SCNN1A gene
sodium channel epithelial 1 alpha subunit

Normal Function

The *SCNN1A* gene provides instructions for making one piece, the alpha subunit, of a protein complex called the epithelial sodium channel (ENaC). The channel is composed of alpha, beta, and gamma subunits, each of which is produced from a different gene. These channels are found at the surface of certain cells called epithelial cells in many tissues of the body, including the kidneys, lungs, and sweat glands. The ENaC channel transports sodium into cells.

In the kidney, ENaC channels take sodium into cells in response to signals that sodium levels in the body are too low. From the kidney cells, this sodium is returned to the bloodstream rather than being removed from the body (a process called reabsorption). In addition to regulating the amount of sodium in the body, the flow of sodium ions helps control the movement of water in tissues. For example, ENaC channels in lung cells help regulate the amount of fluid in the lungs.

Health Conditions Related to Genetic Changes

Pseudohypoaldosteronism type 1

At least a dozen mutations in the *SCNN1A* gene cause pseudohypoaldosteronism type 1 (PHA1). This condition typically begins in infancy and is characterized by low levels of sodium (hyponatremia) and high levels of potassium (hyperkalemia) in the blood and severe dehydration. In particular, *SCNN1A* gene mutations are involved in autosomal recessive PHA1, a severe form of the condition that does not improve with age.

Most mutations in the *SCNN1A* gene result in a shortened alpha subunit protein of the ENaC channel. Other mutations delete a small piece of DNA or change a single protein building block (amino acid) in the alpha subunit protein. *SCNN1A* gene mutations lead to reduced or absent ENaC channel activity. As a result, sodium reabsorption is impaired, leading to hyponatremia and other signs and symptoms of autosomal recessive PHA1. The reduced function of ENaC channels in lung epithelial cells leads to excess fluid in the lungs and recurrent lung infections.

Other disorders

Some people with cystic fibrosis-like syndrome have a mutation or a normal gene variation (polymorphism) in the *SCNN1A* gene. People with cystic fibrosis-like syndrome (also known as atypical cystic fibrosis or bronchiectasis with or without elevated sweat chloride type 2) have signs and symptoms that resemble those of
cystic fibrosis, including breathing problems and lung infections. However, changes in the gene most commonly associated with cystic fibrosis, \textit{CFTR}, cannot explain development of the condition. It is thought that a mutation or gene variation in the \textit{SCNN1A} gene can disrupt sodium transport and fluid balance, which leads to the signs and symptoms of cystic fibrosis-like syndrome.

**Chromosomal Location**

Cytogenetic Location: 12p13.31, which is the short (p) arm of chromosome 12 at position 13.31

Molecular Location: base pairs 6,346,843 to 6,377,357 on chromosome 12 (Homo sapiens Updated Annotation Release 109.20200228, GRCh38.p13) (NCBI)

Credit: Genome Decoration Page/NCBI

**Other Names for This Gene**

- alpha-ENaC
- alpha-NaCH
- amiloride-sensitive epithelial sodium channel alpha subunit
- amiloride-sensitive sodium channel subunit alpha
- BESC2
- ENaCa
- ENaCalpha
- epithelial Na(+) channel subunit alpha
- FLJ21883
- nasal epithelial sodium channel alpha subunit
- nonvoltage-gated sodium channel 1 subunit alpha
- SCNEA
- SCNN1
- SCNN1A_HUMAN
- sodium channel, non voltage gated 1 alpha subunit
- sodium channel, non-voltage-gated 1 alpha subunit
- sodium channel, nonvoltage-gated 1 alpha

Additional Information & Resources

Scientific Articles on PubMed
- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28SCNN1A%5BTIAB%5D%29+OR+%28%28alpha-ENaC%5BTIAB%5D%29+OR+%28alpha-NaCH%5BTIAB%5D%29+OR+%28amiloride-sensitive+epithelial+sodium+channel+alpha+subunit%5BTIAB%5D%29+OR+%28ENaCa%5BTIAB%5D%29+OR+%28ENaCalpha%5BTIAB%5D%29+OR+%28SCNN1%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+1440+days%22%5Bdp%5D

Catalog of Genes and Diseases from OMIM
- BRONCHIECTASIS WITH OR WITHOUT ELEVATED SWEAT CHLORIDE 2
  http://omim.org/entry/613021
- SODIUM CHANNEL, NONVOLTAGE-GATED 1, ALPHA SUBUNIT
  http://omim.org/entry/600228

Research Resources
- Atlas of Genetics and Cytogenetics in Oncology and Haematology
  http://atlasgeneticsoncology.org/Genes/GC_SCNN1A.html
- ClinVar
  https://www.ncbi.nlm.nih.gov/clinvar?term=SCNN1A%5Bgene%5D
- HGNC Gene Symbol Report
- Monarch Initiative
  https://monarchinitiative.org/gene/NCBIGene:6337
- NCBI Gene
- UniProt
  https://www.uniprot.org/uniprot/P37088
Sources for This Summary


- OMIM: SODIUM CHANNEL, NONVOLTAGE-GATED 1, ALPHA SUBUNIT http://omim.org/entry/600228

Reprinted from Genetics Home Reference: https://ghr.nlm.nih.gov/gene/SCNN1A

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