

Rare phenotype in isolated tiger population explains dark wide stripes

September 14 2021, by Bob Yirka



A captive pseudomelanistic tiger and its normal sibling at Nandankanan Biological Park, Bhubaneswar, India. Credit: Rajesh Kumar Mohapatra.

A team of researchers affiliated with a large number of institutions in India and the U.S. has found a rare genotype in an isolated tiger

population that explains its dark wide stripes. In their paper published in *Proceedings of the National Academy of Sciences*, the group describes their genetic study of pseudomelanistic tigers at India's Nandankanan Biological Park.

Nearly a half-century ago, people living in the Mayurbhanj district of Odisha began reporting sightings of tigers with unusual stripes—they were wide and converged, making some of the tigers appear so dark that locals began referring to them as "black tigers." Notably, the tigers were living on a reserve where they were protected, but also prevented from breeding with tigers outside of the reserve.

Over time, operators of the reserve became worried that the tigers, which have been labeled as pseudomelanistic, were examples of genetic drift, in which the frequency of a recessive gene becomes more common in a population as the group becomes more inbred. In this new effort, the researchers sought to learn more about the pseudomelanistic tigers by conducting a [genetic analysis](#) and comparing the results with tigers in other groups.



A captive pseudomelanistic tiger at Nandankanan Biological Park, Bhubaneswar, India. Credit: Rajesh Kumar Mohapatra.

The work involved collecting [tissue samples](#) from all of the tigers in the reserve, whether they were pseudomelanistic or not—each of the samples then underwent whole-genome sequencing. In analyzing the results, the researchers used known pedigrees of tigers with the unusual stripes to narrow down the search for the genes responsible for them. They were able to identify a recessive single nucleotide that prior research had shown in other cat species is responsible for coat patterns. The team then compared the nucleotide with data collected from other tigers in India, both in other sanctuaries and in the wild (via fecal

samples). They found the rare phenotype in 58% of the tigers living in the reserve and none in tigers living outside of the reserve. They also found that the mutation increased the chances of a given [tiger](#) being pseudomelanistic by 200 times, though they also pointed out that copies of the gene have to come from both parents for the unique [stripe](#) pattern to show.



A family of pseudomelanistic tigers at Nandankanan Biological Park, Bhubaneswar, India, including from left to right: white tigress mother, white pseudomelanistic son, orange pseudomelanistic son, orange normal father, and orange normal daughter. Credit: Rajesh Kumar Mohapatra.

More information: "High frequency of an otherwise rare phenotype in a small and isolated tiger population," *PNAS*,
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