

Genes from the father facilitate the formation of new species

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The two closely related bird species, the collared flycatcher and the pied flycatcher, can reproduce with each other, but the females are more strongly attracted to a male of their own species. This has been shown by an international research team directed by Anna Qvarnström at Uppsala University in today's Net edition of *Science*.

They demonstrate that the gene for this sexual preference is found on the sex chromosome that is inherited from the father and that only females have a copy of. The discovery sheds new light on how new species are formed.

The formation of new species takes millions of years. It often happens when a population (group of individuals) is divided and separated geographically and then adapts to disparate environments over thousands of generations. For instance, the earth's ice ages have led to many such population splits. But divided populations often come into contact with each other before they have had time to become entirely sexually isolated from each other. When individuals mate with each other from such split populations that have not quite become separate species, their offspring (so-called hybrids) often have limited viability.

Anna Qvarnström's research team from Uppsala University in Sweden, working with scientists from Norway, the Czech Republic, the US, and Holland, have studied natural hybridization between two closely related bird species, the collared flycatcher and the pied flycatcher. The two flycatcher species (or "quasi species") have come into contact with each

other after having been separated during the last ice age. The question they addressed was whether the flycatchers will conclude the species formation that is under way and become entirely sexually isolated from each other or, instead, if they will meld into the same species again.

“We found that females in the hybrid zone develop a sexual preference for males belonging to their own species and that this preference is determined by genes located on the sex chromosome,” says Anna Qvarnström.

In birds, in contrast with most other animals, it is the females that are the so-called heterogametic sex. Their sex chromosomes are called ZW and correspond to XY in humans. In birds, it is the female that is ZW and the male ZZ, but in humans men are XY and women XX. The results show that the preference for their own species is sited on the sex chromosome that the females inherit from their father. The same chromosome also houses the genes that govern the development of the species-specific plumage.

“When genes regulate species-specific features and the preference for these are located close to each other in the DNA, in this case on the same chromosome, species formation is favored. Therefore, the probability of these two flycatcher species merging into the same species again is small,” says Anna Qvarnström.

It is possible that this will prove to be a general pattern that can explain how new species can continue to exist even if they occasionally hybridize with each other.

Source: Uppsala University

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