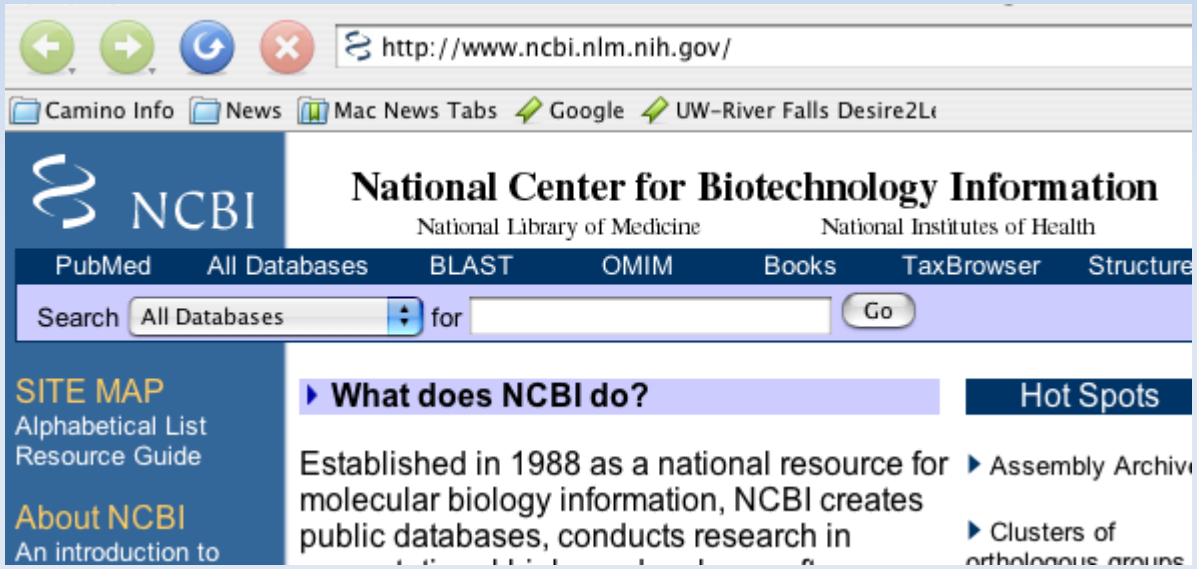
Topic 4 – Genes and Databases

Exons, Introns, UTRs

Surfing – Start with a Protein

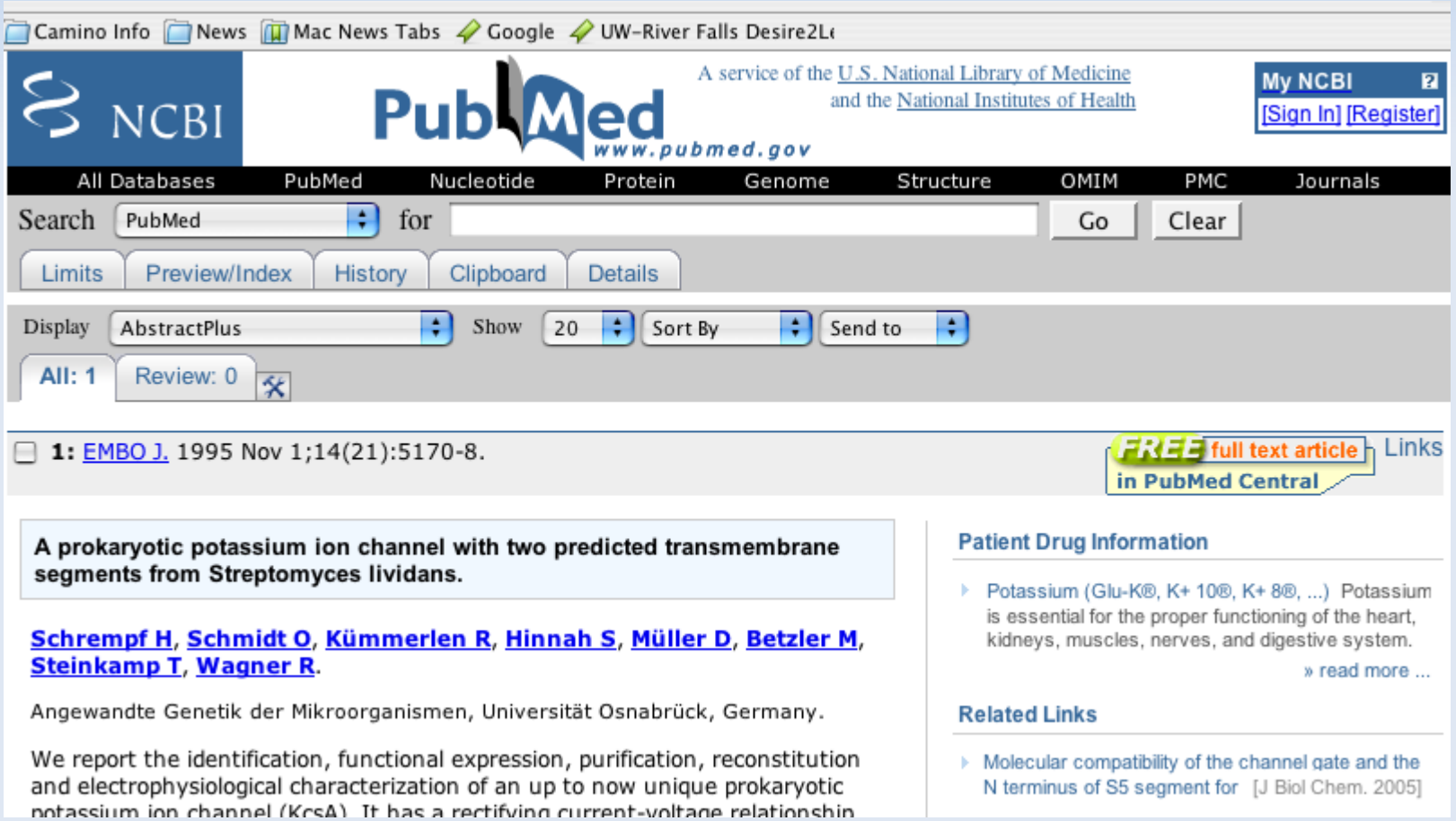


http://www.ncbi.nlm.nih.gov/

Search Protein database for P0A334

Protein to Journal Article

Click on the Pubmed link “7489706”

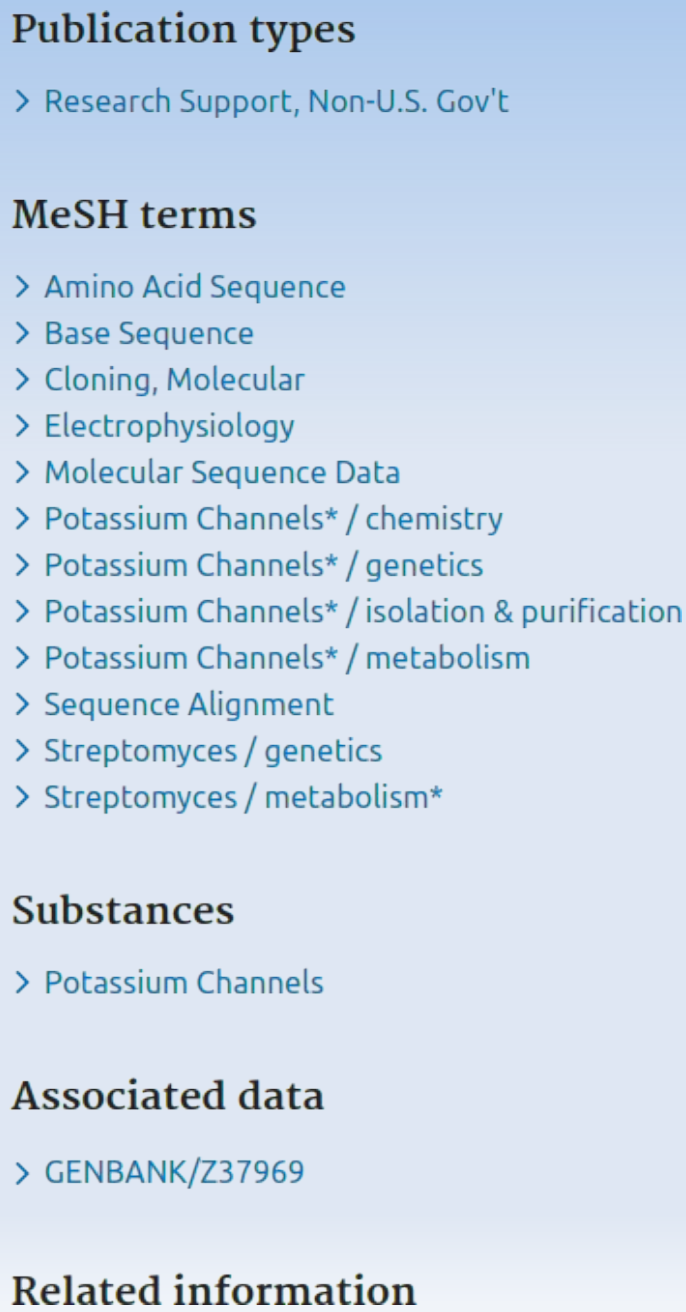


Journals to Nucleotide

Look in the

”Associated data” area:

Click on Z37969 and choose ”Search in Nucleotides



Publication types

> Research Support, Non-U.S. Gov't

MeSH terms

> Amino Acid Sequence
> Base Sequence
> Cloning, Molecular
> Electrophysiology
> Molecular Sequence Data
> Potassium Channels* / chemistry
> Potassium Channels* / genetics
> Potassium Channels* / isolation & purification
> Potassium Channels* / metabolism
> Sequence Alignment
> Streptomyces / genetics
> Streptomyces / metabolism*

Substances

> Potassium Channels

Associated data

> GENBANK/Z37969

Related information

Nucleotide Data

Do the lengths of coding sequence protein sequence tell you anything about the number of introns?

Look at the translation table and compare with the one in the lecture notes.
Where is the stop codon for this sequence?

S.lividans skc1 gene for potassium channel protein

GenBank: Z37969.1

FASTA Graphics

Go to:

```
LOCUS       Z37969                  1161 bp    DNA     linear   BCT 18-APR-2005
DEFINITION  S.lividans skc1 gene for potassium channel protein.
ACCESSION   Z37969
VERSION     Z37969.1
KEYWORDS    potassium channel protein; skc1 gene.
SOURCE      Streptomyces lividans 1326
  ORGANISM  Streptomyces lividans 1326
            Bacteria; Actinobacteria; Streptomycetales; Streptomycetaceae;
            Streptomyces.
REFERENCE   1  (bases 1 to 1161)
  AUTHORS   Schrempf,H., Schmidt,O., Kummerlen,R., Hinnah,S., Muller,D.,
            Betzler,M., Steinkamp,T. and Wagner,R.
  TITLE     A prokaryotic potassium ion channel with two predicted
            transmembrane segments from Streptomyces lividans
  JOURNAL   EMBO J. 14 (21), 5170-5178 (1995)
   PUBMED   7489706
REFERENCE   2  (bases 1 to 1161)
  AUTHORS   Schrempf,H.
  TITLE     Direct Submission
  JOURNAL   Submitted (23-SEP-1994) Schrempf H., Abt. AGM, FB Biologie /
            Chemie, Uni Osnabrueck, Barbarastr. 11, D-49090 Osnabrueck, FRG
FEATURES             Location/Qualifiers
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                     /db_xref="InterPro:IPR003091"
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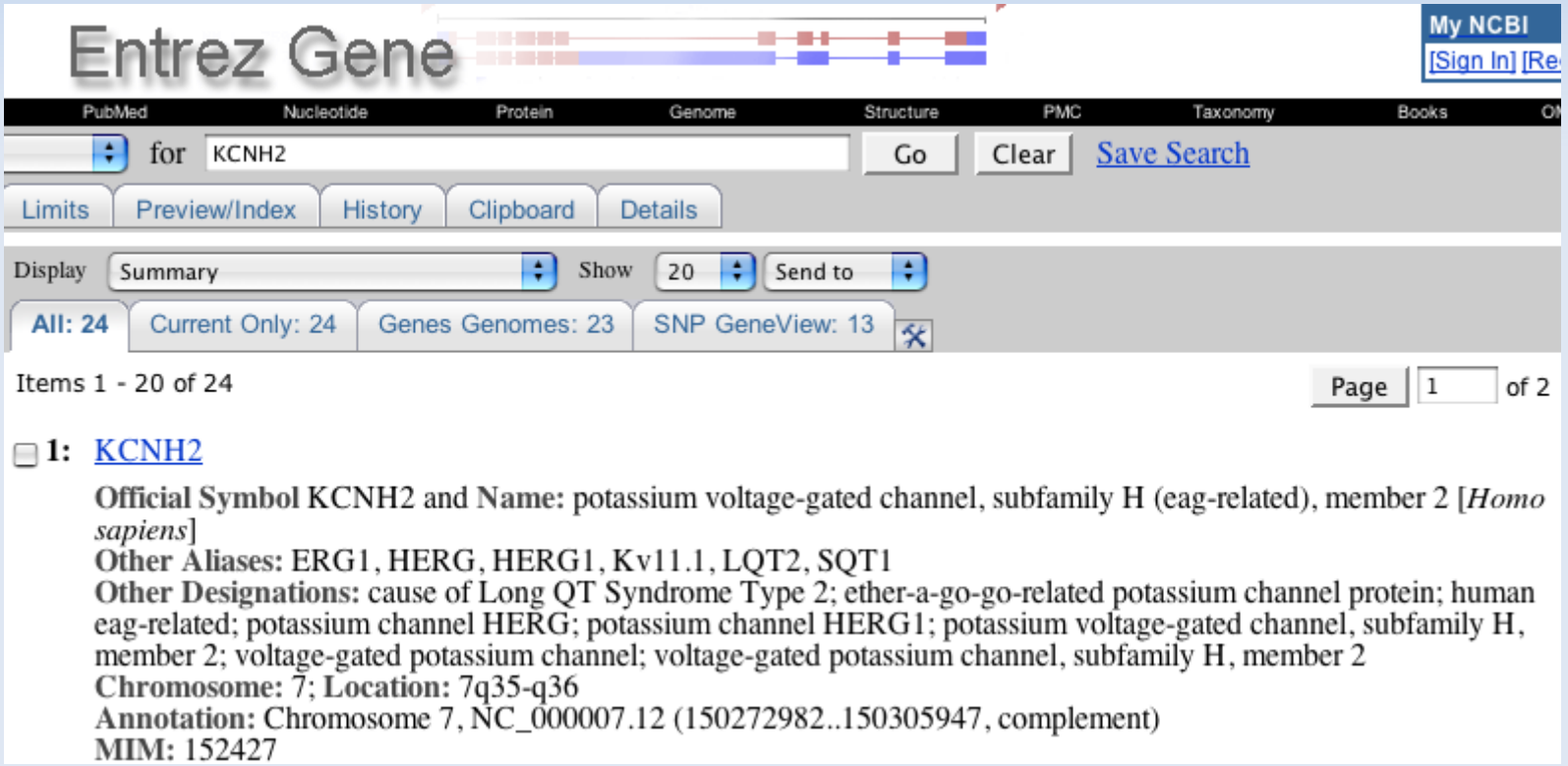
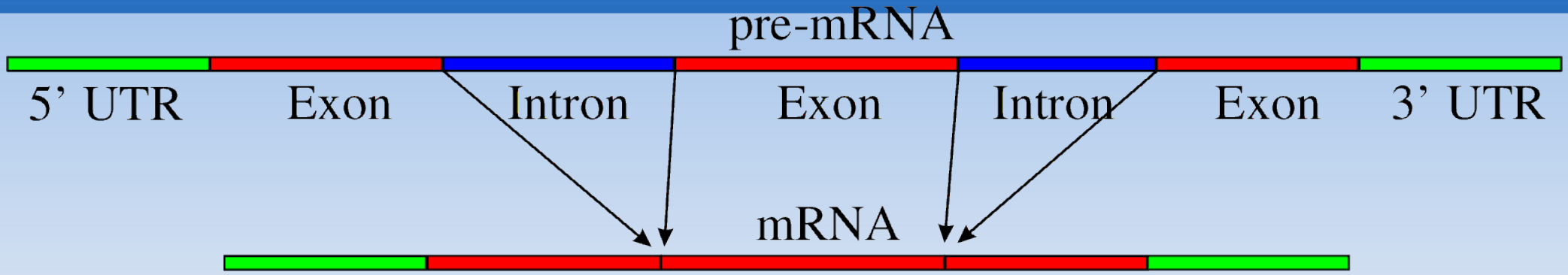
Compare with an eukaryotic gene

Find the NIH Gene database entry for
human KCNH2 gene



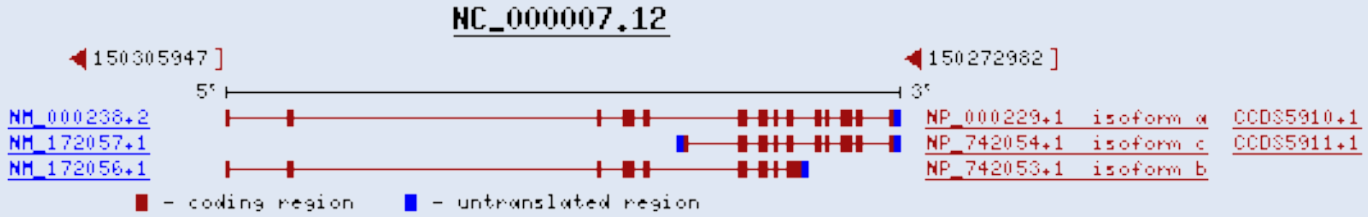
Alternative Splicing



Genomic regions, transcripts, and products

(minus strand) Go to reference sequence details

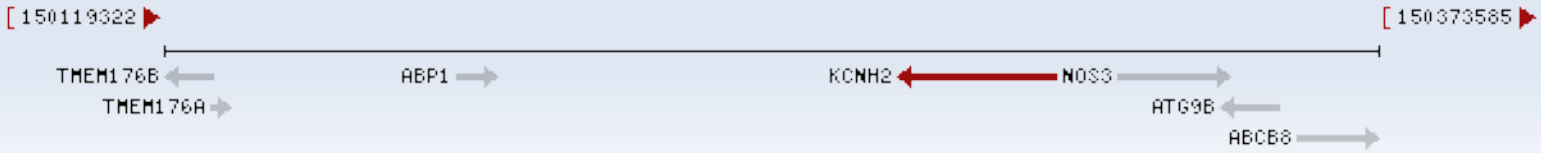
Try our new Sequence Viewer



Genomic context

chromosome: 7; **Location**: 7q35-q36

See KCNH2 in MapViewer



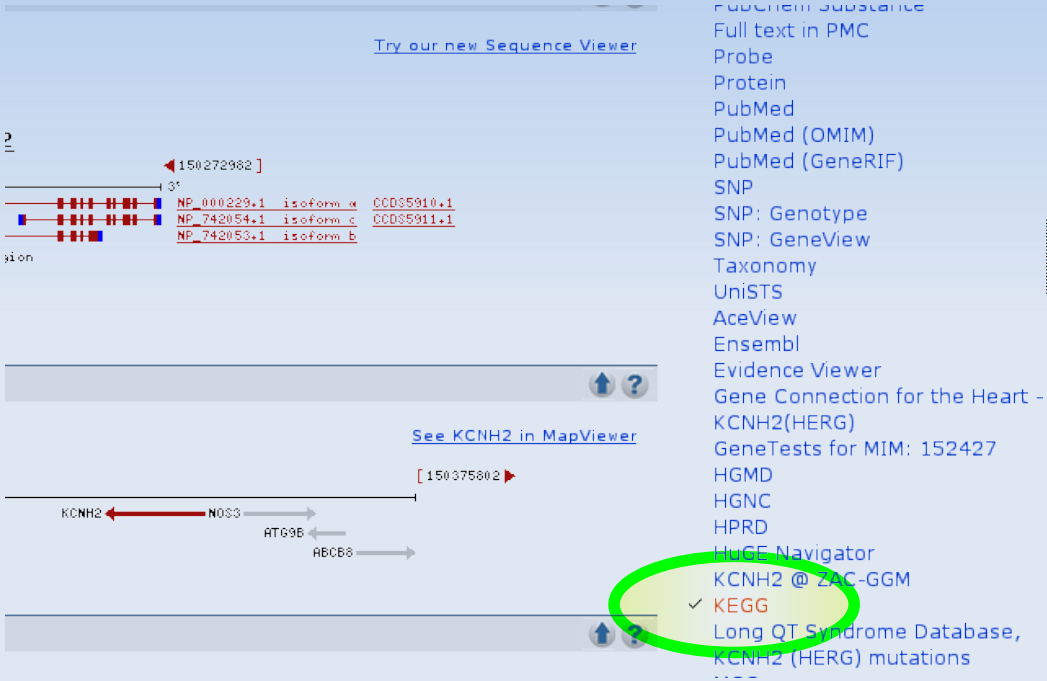
Alternative Splicing

- Humans have about 20,000 genes
- And about 100,000 distinct proteins!

  → on average, each gene may be capable of giving us 5 splice variants!

- We have tissue/organ-specific splicing factors that give us different mature mRNAs in different organs or tissues

From NCBI Gene to the Kyoto Encyclopedia of Genes and Genomes



Click on the 3D Structures link to see protein structure data.

Scroll down to the ”Links to other resources” and click the KEGG link to see information about diseases, drugs, etc.

Homo sapiens (human): 3757

Help

Entry	3757 CDS H.sapiens
Gene name	KCNH2, LQT2
Definition	potassium voltage-gated channel, subfamily H (eag-related), member 2
Orthology	KO: K04905 potassium voltage-gated channel, Eag-related subfamily H, member 2
Class	BRITE hierarchy
SSDB	Ortholog Paralog Gene cluster
Motif	Pfam: PAS PAS_3 Ion_trans Ion_trans_2 cNMP_binding PROSITE: CNMP_BINDING_3 PAS PAC Motif
Other DBs	OMIM: 152427 NCBI-GI: 4557729 NCBI-GeneID: 3757 HGNC: 6251 HPRD: 01069 Ensembl: ENSG00000055118 UniProt: A5H1P7 Q12809
LinkDB	All DBs
Structure	PDB: 1BYW Thumbnails Jmol
Position	7q35-q36
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