Online Databases

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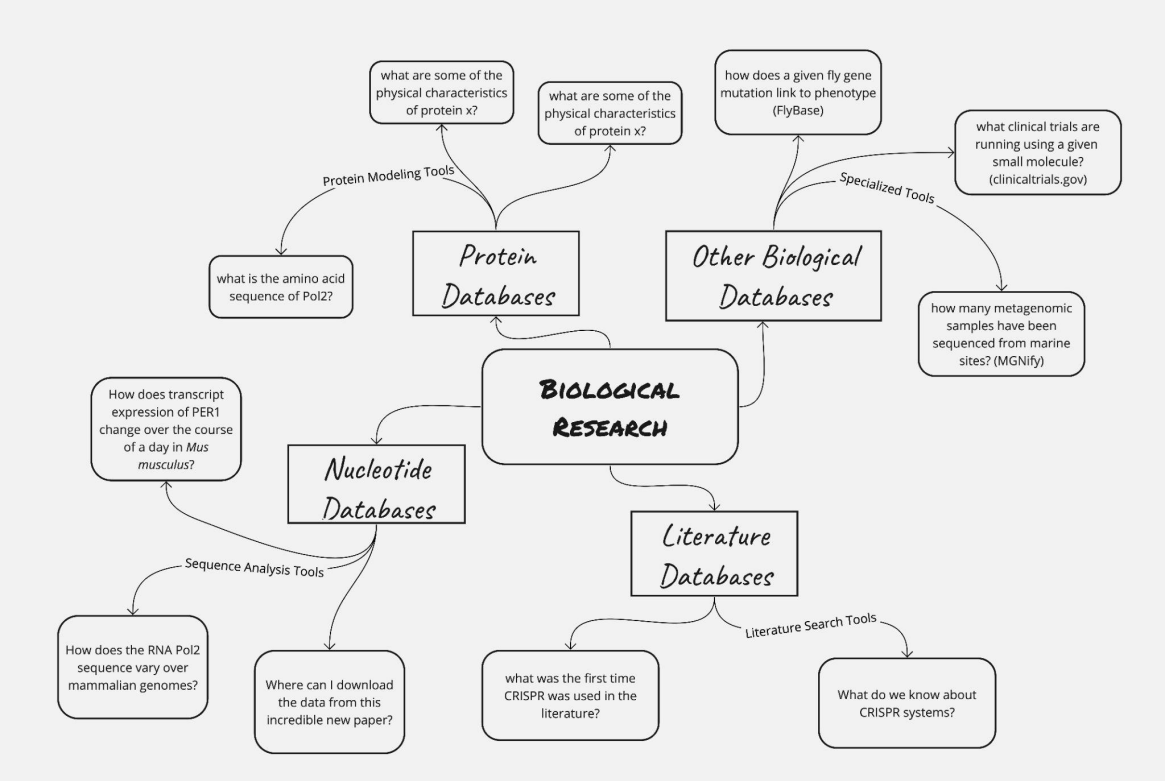
It's a jungle out there !
Categories - Publications and Life/Organism based databases



- Different jurisdictions / silos
- Different data, structured in different ways
- Different tools

Specialized Databases: These are specific to certain organisms, diseases, or types of data. Examples include:

- **FlyBase**: A database for Drosophila genetics and molecular biology.
- **The Cancer Genome Atlas:** Provides genomic and molecular data on various types of cancer.
- **Saccharomyces Genome Database**: a database for yeast genomes and mol bio

Taxonomic and Species Databases: These databases provide information on species classification and taxonomy. Examples include:

- **ITIS** (Integrated Taxonomic Information System): Taxonomic information on plants, animals, fungi, and microbes.
- **The Plant List**: A comprehensive botanical database

Ecological and Environmental Databases: Contain data on ecosystems, biodiversity, and environmental conditions. Examples include:

- **GBIF** (Global Biodiversity Information Facility): Provides access to data about all types of life on Earth.
- **DataONE**: A repository of environmental and ecological data.

What is a database and what content do we expect for bio databases?

Columns:

Name

Source

Organism

Accession – similar to version External references

Treasure column containing the sequence

Central Dogma is DNA→RNA→Proteins so we expect to have DNA (AKA nucleotide/genomic) and RNA and protein databases.

RNA information is indirectly stored in DNA databases, therefore we only focus on **Protein databases and DNA databases** in this course - they are the ones we will need them for our homework

Proteins are chains of Amino-acids, that can be concatenated in long sequences and they have a “Beginning”-called N Terminal and an “End” called C Terminal and elongation occurs only at the end. Each AA uses a letter, for instance Methionine is M. So to capture information on a protein we just need a simple **oriented** sequence of letters like **MALWMRLL**. growing to the →

That **sequence c**olumn and stores the amino-acid names in order starting with N terminal. That is what we will search and download as a text file to further process it in other tools to do our magic.

Nucleotide Databases: These databases contain sequence data for DNA and RNA. Examples include:

- **GenBank**: A genetic sequence database providing an annotated collection of all publicly available DNA sequences.
- **EMBL Nucleotide Sequence Database**: Managed by the European Molecular Biology Laboratory, it collects nucleotide sequences.

Metabolic and Pathway Databases: These focus on metabolic pathways and interactions within a cell. Examples include:

- **KEGG (Kyoto Encyclopedia of Genes and Genomes)**: A database resource for understanding high-level functions of the biological system.
- **Reactome**: Provides curated pathways of many biological processes.

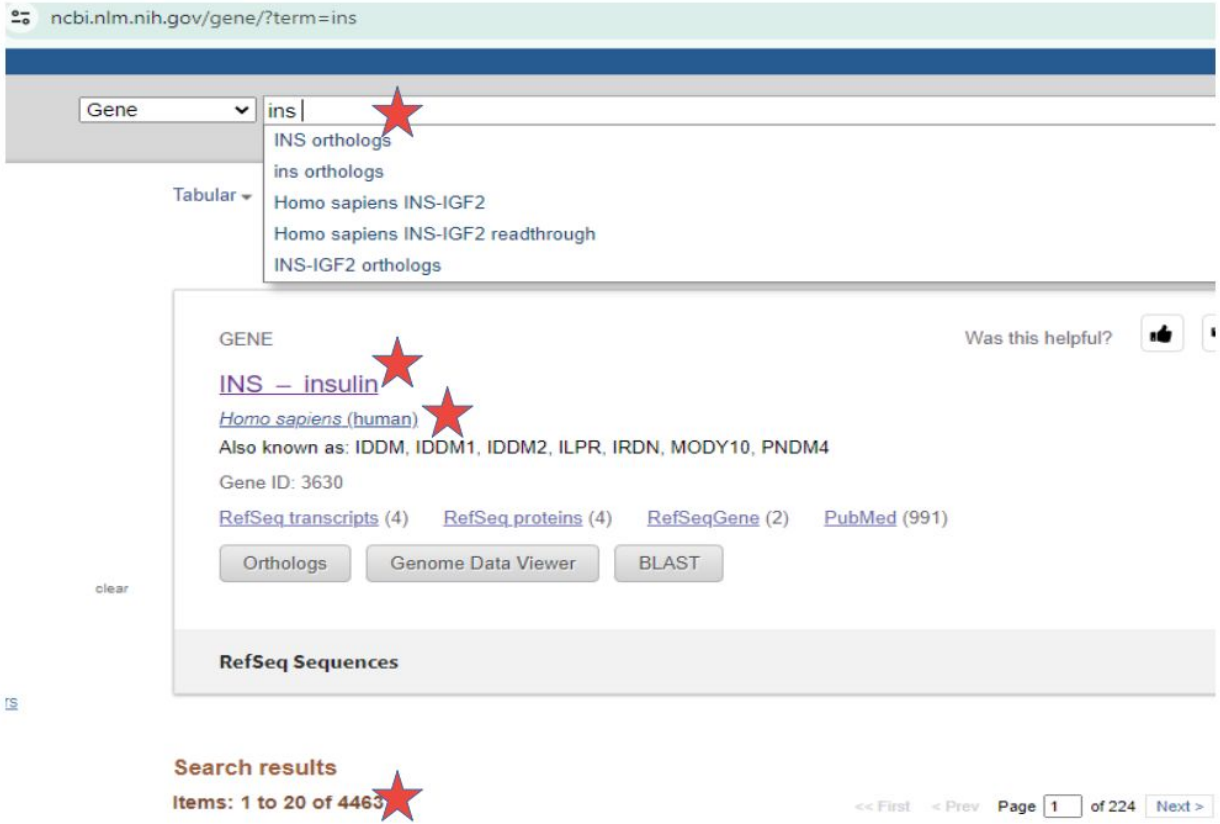
Protein Databases: Focused on proteins and store sequences, structures, and functions:

- **UniProt**: Protein sequence and annotation data.
- **Protein Data Bank (PDB)**: A database for the 3D structural data of large biological molecules.
- **SwissProt**: Protein sequence and functional information

DNA is made of 4 molecules A,T,G,C and like amino-acids they have a beginning and an end called **5' and 3'** and can be linked in long **sequences** called strands
In order to resist breakage the DNA strands are doubled by using **complementary bases oriented in reverse direction**. Only one **strand sequence** is stored in the DNA database and that is called coding strand and it's not !!! the one read by RNA polymerase!!

DNA Databases sometimes called Nucleotide/Genomic **:**

- **NCBI Genome**: National Center for Biotechnology Info complete genome sequences
- **Ensembl/BLAST**: A genomic browser and tools
- **EMBL**: Collection of nucleotide sequences by European Bioinformatics Institute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Gene
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INS orthologs
ins orthologs
Homo sapiens INS-IGF2
Homo sapiens INS-IGF2 readthrough
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Tabular
GENE
Was this helpful?
INS – insulin
Homo sapiens (human)
Also known as: IDDM, IDDM1, IDDM2, ILPR, IRDN, MODY10, PNDM4
Gene ID: 3630
RefSeq transcripts (4)
RefSeq proteins (4)
RefSeqGene (2)
PubMed (991)
Orthologs
Genome Data Viewer
BLAST
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RefSeq Sequences
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Page 1 of 224
Next >

sulin [*Homo sapiens* (human)]

Download Datasets

8630, updated on 16-Jan-2024

mary

Official Symbol	INS provided by HGNC
fficial Full Name	insulin provided by HGNC
Primary source	HGNC:HGNC:6081
See related	Ensembl:ENSG00000254647 MIM:176730; AllianceGenome:HGNC:6081
Gene type	protein coding
RefSeq status	REVIEWED
Organism	Homo sapiens
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Primates; Haplorrhini; Catarrhini; Hominidae; Homo
Also known as	IDDM; ILPR; IRDN; IDDM1; IDDM2; PNDM4; MODY10
Summary	This gene encodes insulin, a peptide hormone that plays a vital role in the regulation of carbohydrate and lipid metabolism. After removal of the precursor signal peptide, proinsulin is post-translationally cleaved into three peptides: the B chain and A chain peptides, which are covalently linked via two disulfide bonds to form insulin, and C-peptide. Binding of insulin to the insulin receptor (INSR) stimulates glucose uptake. A multitude of mutant alleles with phenotypic effects have been identified, including insulin-dependent diabetes mellitus, permanent neonatal diabetes diabetes mellitus, maturity-onset diabetes of the young type 10 and hyperproinsulinemia. There is a read-through gene, INS-IGF2, which overlaps with this gene at the 5' region and with the IGF2 gene at the 3' region. [provided by RefSeq, May 2020]
Expression	Restricted expression toward pancreas (RPKM 671.7) See more
Orthologs	mouse all

NEW Try the new Gene table

Try the new Transcript table

omic context

on: 11p15.5

See INS in Genome Data Viewer

ount: 3

ation release	Status	Assembly	Chr	Location
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023_10	current	T2T-CHM13v2.0 (GCF_009914755.1)	11	NC_060935.1 (2247427..2248857, complement)
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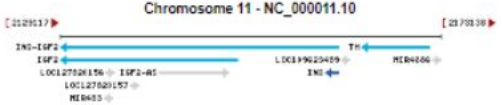
Chromosome 11 - NC_000011.10

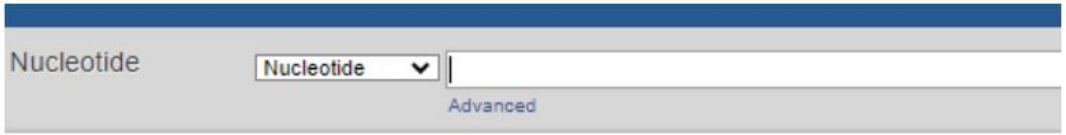


omic regions, transcripts, and products

Go to reference sequence details

ic Sequence: NC_000011.10 Chromosome 11 Reference GRCh38.p14 Primary Assembly

Go to nucleotide: Graphics FASTA GenBank



FASTA

Homo sapiens chromosome 11, GRCh38.p14 Primary Assembly

NCBI Reference Sequence: NC_000011.10

GenBank Graphics

>NC_000011.10:c2161209-2159779 Homo sapiens chromosome 11, GRCh38.p14 Primary Assembly
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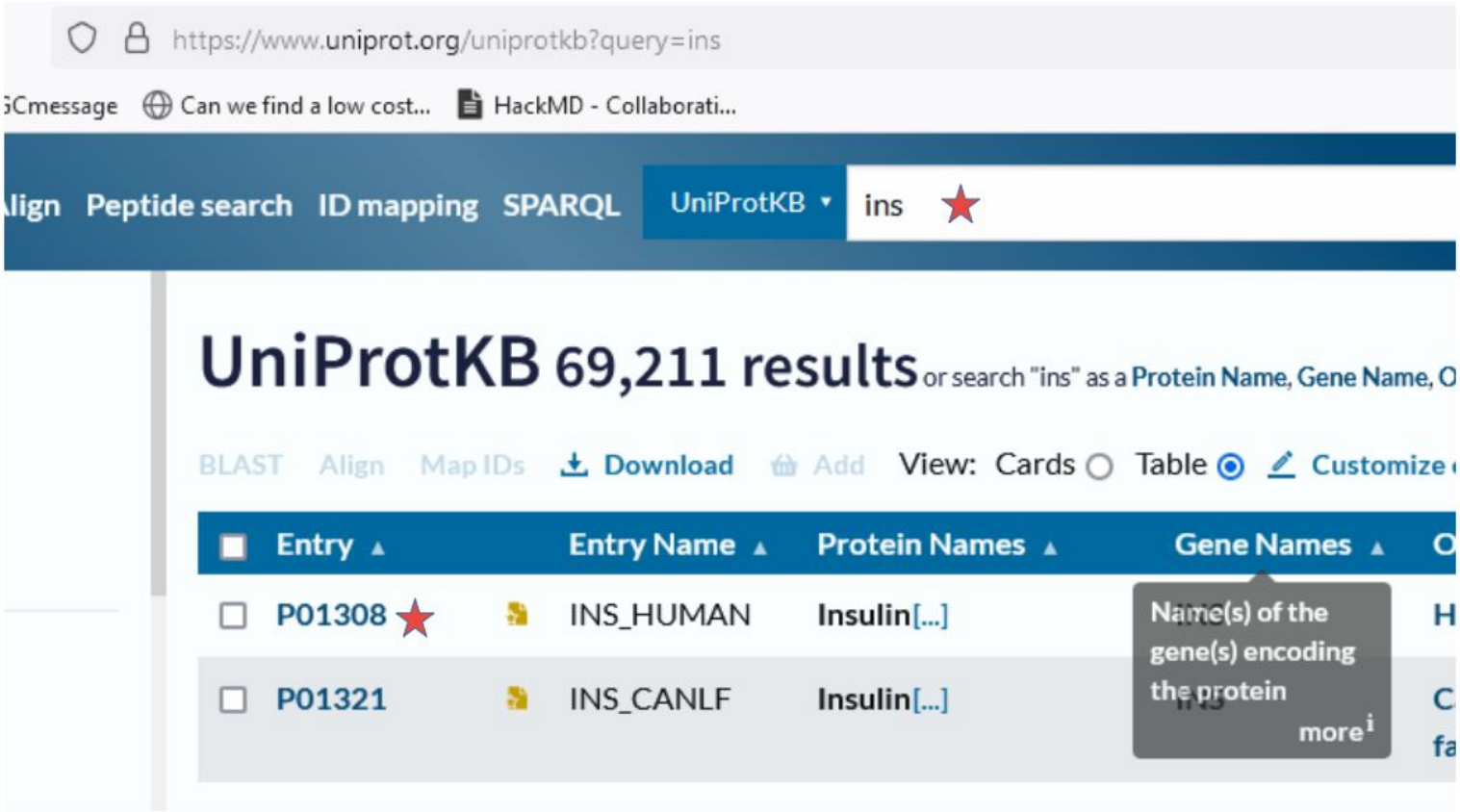
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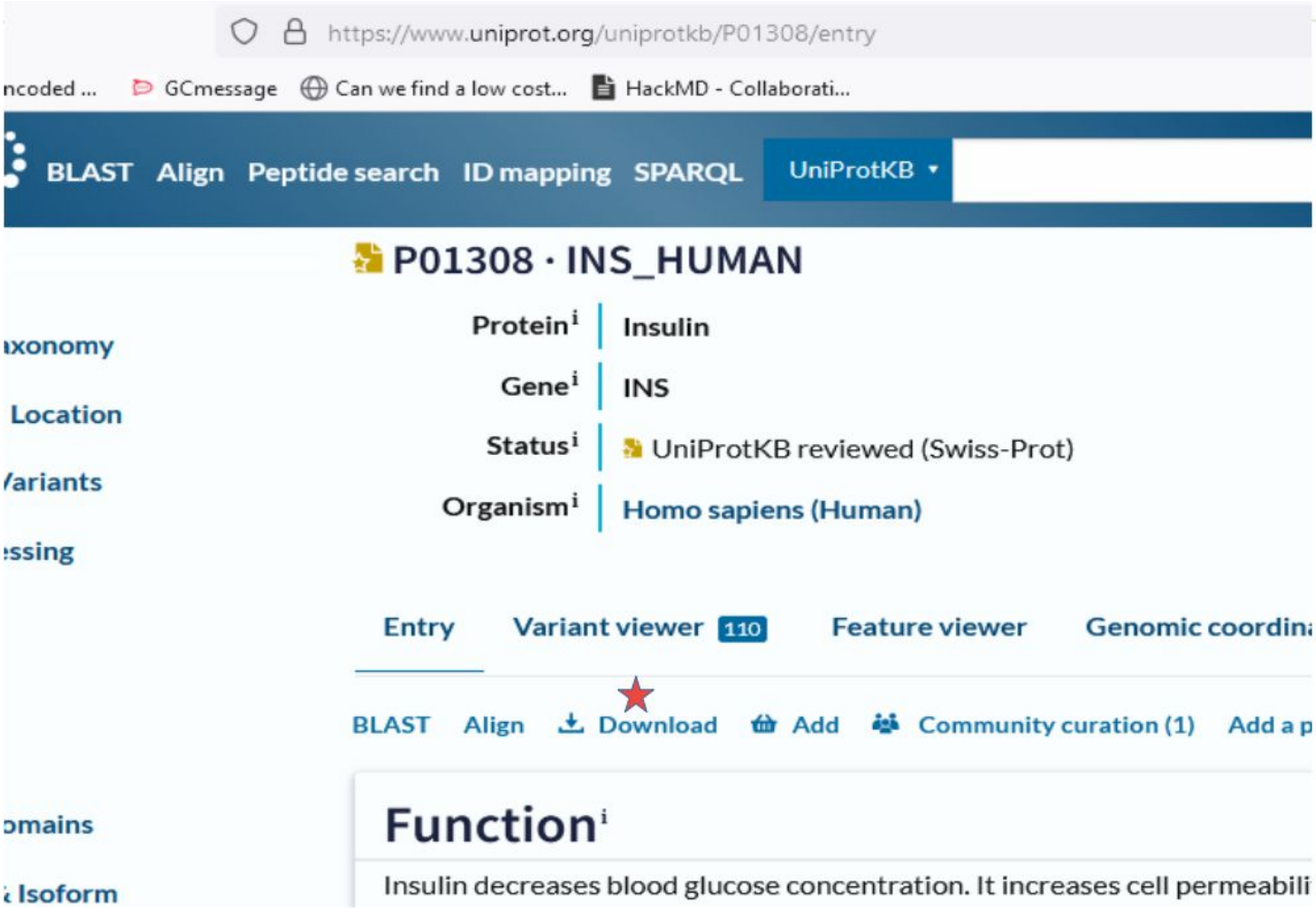
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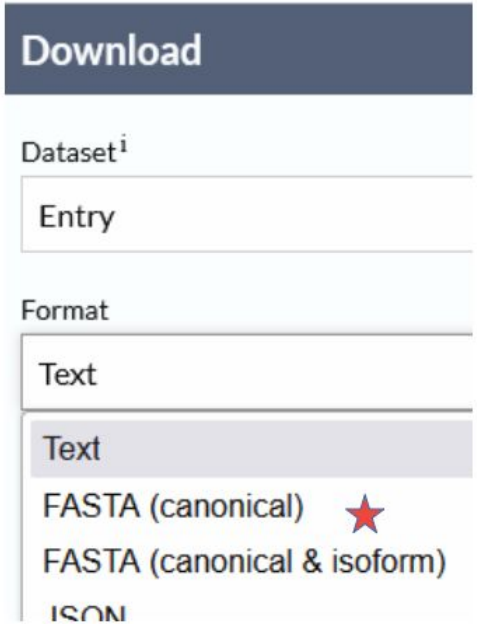
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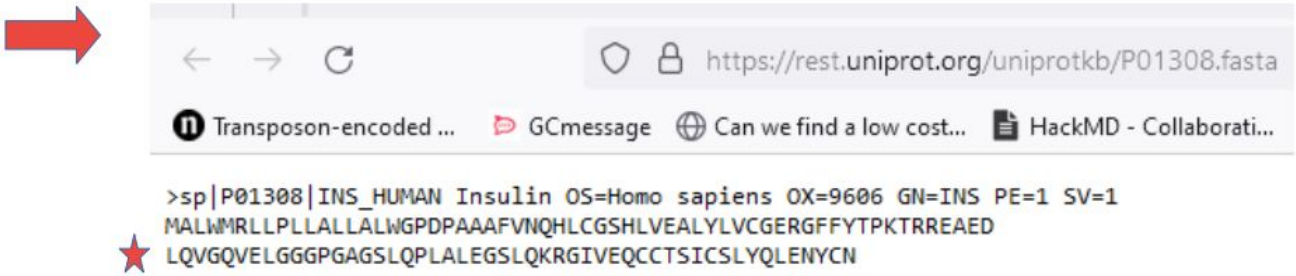
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