

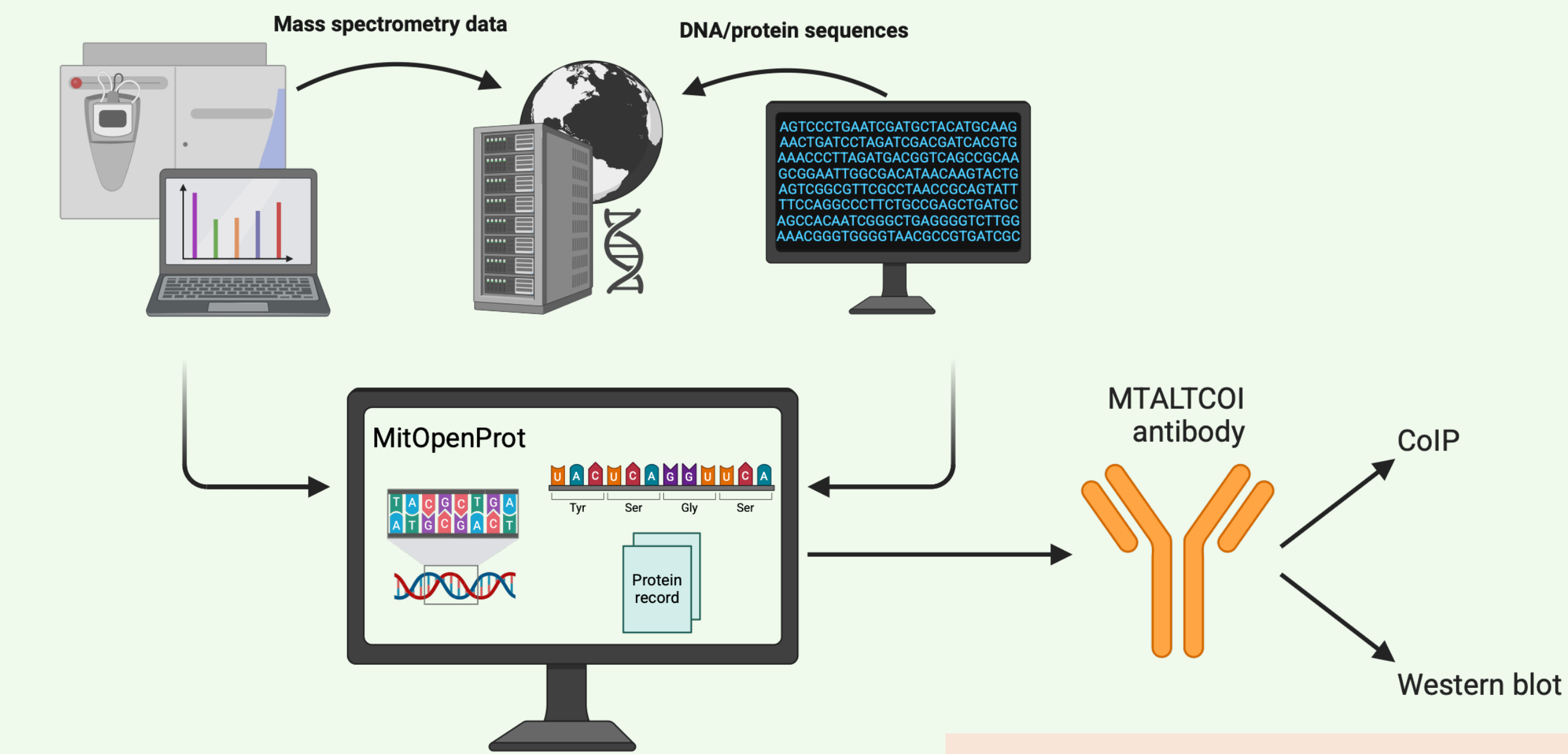
Unraveling the mitochondrial alternative proteome: systematic identification and evolutionary insights into altORFs



Sarah Cornet, Francis Robitaille, Amy Campbell, Xavier Roucou, Sophie Breton
Département de sciences biologiques, Université de Montréal, Canada

What is MitOpenProt?

Based on mass spectrometry data, DNA/protein sequences, MitOpenProt predict protein and DNA sequence of proteins localized in the alternative open reading frames of mitochondrial DNA.

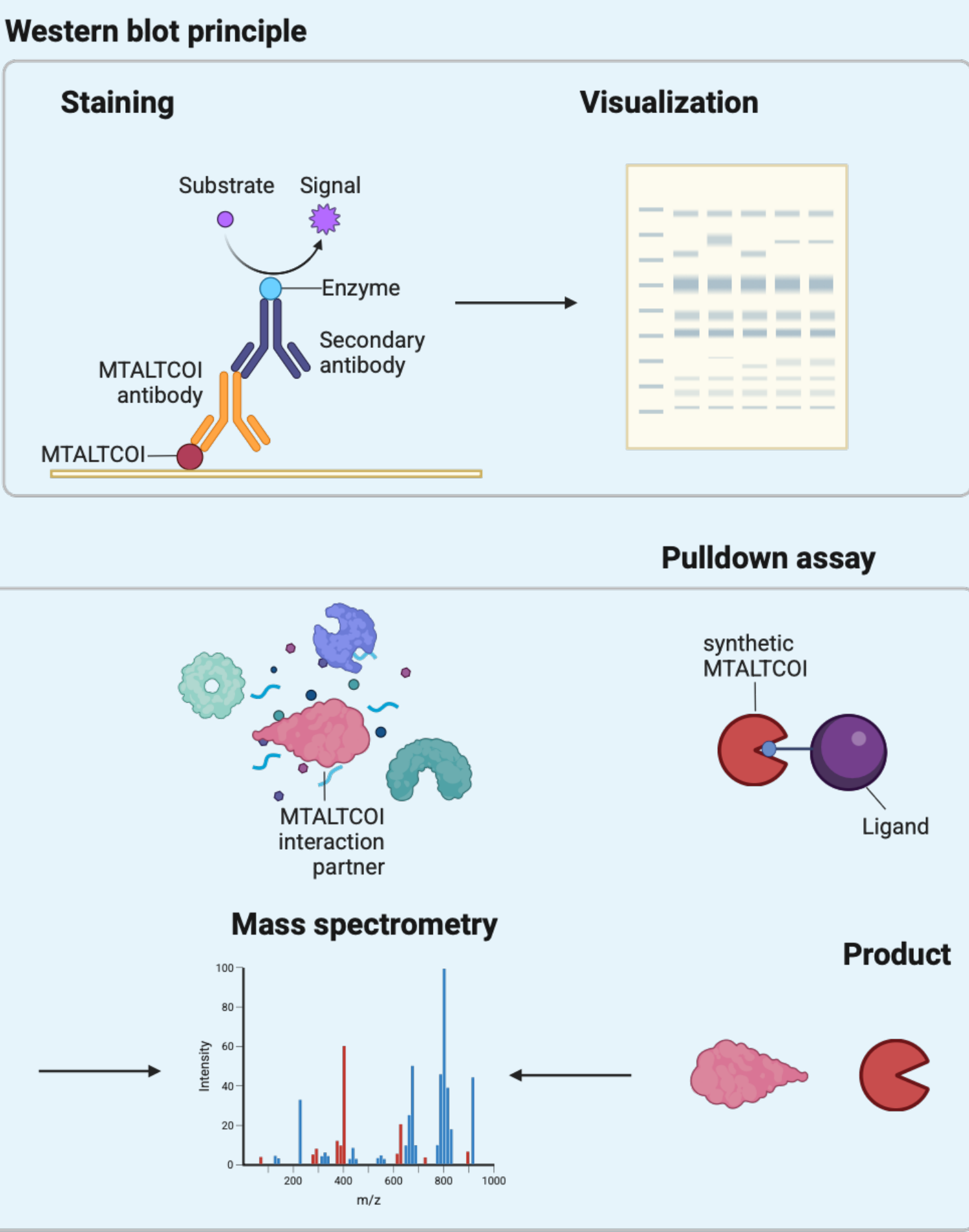


Develop a bioinformatic pipeline to allow alternative protein discovery in human mitogenome

MitOpenProt Wetlab Application

Antibodies designed with MitOpenProt are useful to:

- Identify proteins with Western Blot;
- Identify interaction partners with co-immunoprecipitation.



MitOpenProt Development

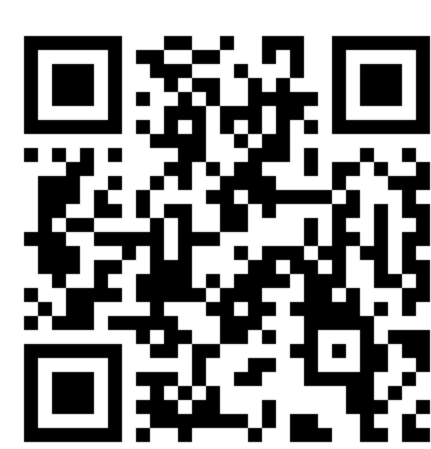


MtaltORFs Human Map

Circular representation of the alternative ORFs in the human mitogenome.

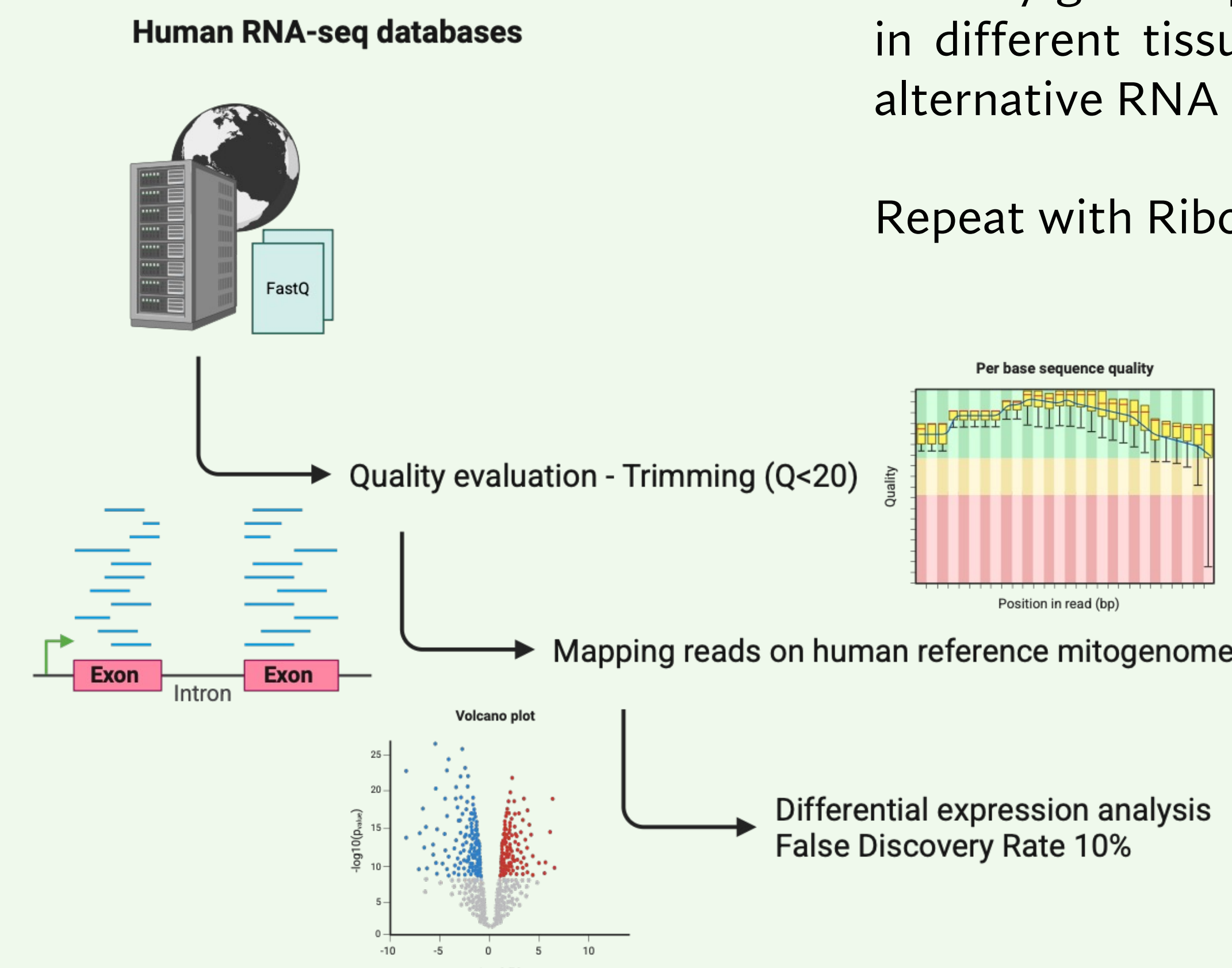
- rRNA
- Complex I
- Complex III
- Complex IV
- ATP synthase
- Alternative protein

Scan me for genetic details!



Where are MtaltORFs Expressed?

To identify sources of alternative proteins in the organism, a meta-analysis of existing complete cell lysate RNA-seq data will be performed.

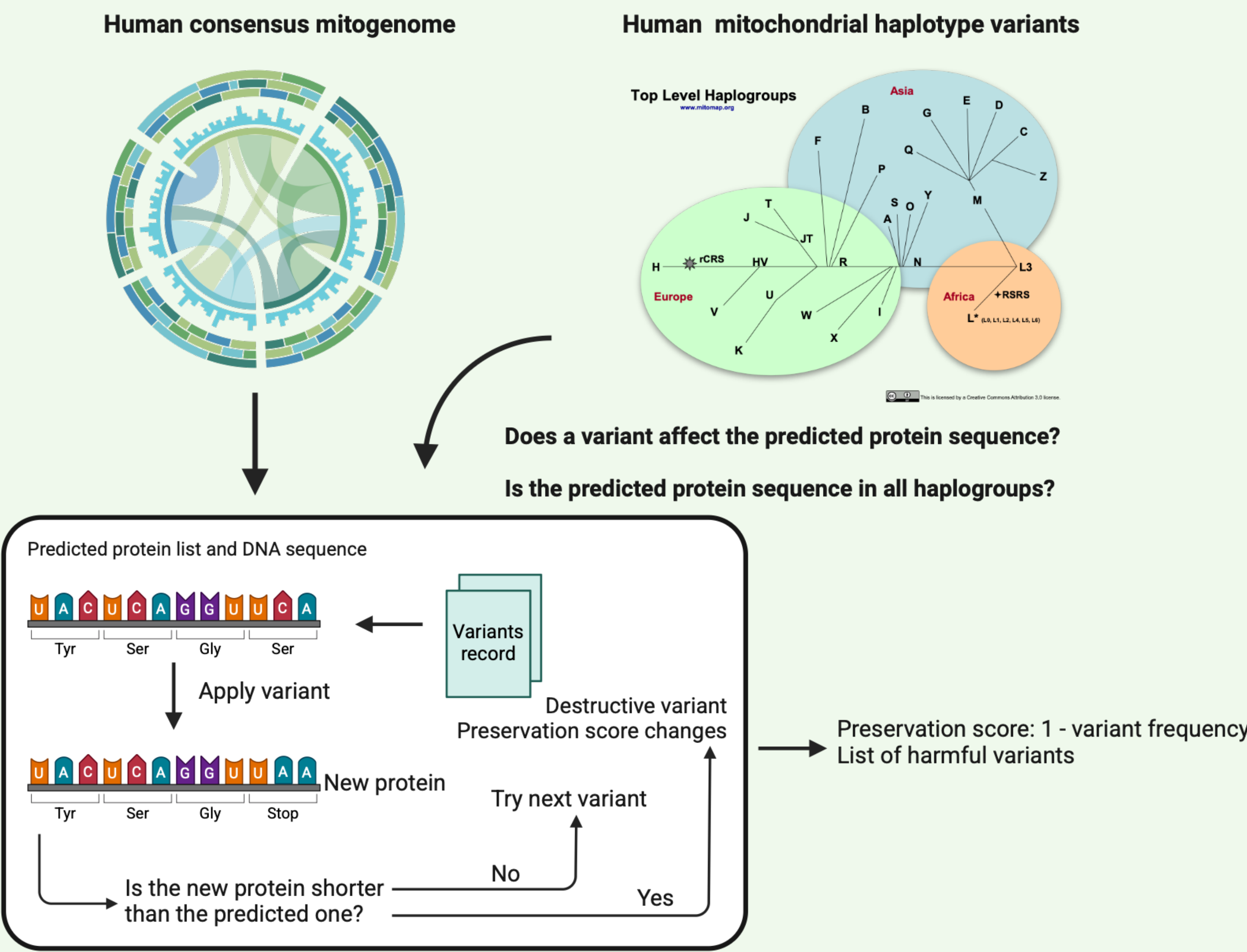


Identify gene expression patterns in different tissues and potential alternative RNA sequences.

Repeat with Ribo-seq data.

Mitogenomic Diversity

Based on the human reference mitochondrial genome, the predictions need to take the haplogroup diversity into account. Here, we simulated the impact of common genetic variants on proteins sequences, variants are considered destructive when affecting it.



Take-Home Message

- Alternative proteins need to be discovered
- MitOpenProt facilitates the designing process of antibodies
- It takes genetic diversity and context dependent expression into account

References

Robitaille *et al.* 2024
Kienzle *et al.* 2023
Biorender.com
Mitomap.org

INNOVATION.CA
CANADA FOUNDATION FOR INNOVATION | FONDATION CANADIENNE POUR L'INNOVATION



Chaires de recherche du Canada
Canada Research Chairs



Fonds de recherche Nature et technologies
Québec