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Gene Section
Mini Review

WRN (Werner syndrome, RecQ helicase-like)

Mounira Amor-Guéret

Institut Curie - Section de Recherche, UMR 2027 CNRS, Bâtiment 110, Centre Universitaire, F-91405 Orsay Cedex, France (MAG)

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Identity

HGNC (Hugo): WRN

Location: 8p12

DNA/RNA

Transcription

4.4 kb mRNA.

Protein

Description

1432 amino acids; contains one ATP binding site, one DExH helicase box, one exonuclease domain unique among known RecQ helicases in the N-terminal region, a nuclear localization signal in the C-terminus and a direct repeat of 27 amino acids between the exonuclease and helicase domains.

Localisation

Nuclear, predominant nucleolar localization.

Function

3-5 DNA helicase; 3-5 exonuclease; functionally interacts with DNA polymerase delta (POLD1) and RPA which are required for DNA replication and DNA repair, with Ku which is involved in double strand DNA break repair by non-homologous DNA end joining, and with p53.

Homology

Homologous to RecQ helicases, a subfamily of DExH box-containing DNA and RNA helicases. In particular, similarities with the four known human members in the RecQ subfamily, human RecQL, human BLM, the product of the Bloom syndrome gene, and the recently identified human RecQL4, involved in the Rothmund-Thomson syndrome, and RecQL5 proteins.

Mutations

Germinal

WRN mutations are located over the entire gene and include stop codons, insertions/deletions and exon deletions: not a single missense mutation has been identified so far.

Implicated in

Werner syndrome

Disease

Uncommon autosomal recessive disorder characterized by early onset of geriatric diseases, including atherosclerosis, osteoporosis, diabetes mellitus, juvenile cataract, graying of the hair and neoplasia, in particular soft-tissue sarcomas, in approximately 10% of WS patients.

Prognosis

WS patients die at mean age 46 +/- 11,6 years due to malignant tumors or cardiovascular infarctions.

Cytogenetics

Reciprocal chromosomal translocations and extensive genomic deletions.

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