

ITGA6 gene

integrin subunit alpha 6

Normal Function

The *ITGA6* gene provides instructions for making one part (the $\alpha 6$ subunit) of two proteins known as $\alpha 6\beta 4$ integrin and $\alpha 6\beta 1$ integrin. Integrins are a group of proteins that regulate the attachment of cells to one another (cell-cell adhesion) and to the surrounding network of proteins and other molecules (cell-matrix adhesion). Integrins also transmit chemical signals that regulate cell growth and the activity of certain genes.

The $\alpha 6\beta 4$ integrin protein is found primarily in epithelial cells, which are cells that line the surfaces and cavities of the body. This protein plays a particularly important role in strengthening and stabilizing the skin. It is a component of hemidesmosomes, which are microscopic structures that anchor the outer layer of the skin (the epidermis) to underlying layers. As part of a complex network of proteins in hemidesmosomes, $\alpha 6\beta 4$ integrin helps to hold the layers of skin together.

The other integrin made with the $\alpha 6$ subunit, $\alpha 6\beta 1$ integrin, functions during the formation of organs and tissues before birth. The $\alpha 6\beta 1$ integrin protein has not been as well studied as $\alpha 6\beta 4$ integrin.

Health Conditions Related to Genetic Changes

Epidermolysis bullosa with pyloric atresia

At least five mutations in the *ITGA6* gene have been found to cause epidermolysis bullosa with pyloric atresia (EB-PA). In addition to skin blistering, people with EB-PA are born with a life-threatening obstruction of the digestive tract called pyloric atresia. Mutations in the *ITGA6* gene account for about 5 percent of all cases of EB-PA.

The *ITGA6* gene mutations responsible for EB-PA lead to a loss of functional $\alpha 6\beta 4$ integrin. These mutations alter the normal structure and function of the $\alpha 6$ integrin subunit or prevent cells from producing enough of this subunit. The resulting shortage of functional $\alpha 6\beta 4$ integrin causes cells in the epidermis to be fragile and easily damaged. Friction or other minor trauma can cause the skin layers to separate, leading to the widespread formation of blisters. It is less clear how mutations in the *ITGA6* gene are related to pyloric atresia.

Prostate cancer

MedlinePlus Genetics provides information about Prostate cancer

Cancers

Researchers believe that both $\alpha 6\beta 1$ integrin and $\alpha 6\beta 4$ integrin may play critical roles in the progression of cancerous tumors called carcinomas. These cancers arise in epithelial cells and can affect many tissues and organs, including the breast, lung, liver, prostate, and skin.

Changes in the location and activity of $\alpha 6\beta 1$ integrin and $\alpha 6\beta 4$ integrin within cancer cells are associated with the progression of carcinomas. The integrin proteins activate key signaling molecules, which trigger cancer cells to migrate through the body and invade other tissues. These signals also make cancer cells more resistant to self-destruction (apoptosis).

Recent studies suggest that, in addition to their roles in the progression of existing carcinomas, $\alpha 6\beta 1$ integrin and $\alpha 6\beta 4$ integrin may be involved in the initial formation of these tumors.

Other Names for This Gene

- CD49f
- CD49f Antigens
- Cluster of differentiation antigen 49f
- FLJ18737
- integrin alpha 6
- integrin alpha chain, alpha 6
- Integrin alpha6
- integrin, alpha 6
- integrin, alpha-6
- ITA6_HUMAN
- Lymphocyte antigen CD49F
- VLA-6

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of ITGA6 ([https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=3655\[geneid\]](https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=3655[geneid]))

Scientific Articles on PubMed

- PubMed (<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28ITGA6%5BTIAB%5D%29+OR+%28integrin+%5Bti%5D+AND+alpha6+%5Btiab%5D%29+OR+%28integrin+%5Bti%5D+AND+alpha6+%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

- INTEGRIN, ALPHA-6; ITGA6 (<https://omim.org/entry/147556>)

Gene and Variant Databases

- NCBI Gene (<https://www.ncbi.nlm.nih.gov/gene/3655>)
- ClinVar ([https://www.ncbi.nlm.nih.gov/clinvar?term=ITGA6\[gene\]](https://www.ncbi.nlm.nih.gov/clinvar?term=ITGA6[gene]))

References

- Allegra M, Gagnoux-Palacios L, Gache Y, Roques S, Lestringant G, Ortonne JP, Meneguzzi G. Rapid decay of alpha6 integrin caused by a mis-sense mutation in the propeller domain results in severe junctional epidermolysis bullosa with pyloric atresia. *J Invest Dermatol.* 2003 Dec;121(6):1336-43. doi:10.1111/j.1523-1747.2003.12625.x. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/14675179>)
- Ashton GH, Sorelli P, Mellerio JE, Keane FM, Eady RA, McGrath JA. Alpha 6 beta4 integrin abnormalities in junctional epidermolysis bullosa with pyloric atresia. *Br J Dermatol.* 2001 Feb;144(2):408-14. doi:10.1046/j.1365-2133.2001.04038.x. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/11251584>)
- Chung J, Mercurio AM. Contributions of the alpha6 integrins to breast carcinoma survival and progression. *Mol Cells.* 2004 Apr 30;17(2):203-9. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/15179031>)
- Chung J, Yoon S, Datta K, Bachelder RE, Mercurio AM. Hypoxia-induced vascular endothelial growth factor transcription and protection from apoptosis are dependent on alpha6beta1 integrin in breast carcinoma cells. *Cancer Res.* 2004 Jul 15;64(14):4711-6. doi: 10.1158/0008-5472.CAN-04-0347. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/15256436>)
- Gache Y, Romero-Graillet C, Spadafora A, Lepinard C, Descamps P, Bardon CB, Ortonne JP, Meneguzzi G. A novel homozygous mutation affecting integrin alpha6 in a case of junctional epidermolysis bullosa with pyloric atresia detected in utero by ultrasound examination. *J Invest Dermatol.* 1998 Nov;111(5):914-6. doi:10.1046/j.1523-1747.1998.00373.x. No abstract available. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/9804362>)
- Lipscomb EA, Mercurio AM. Mobilization and activation of a signaling competent alpha6beta4 integrin underlies its contribution to carcinoma progression.

CancerMetastasis Rev. 2005 Sep;24(3):413-23. doi: 10.1007/s10555-005-5133-4. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/16258729>)

- Nejjar M, Hafdi Z, Dumortier J, Bringuier AF, Feldmann G, Scoazec JY. alpha6beta1 integrin expression in hepatocarcinoma cells: regulation and role in cell adhesion and migration. Int J Cancer. 1999 Nov 12;83(4):518-25. doi:10.1002/(sici)1097-0215(19991112)83:43.0.co;2-q. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/10508489>)
- Pulkkinen L, Kimonis VE, Xu Y, Spanou EN, McLean WH, Uitto J. Homozygous alpha6 integrin mutation in junctional epidermolysis bullosa with congenital duodenal atresia. Hum Mol Genet. 1997 May;6(5):669-74. doi: 10.1093/hmg/6.5.669. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/9158140>)
- Ruzzi L, Gagnoux-Palacios L, Pinola M, Belli S, Meneguzzi G, Alessio M, Zambruno G. A homozygous mutation in the integrin alpha6 gene in junctional epidermolysis bullosa with pyloric atresia. J Clin Invest. 1997 Jun 15;99(12):2826-31. doi: 10.1172/JCI119474. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/9185503>) or Free article on PubMed Central (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC508131/>)

Genomic Location

The *ITGA6* gene is found on chromosome 2 (<https://medlineplus.gov/genetics/chromosome/2/>).

Last updated September 1, 2009