

B chromosomes affect sex determination in cichlid fishes

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B chromosomes have a functional effect on sex determination in a species of cichlid fishes from Lake Victoria, according to a study by Japanese researchers to be published in open-access journal *PLoS Genetics* on August 18th, 2011. The researchers found sex-ratio distortions caused by B chromosomes in the breeding line of the cichlids, as well as several protein-coding genes in the B chromosomes. The resultant ratio was female biased, suggesting a role for B chromosomes in female sex determination.

The B chromosome was first identified by E. B. Wilson in 1907. B [chromosomes](#) (or accessory chromosomes) are additional to the standard set of chromosomes (autosomes and [sex chromosomes](#)) in an organism. They have been found in many species (more than 1,000) over the last hundred years. Although they are widely distributed, the effect of B chromosomes on host organisms has not been detected. Indeed, B chromosomes have been thought to be a selfish [genetic element](#), lacking genes and having no effect on the organism. It has previously been proposed that the unique features shared by B chromosomes and sex chromosomes imply an evolutionary relation between them. However, research into B chromosomes has been limited to a few species and the question has not been resolved.

In the present study, the researchers performed an extensive analysis of B chromosomes in cichlid fishes from Lake Victoria to investigate their effect on cichlid evolution. Karyotype analysis of Lake Victoria cichlids suggested that, in one species, *Lithochromis rubripinnis*, there are

female-specific B chromosomes. Crossbreeding experiments suggested that an effector of female [sex determination](#) in this species was the B chromosome. Furthermore, analyses of large-scale sequences of B chromosomes in Lake Victoria cichlids revealed multiple protein-coding genes in B chromosomes.

The sex determination gene was not found in this research. However, the researchers provide evidence that B chromosomes have a functional effect on sex determination and that they demonstrate a capacity to evolve into sex chromosomes.

More information: Yoshida K, Terai Y, Mizoiri S, Aibara M, Nishihara H, et al. (2011) B Chromosomes Have a Functional Effect on Female Sex Determination in Lake Victoria Cichlid Fishes. PLoS Genet 7(8): e1002203. [doi:10.1371/journal.pgen.1002203](https://doi.org/10.1371/journal.pgen.1002203)

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