Bird genes are multitaskers, say scientists

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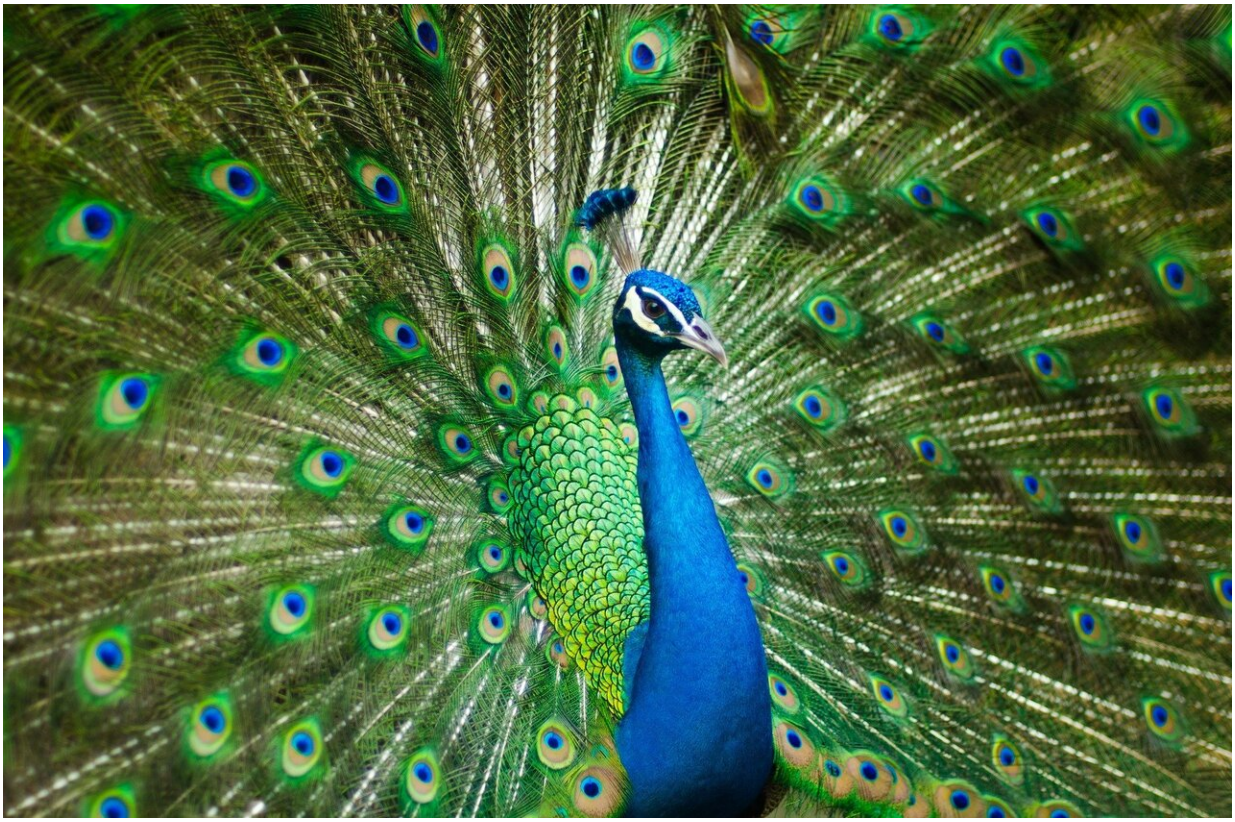

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Scientists from the University of Sheffield have found that although male and female birds have an almost identical set of genes, they function differently in each sex through a mechanism called alternative splicing.

Males and females of the same bird species can be strikingly different. For example, in addition to fundamental differences in reproduction, the sexes can show profound variation in behavior, colouration, metabolism, disease incidence and life history. The team wanted to understand how these remarkable differences develop despite males and females sharing mostly the same DNA.

Thea Rogers, Ph.D. student at the University of Sheffield and lead author of the study, said: "One notable example of differences between male and female birds is in the peafowl, peacocks have magnificent plumage, whereas the female peahen is relatively dull. The peacock's long tail and bright colours evolved to help them attract mates, but having such eye-catching looks can come with negatives such as making them more noticeable to predators.

"Features like this are beneficial to the males but may not be beneficial for females, so birds must find a way to evolve different characteristics. We predicted that the secret to these differences must lie in understanding how the same genes are expressed and function differently in males and females."

The team studied the genomes of multiple bird species to understand how they expressed these different qualities in males and females.

Genes encode proteins, large complex molecules which drive processes in the body and are responsible for the function and structure of the body's tissues. Before genes can be used to make proteins, their DNA sequence is transcribed into RNA, an intermediary molecule that contains the instructions for making proteins.

The scientists found that males and females differ in how bits of RNA are stitched together, meaning that the same gene can produce a large number of distinct proteins and functions depending on which sex the

gene is expressed in. This process is called alternative splicing.

Dr. Alison Wright, a researcher at the University of Sheffield and senior author of the study, said: "It is likely that this genetic process is really important for generating biodiversity, not only in birds but across the whole animal kingdom."

The study, published in *Molecular Biology & Evolution*, revealed hundreds of bird genes that use this method to enable the evolution of sex differences. The researchers showed that these genes have evolved remarkably rapidly as a result of the different selection pressures experienced by males and females.

Provided by University of Sheffield