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Gene Section
Short Communication

SLC24A5 (solute carrier family 24 (sodium/potassium/calcium exchanger), member 5)

Kunal Ray, Mainak Sengupta, Sampurna Ghosh

Academy of Scientific and Innovative Research (AcSIR), Campus at CSIR - Central Road Research Institute, Mathura Road, New Delhi - 110 025, kunalray@gmail.com (KR); University of Calcutta, Department of Genetics, 35, Ballygunge Circular Road, Kolkata - 700 019, sengupta.mainak@gmail.com); sampurna_ghosh@yahoo.in (MS, SG) India.

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Abstract

SLC24A5 is a member of the potassium-dependent sodium/calcium exchanger family and encodes an intracellular membrane protein. Sequence variations in this gene have been associated with differences in skin pigmentation, and the defective protein leads to Oculocutaneous albinism type VI, OCA6.

Keywords: OCA6, albinism, SLC24A5

Identity

Other names: NCKX5, JSX, SHEP4, OCA6

HGNC (Hugo): SLC24A5

Location: 15q21.1

DNA/RNA

Description

In Chromosome 15, the 21,701 bases long gene starts from 48,120,972 bp from pter and ends at 48,142,672 bp from pter; Orientation: Plus strand. It contains 9 exons.

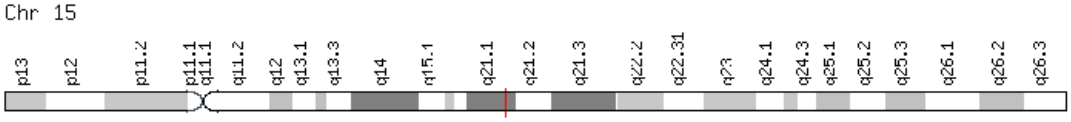
Transcription

This gene has 5 transcripts: 4 splice variants and 1 unspliced form (http://www.ncbi.nlm.nih.gov/IEB/Research/Acembly/av.cgi?db=humanc=Genel=SLC24A5).
The full protein coding transcript is 1617 bp long.

Protein

Description

The gene encodes a cation exchanger which is 500 amino acids protein of molecular mass 54888 Da; this multi-pass membrane protein is an intracellular potassium-dependent sodium/calcium exchanger with 2 large hydrophilic loops and 2 sets of multiple trans-membrane-spanning segments.
The first large hydrophilic loop is located extracellularly at the N-terminus while the other is cytoplasmic and separates the two sets of transmembrane domains.
It belongs to sodium/potassium/calcium exchanger family, SLC24A subfamily.



Cytogenetic band showing SLC24A5 locus (Ref: http://www.genecards.org/cgi-bin/carddisp.pl?gene=SLC24A5&keywords=SLC24A5)

Expression

Due to its localization in the melanosomal membrane, SLC24A5 is thought to be expressed in the melanocytes (Wilson S et al., 2013). Interestingly, the expression of the gene in the following tissue types are evident by its existence in the corresponding cDNA libraries: B-cell, brain, cerebellum, cerebrum, colon, embryonic tissue, fetus, gastrointestinal tract, kidney, liver, lung, lymph node, lymphoreticular, mammary gland, nervous, pancreas, pancreatic islet, placenta, prostate, skin, stem cell, stomach, testis, thymus, uterus and vascular tissue (http://cgap.nci.nih.gov/Genes/GeneInfo?ORG=Hs CID=710240).

Localisation

SLC24A5 is expressed in the trans-Golgi network of melanocytes (Wilson S et al., 2013).

Function

The precise function of SLC24A5 is not yet known. However, the potential functions include: (a) transporting 1 Ca^{2+} and 1 K^{+} to the melanosome in exchange for 4 cytoplasmic Na (Lamason RL et al., 2005); (b) Influencing natural variation in skin pigmentation via an unknown mechanism affecting cellular sterol levels (Wilson S et al., 2013).

Homology

It belongs to Solute Carrier Family 24 (http://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=202).

Mutations

Germinal

SLC24A5 mutations are responsible for Oculocutaneous Albinism type 6 (OCA6). Only 9 SLC24A5 mutations have been reported till date - one patient from India, one from China, two from France, three from Portugal, one from Belgium and one from Syria (Mondal et al. 2012; Wei et al., 2013; Fanny et al., 2014). Patients are generally characterized by light hair at birth that darkens with age, white skin, transparent irises, photophobia, nystagmus, foveal hypoplasia and reduced visual acuity. In a man from eastern India who had extreme hypopigmentation resulting in pinkish-white skin, but with dark brown hair and brown irises, was found to have a 4-bp insertion in the SLC24A5 gene as homozygous genotype (Mondal et al, 2012).

Somatic

Somatic variations in SLC24A5 have been identified in cancers (https://dcc.icgc.org/mutations/MU45848787; http://cancer.sanger.ac.uk/cosmic/search?q=SLC24A5), but no causality have been reported.

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