

mitoBench: An interactive visual workbench for population genetics on mitochondrial DNA



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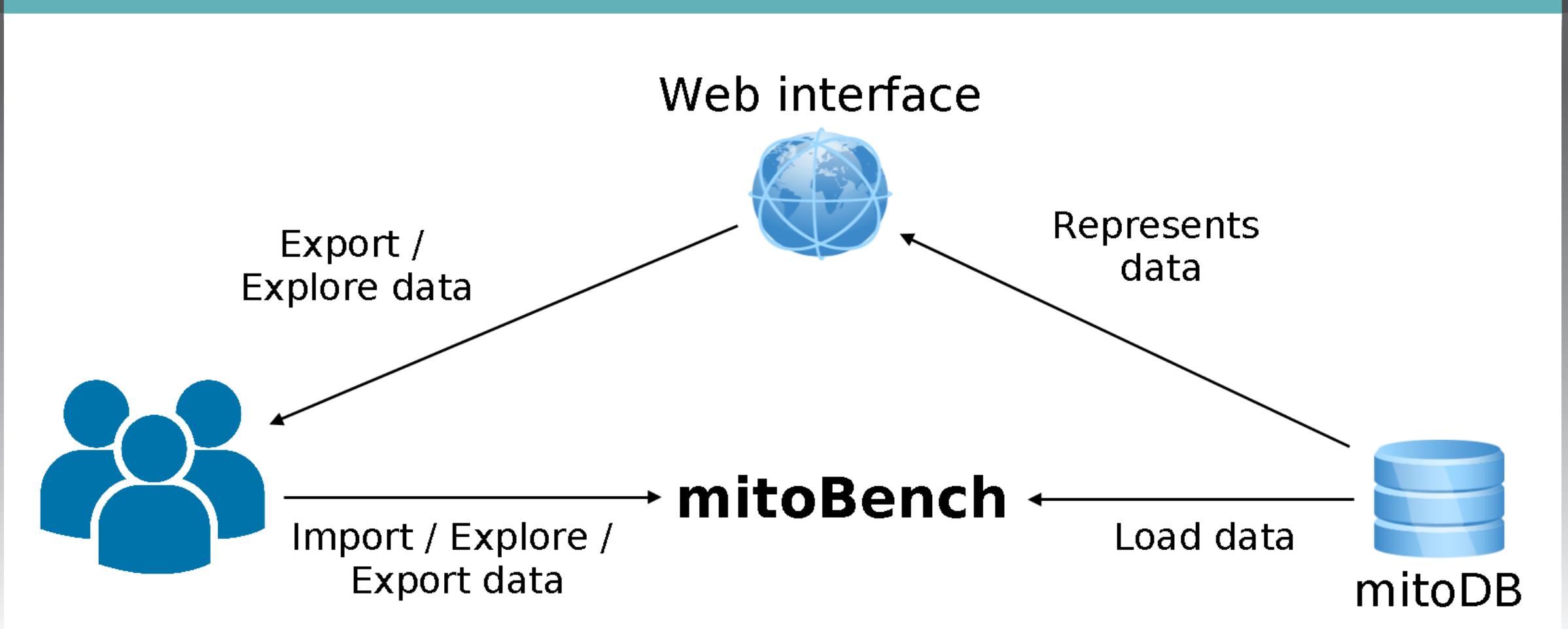


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Motivation & Goals

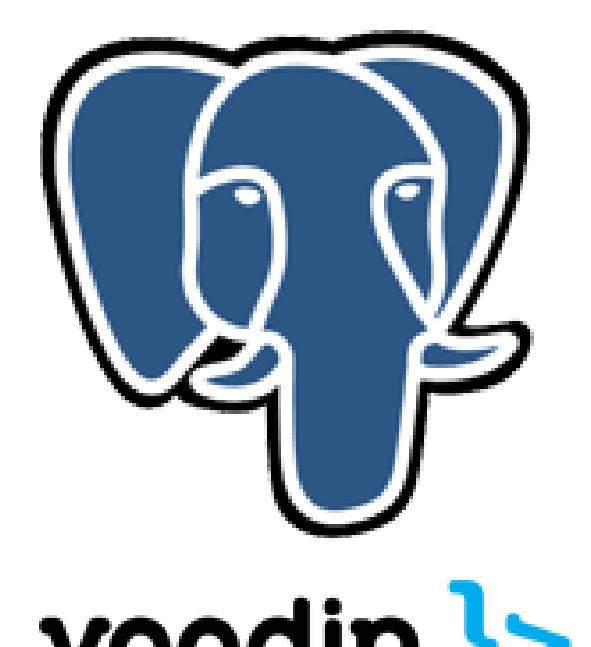
- Mitochondrial DNA (mtDNA) is often the only proxy available to study extinct populations and their relationship with modern populations
- Tools for the analysis typically rely on different file formats → requiring manual interaction with the data for downstream analysis
- mitoBench: workbench to ease file conversions, methods to interactively analyze and visualize human mitochondrial data
- mitoDB: database for human mitochondrial genomes to provide a central reference that can be easily accessed via the workbench and a web-frontend

Workflow



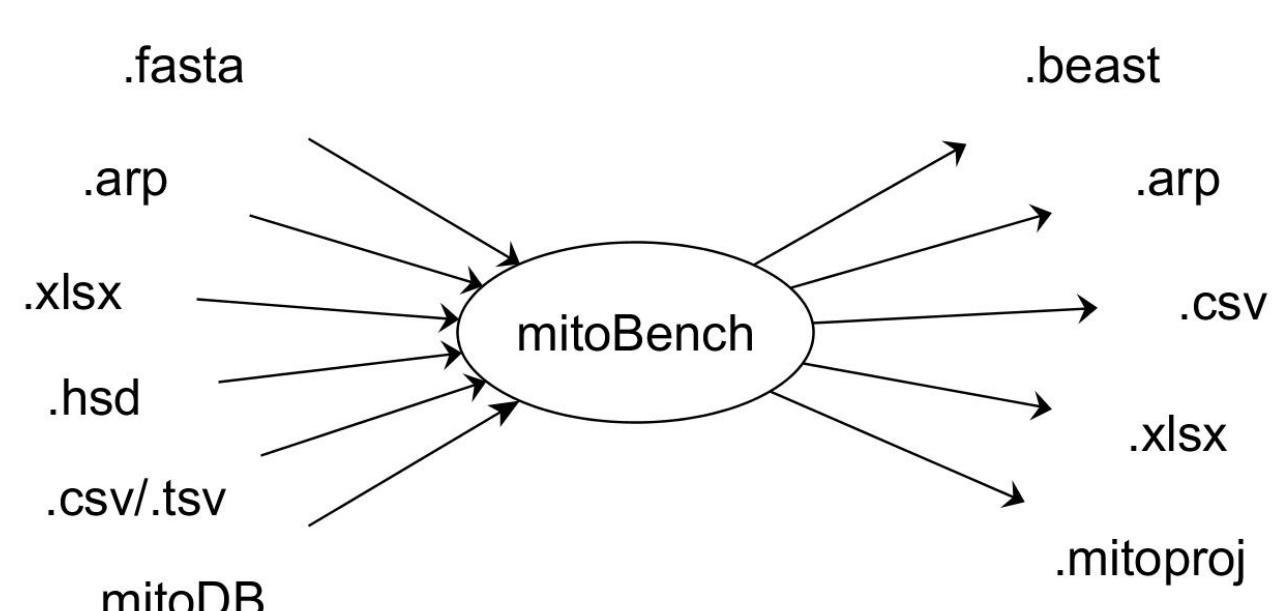
mitoDB

- Web-Frontend: Browsing data, searching for locations, quick look at database contents
- Database: Providing meta-information (Location, language, ...)
- Data Upload: Little curation - Users can rate samples based on their experiences with data
- Retrieval possible through Web-Frontend and mitoBench



mitoBench

File conversions



⇒ connect the workbench with existing analysis methods such as BEAST, Arlequin, PhyloTree and others

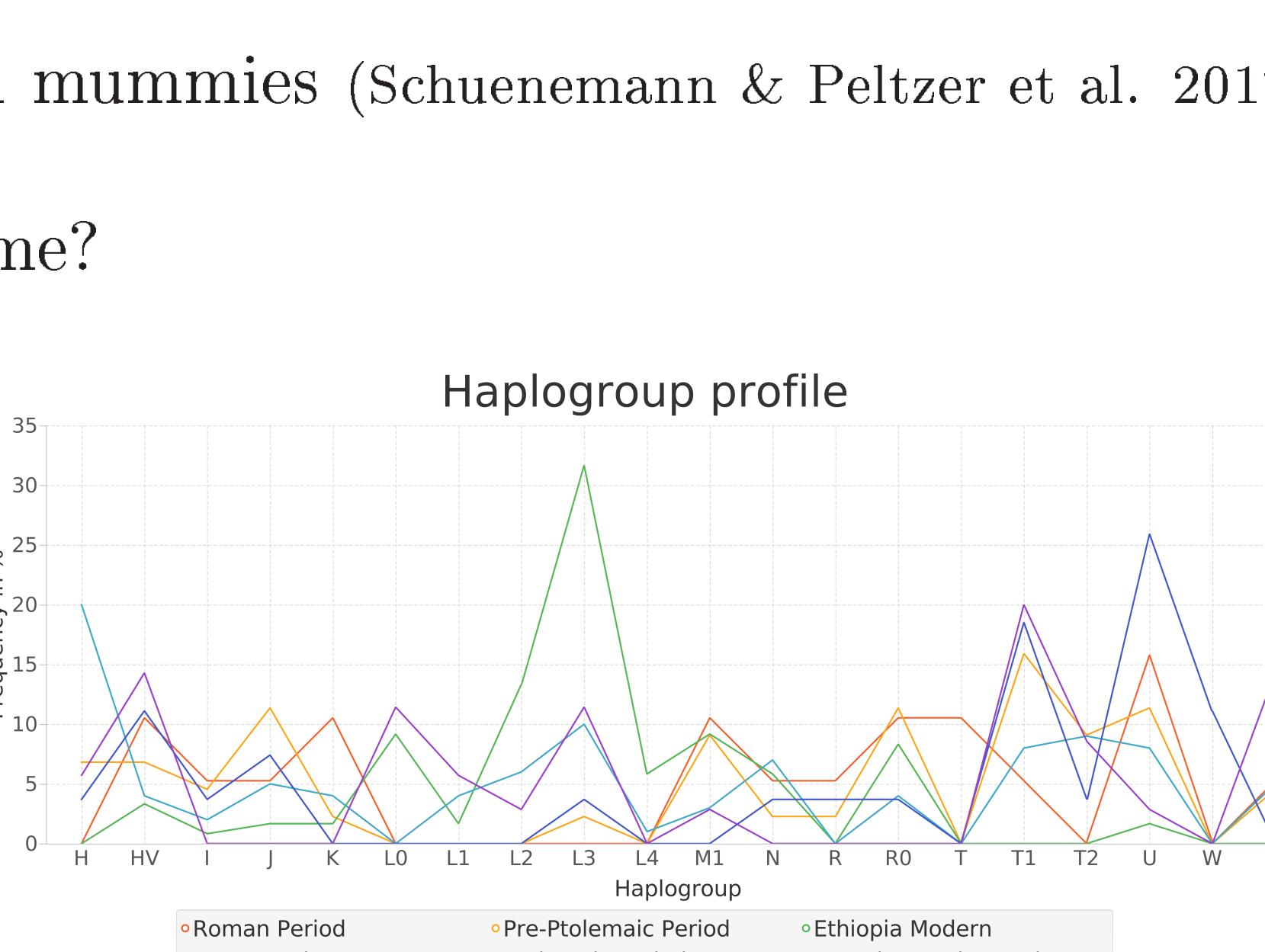
Data representation as Table

ID	MTSequence	Haplogroup	Time Period	continent	country	country_region	culture_type
K2975	GATCA...	R	Roman Period	Africa	Egypt	Beni Suef	Ancient
K2974	GATCA...	U	Ptolemaic Period	Africa	Egypt	Beni Suef	Ancient
K2972	GATCA...	T1a5	Ptolemaic Period	Africa	Egypt	Beni Suef	Ancient
K2916	NNCCA...	R0	Pre-Ptolemaic Period	Africa	Egypt	Beni Suef	Ancient
K2912	GATCA...	IV1a2a	Roman Period	Africa	Egypt	Beni Suef	Ancient
K2918	GATCA...	J2a2a	Roman Period	Africa	Egypt	Beni Suef	Ancient
K2919	GATCA...	J2a2a1	Ptolemaic Period	Africa	Egypt	Beni Suef	Ancient
K2988	GATCA...	T1a	Ptolemaic Period	Africa	Egypt	Beni Suef	Ancient
K2937	GATCA...	J2a2b	Ptolemaic Period	Africa	Egypt	Beni Suef	Ancient
K2963	GATCA...	M1a1	Pre-Ptolemaic Period	Africa	Egypt	Beni Suef	Ancient
K2985	GATCA...	R2jT	Pre-Ptolemaic Period	Africa	Egypt	Beni Suef	Ancient
K2987	GATCA...	J2a1a1	Pre-Ptolemaic Period	Africa	Egypt	Beni Suef	Ancient
K2953	GATCA...	R0a1a	Roman Period	Africa	Egypt	Beni Suef	Ancient
K2932	GATCA...	T	Roman Period	Africa	Egypt	Beni Suef	Ancient
K2928	GATCA...	HV21	Ptolemaic Period	Africa	Egypt	Beni Suef	Ancient
K2930	GATCA...	M1a1	Roman Period	Africa	Egypt	Beni Suef	Ancient
K2962	GATCA...	M1a1	Pre-Ptolemaic Period	Africa	Egypt	Beni Suef	Ancient
K2969	GATCA...	M1a1	Pre-Ptolemaic Period	Africa	Egypt	Beni Suef	Ancient
K2983	GATCA...	HV1a2	Pre-Ptolemaic Period	Africa	Egypt	Beni Suef	Ancient
K2979	GATCA...	U3b	Roman Period	Africa	Egypt	Beni Suef	Ancient

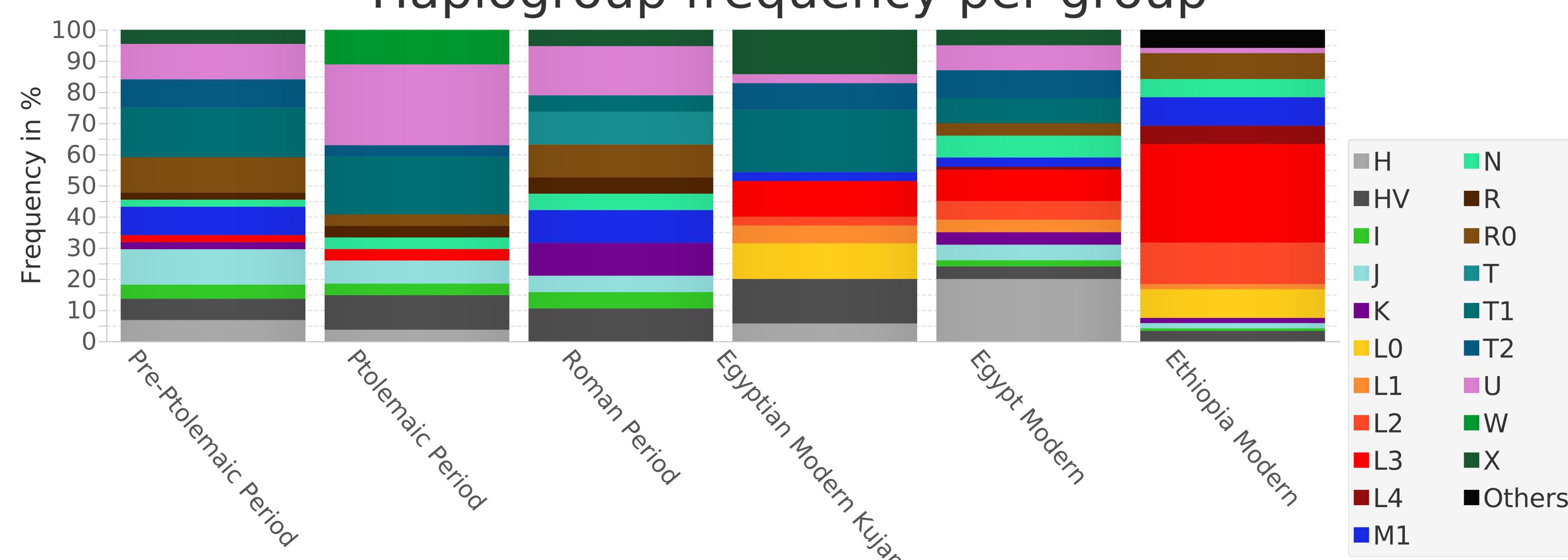
Data filtering / Statistics

- Haplogroup filtering / frequencies
- Mutation filtering / frequencies

Haplogroups based on [PhyloTree^{mt}](#)



Haplogroup frequency per group



Outlook

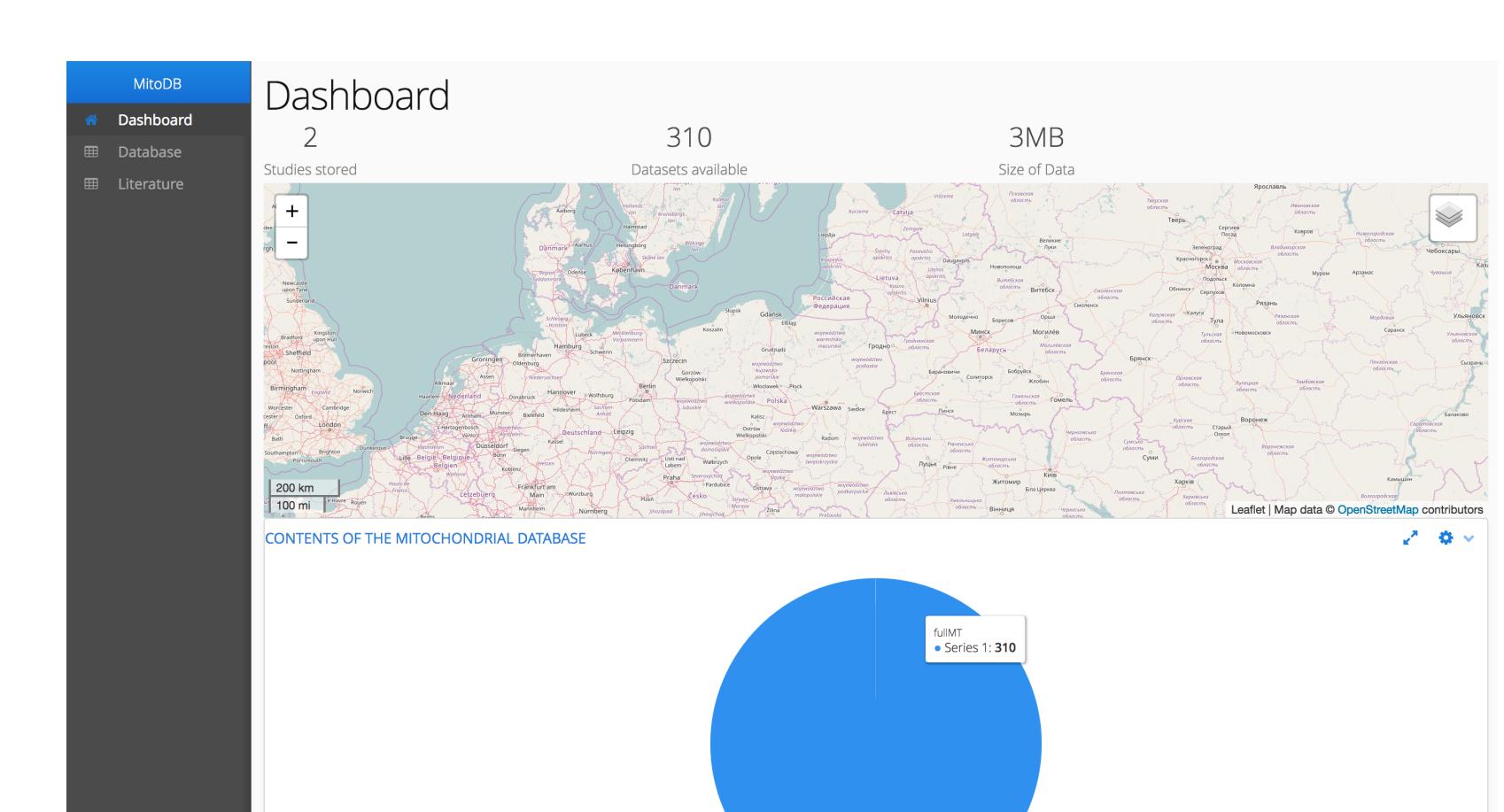
mitoBench

- Provide methods for downstream analysis (e.g. F_{ST} calculations, Founder Analysis)
- Offer more visualizations (e.g. geographical maps)



mitoDB & web interface

- Export/import functionality
- web-based dashboard to explore database



References

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