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## Sex determination in fish

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No equivalent to the mammalian [Srysex-determining gene](#) has been found in non-mammalian vertebrates. In an Advanced Online Publication in [Nature](#), Matsuda *et al.* describe the characterization of the first fish gene required for male development (*Nature* 12 May 2002, DOI://10.1038/nature751).

They chose the [medaka fish](#) (*Oryzias latipes*), a cousin of the zebrafish that is widely used a genetic model organism to study vertebrate development. The major difference between the medaka Y and X chromosomes is thought to be the sex-determining region. Matsuda *et al.* used a Y congenic strain and a positional cloning approach to narrow down the sex-determining region to a 530 kb region that includes 52 predicted genes. Study of an XY female with a large deletion of the Y chromosome allowed them to narrow the search further, to a 250 kb region with 27 predicted genes. They tested each of these candidates and found just one (which they named *DMY*) that is expressed exclusively in XY embryos.

*DMY* encodes a 267 residue protein that has a conserved DM domain with a DNA-binding motif. Matsuda *et al.* found two XY females with distinct mutations in *DMY* (one is a loss-of-function mutation and the other is a depressed expression mutant), confirming the importance of *DMY* in sex determination. *DMY* is expressed in XY embryos but not XX embryos and is expressed in somatic cells surrounding the germ cells. *DMY* is homologous to the [DMRT1](#) (DM-related transcription factor 1) protein that is also implicated in mammalian testis differentiation. These results suggest that *DMY* plays a pivotal role in testicular differentiation and sex determination in fish.

## References

1. A gene from the human sex-determining region encodes a protein with homology to a conserved DNA-binding motif.
2. *Nature*, [<http://www.nature.com>]
3. Medaka--a model organism from the far East.
4. *Dmrt1*, a gene related to worm and fly sexual regulators, is required for mammalian testis differentiation.