NEUROD1, also known as Neurogenic Differentiation 1, is a gene that encodes a transcription factor and belongs to the neurogenic differentiation family. Transcription factors are proteins that regulate gene expression by binding to specific DNA sequences, and NEUROD1 is particularly important in the development and function of neurons. Here are some key points about NEUROD1:

Neuronal Differentiation: NEUROD1 plays a crucial role in promoting the differentiation of neural progenitor cells into mature neurons. It is part of the family of transcription factors involved in neurogenesis, the process by which neural stem cells or progenitor cells give rise to functional neurons.

Basic Helix-Loop-Helix (bHLH) Domain: NEUROD1, like many other transcription factors involved in neural development, contains a basic helix-loop-helix (bHLH) domain. This domain enables NEUROD1 to form dimers with other bHLH proteins and bind to specific DNA sequences, leading to the activation of target genes involved in neuronal differentiation.

Expression in the Nervous System: NEUROD1 is expressed in various regions of the developing and adult nervous system, including the brain and spinal cord. Its expression is particularly prominent in areas associated with sensory perception, as well as regions involved in motor control and autonomic functions.

Function in Pancreatic Islet Cells: In addition to its role in the nervous system, NEUROD1 is also important in the pancreas, where it plays a role in the differentiation and function of pancreatic islet cells, particularly insulin-producing beta cells. It contributes to the regulation of blood sugar levels.

Research Significance: NEUROD1 and related transcription factors are of great interest in the field of neuroscience and developmental biology. Understanding the regulatory mechanisms involved in neural differentiation is critical for unraveling the processes that govern the formation and function of neurons in the central and peripheral nervous systems. Additionally, research on NEUROD1 is relevant to the study of diabetes and pancreatic islet cell function.

NEUROD1's role in neuronal differentiation and its broader impact on both neural and pancreatic cell development highlight its importance in embryonic development, tissue-specific differentiation, and the proper functioning of the nervous system and pancreas.

Li et al. compared the gene expression levels in the four different medulloblastoma groups (MB-WNT, MB-SHH, MB-G3, and MB-G4), with a focus on genes associated with mitochondria. They used several tools including Salmon, Tximeta, DESeq2, BiomaRt, STRING, Ggplot2, EnhancedVolcano, Venny 2.1, and Metscape.

A total of 668 genes were differentially expressed and the most abundant genes were associated with the cell division pathway followed by modulation of chemical synaptic transmission. We also identified several genes (ABAT, SOX9, ALDH5A, FOXM1, ABL1, NHLH1, NEUROD1 and NEUROD2) known to play vital role in medulloblastoma. Comparative expression analysis revealed OXPHOS complex-associated proteins of mitochondria. The most significantly expressed genes in the MB-SHH and MB-G4 groups were AHCYL1 and SFXN5 while PAICS was significantly upregulated in the MB-WNT group. Notably, MB-G3 contained the most downregulated genes from the OXPHOS complexes, except COX6B2 which was strongly upregulated. They show the importance of mitochondria and compare their role in the four different medulloblastoma groups [1)].

1)

Li Q, Jia Y, Tang B, Yang H, Yang Q, Luo X, Pan Y. Mitochondrial subtype MB-G3 contains potential novel biomarkers and therapeutic targets associated with prognosis of medulloblastoma. Biomarkers. 2023 Oct 27:1-16. doi: 10.1080/1354750X.2023.2276670. Epub ahead of print. PMID: 37886818.