Phylogenetic Systematics: Project Data
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My phylogeny will be constructed using Data from the study, Supermatrix, and species tree methods to resolve phylogenetic relationships within the big cats, Panthera (Carnivora: Felidae). This study provided the GenBank accession numbers they used for their phylogenetic tests. I supplemented the data that did not come from GenBank with mitochondrial genome sequences I found on Genbank.

	12S	16S	CYTB	ND1	ND2	ND4	ND5
Lion	OP930842	AF006457	OP930842	OP930842	OP930842	OP930842	OP930842
Leopard	EF551002	EF551002	EF551002	EF551002	EF551002	EF551002	EF551002
Tiger	EF551003	EF551003	EF551003	EF551003	EF551003	EF551003	EF551003
Jaguar	OR863197	AF006441	OR863197	OR863197	AY634391	AY634403	OR863197
Snow leopard	EF551004	EF551004	EF551004	EF551004	EF551004	EF551004	EF551004
Clouded leopard	DQ257669	DQ257669	DQ257669	DQ257669	DQ257669	DQ257669	DQ257669

My research found several genes responsible for Panthera fur color and pattern. The ASIP (Agouti Signaling Protein) gene affects the distribution of pigments in the fur and can influence patterns such as the agouti patterning. The TYR (Tyrosinase) gene is essential for melanin production and can affect overall color intensity. The genes KIT, SOX10, and MITF affect the movement and survival of melanocytes which are cells that produce pigment. Changes in these genes can create spots, stripes, and new colors. I have compiled the GenBank accession numbers for each of these genes.

	ASIP	TYR	KIT	SOX10	MITF
Lion	NC056681	NC056688	NC056682	NC056685.1	NC056680
Leopard	NW026526821	NW026526677	NW026526688	NW026526991	NW026527013
Tiger	NC056662	NC056669	NC056663	NC056666	NC056661
Jaguar	NC083296.	NC083307	NC083305	NC083306	NC083297
Snow leopard	NW026057578	NC064808	NC064811	NC064809	NC064816

Time Data -
Tiger remains dated to 1648–1812 AD - Discovery of a tiger (Panthera tigris (L.)) skeleton from the Little Ice Age buried on the shore of Qinghai Lake, northeast Tibet Plateau

Panthera onca fossils in caves of Bahia, Brazil dated to late Pleistocene (29 ka and 36 ka) - Panthera onca (Linnaeus, 1758) from the late Pleistocene of Brazilian Intertropical Region: taxonomy, habitat, isotopic diet composition, and isotopic niche overlap with extinct faunivores

The first occurrence of leopards in Europe is dated to the Early Pleistocene, till about 1 Ma ago - Villafranchian large mammals from the Iberian Peninsula: paleobiogeography, paleoecology and dispersal events

Leopard population in northwestern Italy during the pre-Last Glacial Maximum Late Pleistocene. - The remarkable Panthera pardus (Felidae, Mammalia) record from Equi (Massa, Italy): taphonomy, morphology, and paleoecology

Morphological Data -

Jaroš, Filip. *The Ecological and Ethological Significance of Felid Coat Patterns (Felidae)*. 2012. Charles University in Prague, PhD dissertation. Supervised by Prof. RNDr. Stanislav Komárek, Dr. - Link

This dissertation has a plethora of information surrounding Felidae fur pattern and color that discusses their function, development, physiology, and adaptive significance. This will be a tremendous resource for morphologically mapping my phylogenetic tree.

Nagel, Doris, et al. "Functional Morphology and Fur Patterns in Recent and Fossil Panthera Species." *Scripta Geologica*, vol. 126, 2003, pp. 227-240. - Link

This paper discusses the morphology and fur patterns in Panthera species and uses fossil evidence with cave drawings to infer the morphology of extinct Panthera species. This paper could lend valuable insights into the evolutionary changes present in Panthera fur and color pattern as well as provide time calibration spots.