New genetic study of lions may help to prevent them going extinct

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A large international team of researchers has conducted an extensive genetic analysis of lions, and in so doing, has learned about their evolutionary history. In their paper published in *Proceedings of the*

National Academy of Sciences, the group describes how they confirmed long-term divisions between extant lion populations and showed genetic diversity among modern samples.

Prior research has shown that historically, lions have lived in many parts of the word, even in America. Most such species went extinct, however, including the cave lions that once roamed what is now Eurasia approximately 15,000 years ago. Today, lions live in parts of Africa and India and are endangered—just 20,000 African lions remain in the wild today, and their numbers are dwindling. In this new effort, the researchers carried out an extensive examination of the lion genome as part of an effort to save them from extinction.

The work involved analyzing the genomes of 20 specimens, including the cave lion and 12 historic lines that were known to live sometime between the 15th and 20th centuries—and six specimens from modern African and Asiatic lions.

One of the major findings was that modern lions and several extinct lions shared a common ancestor. They also found that approximately 70,000 years ago, two unique lineages of modern lion lineages emerged—and that cave lions lived in cold climates.

The researchers note that prior studies of the lion genome involved analysis of mitochondrial DNA—in this study, they went much further by looking at the whole genome—some of which was derived from 30,00-year-old lion fossils. They learned that modern lines split off from two different lineages in Africa—one in northern parts of Africa, the other in the south.

The researchers also found that the Asiatic lions living in the Gir forest in India have low genetic diversity due to their small population. And they found that the Asiatic lions evolved from the northern range lions in

Africa, though they still had remnants of southern lions in their genome. They did not find any evidence of African lions being introduced into India in modern times. The researchers suggest their findings will help with lion conservation efforts in both India and Africa.

More information: Marc de Manuel et al. The evolutionary history of extinct and living lions, *Proceedings of the National Academy of Sciences* (2020). DOI: 10.1073/pnas.1919423117