

Peutz-Jeghers syndrome

Inherited mutations in the *STK11* gene cause Peutz-Jeghers syndrome, a condition characterized by the development of noncancerous growths called hamartomatous polyps in the gastrointestinal tract and a greatly increased risk of developing several types of cancer. More than 340 *STK11* gene mutations have been identified in people with this condition. Many of these mutations result in the production of an abnormally short, nonfunctional version of the serine/threonine kinase 11 enzyme. Other mutations change single protein building blocks (amino acids) used to build the enzyme. Mutations in the *STK11* gene impair the enzyme's tumor suppressor function, allowing cells to grow and divide without control or order. This uncontrolled cell growth can lead to the formation of hamartomatous polyps and cancerous tumors.

Lung cancer

MedlinePlus Genetics provides information about Lung cancer

Ovarian cancer

MedlinePlus Genetics provides information about Ovarian cancer

Other cancers

Noninherited (somatic) mutations in the *STK11* gene have been found in various forms of cancer. Somatic mutations are acquired during a person's lifetime and are present only in certain cells. They do not occur as part of a cancer syndrome. Somatic *STK11* gene mutations have been identified in a form of lung cancer called non-small cell lung carcinoma, cervical cancer, colorectal cancer, an aggressive type of skin cancer called melanoma, and pancreatic cancer. These mutations impair the function of serine/threonine kinase 11, which can allow cells to grow and divide uncontrollably and contribute to the formation of a cancerous tumor.

Other Names for This Gene

- LKB1
- PJS
- serine/threonine kinase 11 (Peutz-Jeghers syndrome)
- Serine/threonine-protein kinase 11
- STK11_HUMAN

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of STK11 ([https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=6794\[geneid\]](https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=6794[geneid]))

Scientific Articles on PubMed

- PubMed (<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28STK11%5BTIAB%5D%29+OR+%28serine/threonine+kinase+11%5BTIAB%5D%29%29+OR+%28LKB1%5BTIAB%5D%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+360+days%22%5Bdp%5D%29%29%29>)

Catalog of Genes and Diseases from OMIM

- SERINE/THREONINE PROTEIN KINASE 11; STK11 (<https://omim.org/entry/602216>)

Gene and Variant Databases

- NCBI Gene (<https://www.ncbi.nlm.nih.gov/gene/6794>)

- ClinVar ([https://www.ncbi.nlm.nih.gov/clinvar?term=STK11\[gene\]](https://www.ncbi.nlm.nih.gov/clinvar?term=STK11[gene]))

References

- Hardie DG, Alessi DR. LKB1 and AMPK and the cancer-metabolism link - ten years after. *BMC Biol.* 2013 Apr 15;11:36. doi: 10.1186/1741-7007-11-36. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/23587167>) or Free article on PubMed Central (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3626889/>)
- Hemminki A, Markie D, Tomlinson I, Avizienyte E, Roth S, Loukola A, Bignell G, Warren W, Aminoff M, Hoglund P, Jarvinen H, Kristo P, Pelin K, Ridanpaa M, Salovaara R, Toro T, Bodmer W, Olschwang S, Olsen AS, Stratton MR, de la Chapelle A, Aaltonen LA. A serine/threonine kinase gene defective in Peutz-Jeghers syndrome. *Nature.* 1998 Jan 8;391(6663):184-7. doi: 10.1038/34432. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/9428765>)
- McGarrity TJ, Amos CI, Baker MJ. Peutz-Jeghers Syndrome. 2001 Feb 23 [updated 2021 Sep 2]. In: Adam MP, Feldman J, Mirzaa GM, Pagon RA, Wallace SE, Bean LJH, Gripp KW, Amemiya A, editors. *GeneReviews(R)* [Internet]. Seattle (WA): University of Washington, Seattle; 1993-2024. Available from <http://www.ncbi.nlm.nih.gov/books/NBK1266/> Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/20301443>)
- National Cancer Institute: Genetics of Breast and Gynecologic Cancers (PDQ®)–Health Professional Version (<https://www.cancer.gov/types/breast/hp/breast-ovarian-genetics-pdq>)
- Vahtomeri K, Makela TP. Molecular mechanisms of tumor suppression by LKB1. *FEBS Lett.* 2011 Apr 6;585(7):944-51. doi: 10.1016/j.febslet.2010.12.034. Epub 2010 Dec 27. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/21192934>)
- Weissman SM, Weiss SM, Newlin AC. Genetic testing by cancer site: ovary. *Cancer J.* 2012 Jul-Aug;18(4):320-7. doi: 10.1097/PPO.0b013e31826246c2. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/22846732>)
- Wingo SN, Gallardo TD, Akbay EA, Liang MC, Contreras CM, Boren T, Shimamura T, Miller DS, Sharpless NE, Bardeesy N, Kwiatkowski DJ, Schorge JO, Wong KK, Castrillon DH. Somatic LKB1 mutations promote cervical cancer progression. *PLoS One.* 2009;4(4):e5137. doi: 10.1371/journal.pone.0005137. Epub 2009 Apr 2. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/19340305>) or Free article on PubMed Central (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2660434/>)
- Zhuang ZG, Di GH, Shen ZZ, Ding J, Shao ZM. Enhanced expression of LKB1 in breast cancer cells attenuates angiogenesis, invasion, and metastatic potential. *Mol Cancer Res.* 2006 Nov;4(11):843-9. doi: 10.1158/1541-7786.MCR-06-0118. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/17114342>)

Genomic Location

The *STK11* gene is found on chromosome 19 (<https://medlineplus.gov/genetics/chromo>)

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