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Gene Section
Review

ERCC5 (xeroderma pigmentosum, complementation group G)

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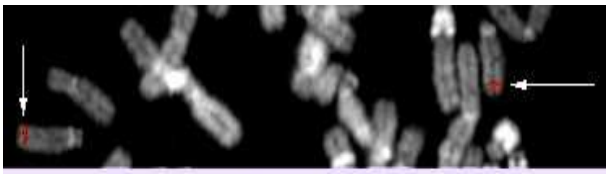
Identity

Other names: XPG (xeroderma pigmentosum, complementation group G); ERCC5

HGNC (Hugo): ERCC5

Location: 13q32-33



XPG (13q32-33) - Courtesy Mariano Rocchi, Resources for Molecular Cytogenetics.

DNA/RNA

Description

30 kb; 15 exons (from 61 to 1074 bp) and 14 introns (250 to 5763 bp).

Transcription

15 exons.
Six spliced XPG mRNA isoforms retaining alternatively spliced exons (I,III), full intron retentions (II, VI), partial intron retention (V) and partial exon skipping (IV).

Protein

Description

Xeroderma pigmentosum group G complementing factor; DNA-repair protein complementing XPG cells.

Function

The XPG protein has DNA endonuclease activity without preference for damaged DNA and is responsible for the 3' incision made during Nucleotide Excision Repair (NER). At the site of a lesion NER proteins create a DNA bubble structure over a length of approximately 25 nucleotides and the XPG protein incises the damaged DNA strand 0-2 nucleotides 3' to the ssDNA-dsDNA junction. In most studies the 3'-incision made by the XPG protein appeared to be performed prior to and independently of the 5'-incision by XPF-ERCC1. The XPG protein is required non-enzymatically for subsequent 5=D5 incision by the XPF/ERCC1 heterodimer during the NER process. Patients belonging to the XP-G complementation group clinically exhibit heterogeneous symptoms, from mild to very severe, sometimes associated with CS. XP-G cells are almost completely repair-deficient and as UV-sensitive as XP-A cells. About half of the described XPG patients exhibit also CS symptoms. In that case, the XPG protein is also involved in the transcription-coupled repair of oxidative DNA lesions.

Homology

Extensive sequence similarities, in bipartite domain A and B, to products of RAD repair genes of two yeasts, Saccharomyces cerevisae RAD2 and Schizosaccharomyces pombe RAD13.

Mutations

Germinal

5 XPG sequence alterations: 3 point mutations and two small deletions.

Implicated in

Xeroderma pigmentosum, XP group G/cockayne=D5s syndrome, XP/CS

Disease

Early skin tumours.

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