

Bird sex is something else

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We've all heard about the birds and the bees. But apparently when it comes to birds, they have an unusual take on his and hers – and the difference is genetic. Species with differentiated sex chromosomes (X and Y in humans, for example) get around the fact that males and females get different-sized portions of sex chromosome genes with a balancing act geneticists call dosage compensation.

But research published today in the *Journal of Biology* shows that birds are extraordinary, because some bird genomes can live with an apparent overdose of sex-related genes.

US researchers Itoh, Melamed et al. working in Arthur Arnold's University of California, Los Angeles laboratory used RNA microarray analysis for their dosage compensation study. The team sampled chickens and zebra finches, and compared the results with data from humans and mice. In several types of finch and embryonic chicken brain tissue, Z chromosome genes were expressed up to 40% higher in ZZ males than ZW females. This contrasts with findings from the mammal samples, where dosage compensation meant that the male: female ratio of X-linked genes is similar to that of autosomal genes.

In mammals, mismatched doses of X genes between males and females threaten to upset the gene network in one or both sexes. Fruit flies (*Drosophila*), roundworms (*C. elegans*) and humans each work around this dosage problem using different molecular pathways. By contrast, for birds it appears that most genes on the Z chromosome are not fully dosage-compensated, at least at the transcriptional level.

The study challenges current thinking about the role and mechanisms of dosage compensation in species with heteromorphic sex chromosomes. "Unlike mammals, birds have an ineffective dosage compensation," says Arnold. "The finding is surprising because dosage compensation was previously thought to be critical for survival. Birds, however, seem to be doing just fine without sexual equality of Z gene expression".

Source: BioMed Central

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