Sry Gene Encyclopedia Article

Sry Gene

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In humans, early studies comparing normal males and females to individuals with a structurally aberrant **Y chromosome** determined that a **gene** key to the development of the testes was located on the short arm of the Y **chromosome**. The name given at that time was TDF, testis-determining factor. Ongoing research narrowed the area of interest to a 35 kb segment just below the pseudoautosomal region and eventually the relevant gene was identified and named SRY, for sex determining region of the Y chromosome. Cross **species** comparisons showed that this gene is very similar to the mouse Sry gene and that it is also represented in other mammals and marsupials.

As its name implies, SRY plays a major role in **sex determination**, a complex, multistep pathway that gives rise to either a male or female individual. In humans, female development appears to be the default, so in order for a male to develop, a switch to the male pathway must occur. The activator for this is SRY. **Transcription** and **translation** of the gene results in the development of the testes that in turn produce testosterone and launch **differentiation** of the male sex genitalia. At the same time, another gene, MIF--Müllerian inhibitory factor, is stimulated to shut down the female developmental process. The entire series of events requires a large number of genes on many different chromosomes.

As with all genes, it is possible for mutations to occur which change its function. **Deletions** and a variety of point mutations have been described in SRY that result in blockage of the male developmental pathway and give rise to individuals with gonadal dysgenesis, which is clinically, a phenotypic female with a male XY **sex chromosome** complement. Although outwardly female, these individuals usually have undifferentiated or abnormal internal sexual organs and are therefore infertile.

Translocations between the X and Y chromosomes in which the SRY gene is moved from the Y to the tip of one X have also been reported. The change in position does not affect the function of SRY, so in the absence of any other factors, male development will proceed. However, the individual will have an apparent female chromosome complement with two X chromosomes.

The key aspect of the SRY gene is, therefore, its importance as the initiator of the male developmental pathway.