

Gene Section

Mini Review

TRB (T cell Receptor Beta)

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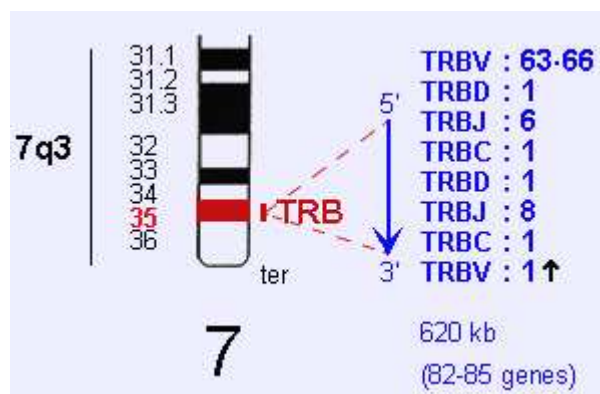
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Identity

HGNC (Hugo): TRB@

Location: 7q35



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Note

The human TRB locus is located on chromosome 7 on the long arm, at band 7q35. The orientation of the locus has been determined by the analysis of translocations, involving the TRB locus, in leukemia and lymphoma.

DNA/RNA

Description

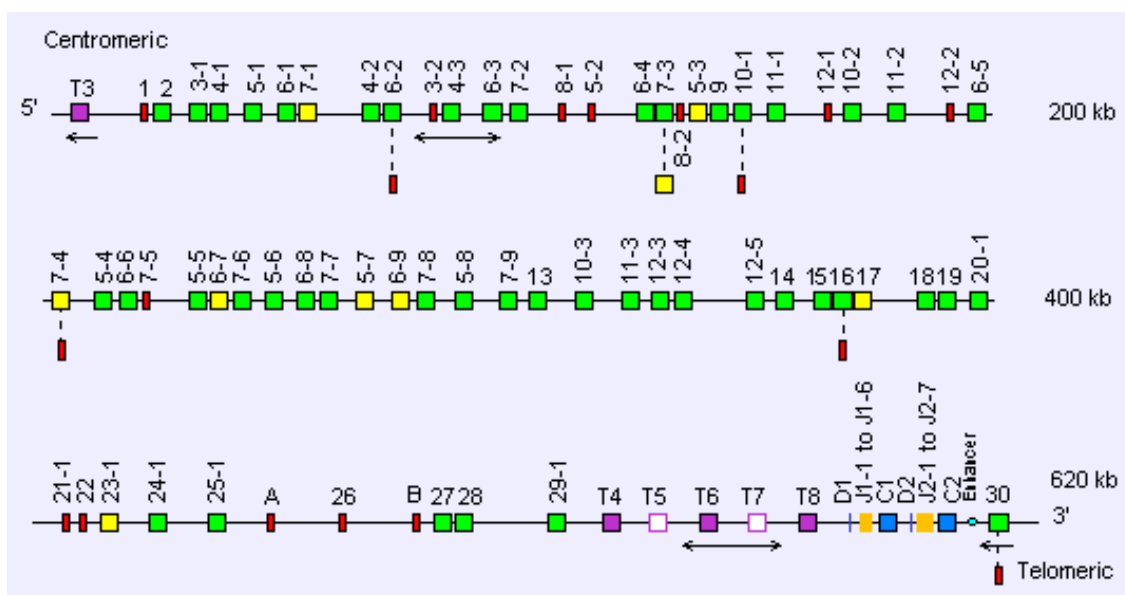
The human TRB locus at 7q35 spans 620 kb. It consists of 64-67 TRBV genes belonging to 32 subgroups.

Except for TRBV30, localized downstream of the TRBC2 gene, in inverted orientation of transcription, all the other TRBV genes are located upstream of a duplicated D-J-C-cluster, which comprises, for the first part one TRBD, six TRBJ, and the TRBC1 gene, and for the second part, one TRBD, eight TRBJ, and the TRBC2 gene.

The most 5' TRBV genes occupy the most centromeric position, whereas the TRBV30 gene, 3' of the locus, is the most telomeric gene in the TRB locus.

The potential repertoire consists of 39-46 functional TRBV genes belonging to 21-23 subgroups, the two TRBD, thirteen TRBJ (6 from the first cluster and 7 from the second cluster), and the two TRBC genes.

Six TRBV orphans have been localized on chromosome 9 at 9p21. Enhancer sequences have been characterized 5.5 kb 3' from TRBC2.



TRB
 V-GENE: Green box: Functional; Yellow box: Open reading frame; Red: Pseudogene.
 D-GENE: Blue: Functional.
 J-GENE: Grey: Functional.
 C-GENE: Blue: Functional.
 GENES NOT RELATED: Purple: Functional; Purple open box: Pseudogene.

For complete Figure, see the international ImMunoGeneTics information system; Copyright 1995-2003 IMGT.

Protein

Description

Proteins encoded by the TRB locus are the T cell receptor beta chains. They result from the recombination (or rearrangement), at the DNA level, of three genes: TRBV, TRBD and TRBJ, with deletion of the intermediary DNA to create a rearranged TRBV-D-J gene. The rearranged TRBV-D-J gene is transcribed with one of the two TRBC genes and translated into a T cell receptor beta chain.

Translation of the variable germline genes involved in the TRBV-D-J rearrangements are available at IMGT Repertoire Protein displays. TRB V-D-J rearrangements can be analysed using the IMGT/V-QUEST tool.

Mutations

Note

Mutations which correspond to allelic polymorphisms of the functional germline TRBV, TRBD, TRBJ and TRBC genes are described in the IMGT database.

Implicated in

Translocations which frequently result from errors of the recombinase enzyme complex (RAG1, RAG2, etc.), responsible of the Immunoglobulin and T cell receptor V-J and V-D-J rearrangements. TRBV, TRBD or TRBJ recombination signals or isolated heptamer are frequently observed at the breakpoints.

t(7;9)(q35;q34)

t(7;10)(q35;q24)

t(7;11)(q35;p13)

t(7;19)(q35;p13)

References

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