CHCHD2

Full name: Coiled-Coil-Helix-Coiled-Coil-Helix Domain Containing 2

Gene type: Protein-coding

Location: Chromosome 7p11.2

Protein: CHCHD2 protein (mitochondrial)

 Function CHCHD2 encodes a mitochondrial protein with several key roles:

Mitochondrial respiration: Regulates oxidative phosphorylation and electron transport chain function.

Apoptosis inhibition: Helps prevent cytochrome c release under stress, acting as an anti-apoptotic factor.

Cellular response to hypoxia: Translocates to the nucleus under hypoxic conditions to regulate expression of metabolic genes.

 Clinical and Disease Relevance Neurodegeneration Parkinson’s disease: CHCHD2 mutations have been associated with autosomal dominant Parkinson’s disease (especially c.182C>T, p.T61I).

Mechanisms include:

Mitochondrial dysfunction

Abnormal protein aggregation

Oxidative stress sensitivity

 Cancer Glioblastoma: Overexpression linked to tumor progression, metabolic reprogramming, and resistance to apoptosis.

May act as a pro-survival factor in hypoxic tumor microenvironments.

 Molecular Features CHCH domain: A signature helix-loop-helix motif with twin CX9C motifs, typical of proteins imported into mitochondria via the Mia40 pathway.

Localization: Predominantly mitochondrial intermembrane space.