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Reconstructing sex chromosome evolution

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The mammalian X and Y chromosomes evolved from an ordinary pair of autosomes that existed in a reptilian ancestor that probably relied on temperature-dependent sex determination, as in crocodiles today. Independently and concurrently, the avian Z and W chromosomes (ZZ males, ZW females) evolved from a different pair of autosomes that was present in the same ancestor. Both the mammalian XY pair and the avian ZW pair have emerged with specialized and disproportionate roles in germ cell development. These germ cell specializations are best understood in the mammalian Y chromosomes and are only now being appreciated in the mammalian X chromosomes and the avian ZW pair.

To reconstruct and better understand nature's sex chromosome experiment, we have set out to comprehensively sequence and compare the sex chromosomes of four primates, two rodents, an ungulate, a marsupial and a bird. I will describe insights that have emerged from this ongoing effort.

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