



Sex Reversal

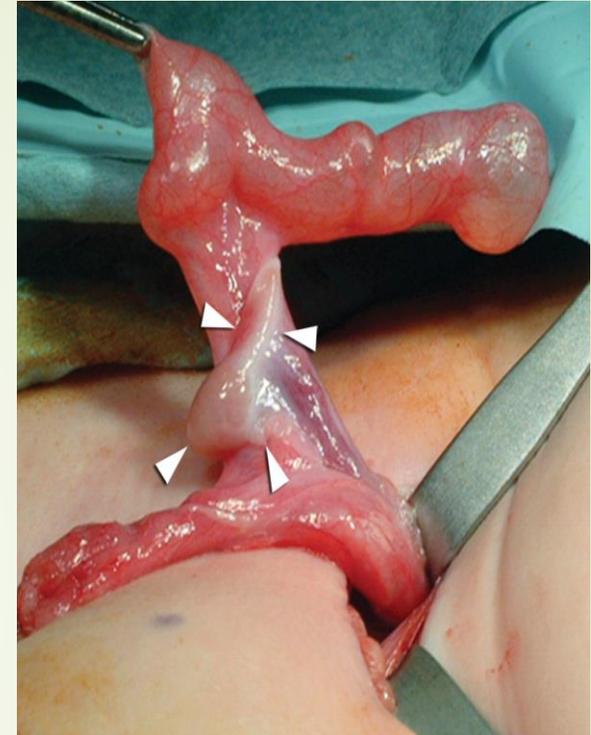
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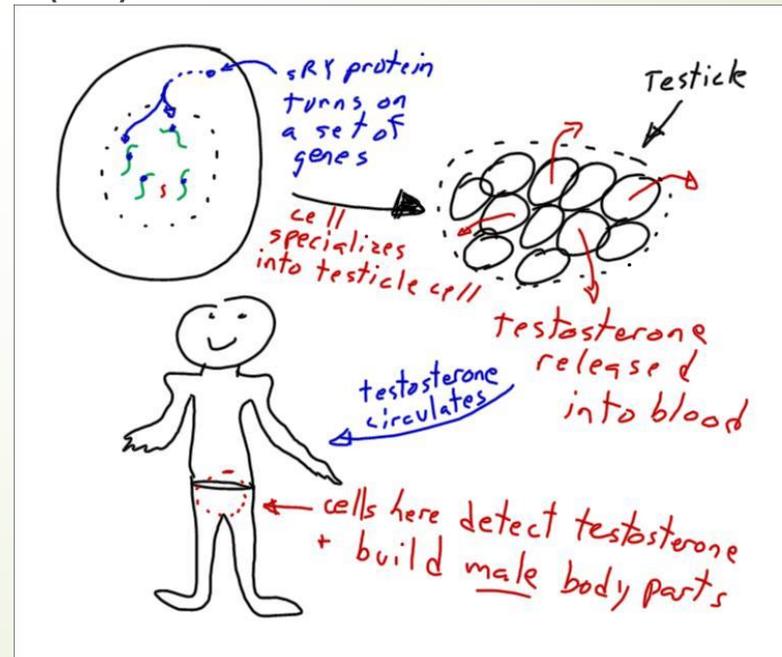
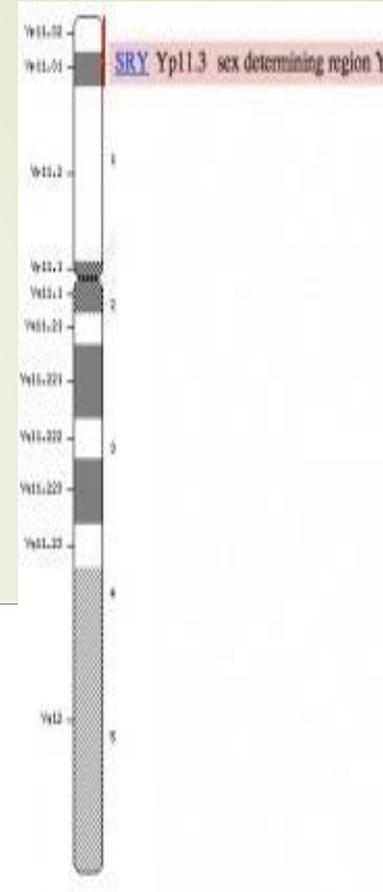
Physiology

- ▶ The age of onset is prenatal. The target tissue where the effects of Sex Reversal is the most prominent is the reproductive system.
- ▶ XX males usually resemble patients with Klinefelter's syndrome while XY females usually resemble patients with Turner's syndrome. The more of the Y chromosome that is deleted or translocated results in more similarities with these patients.
- ▶ However, Sex Reversal patients usually have normal skeletal proportions, normal intelligence, and fewer psychological problems.
- ▶ Also, Streak gonads.



Molecular Cause

- The key molecule that is changed is Sry, a DNA binding protein. Sry is also involved in a lot of different aspects of gene regulation.
- It does not follow Mendelian Inheritance patterns, in fact there is no real inheritance. Most people who have sex reversal are sterile and therefore can not pass on the disease except in rare cases. Also, if the father has a balance of Xp and Yp translocations, SRY mutations can be inherited.
- For males (XY), the cause of Sex reversal is a translocation of the SRY gene onto one of their X chromosomes. For females, (XX), the cause is a deletion of the SRY gene from the Y chromosome.
- Occurs in 1 out of every 20,000 births



TREATMENTS

- ▶ Androgen supplementation is one current treatment of sex reversal
 - ▶ Androgens like testosterone and estrogen are vital in everyday life because they help regulate the body. Also, androgens are required in order for the body to go through puberty and develop secondary sexual characteristics. Since the gonads of sex reversal patients are disfigured, androgens are not produced.
- ▶ Another current treatment is surgery
 - ▶ Surgery is required because the removal of the non-functional gonads. This prevents problems that would develop later on in life such as gonadoblastoma.
- ▶ Another current treatment is other's acceptance towards them.
 - ▶ As with all sex/reproductive related diseases, confusion is usually one of the general responses. However, it is important that the family of those affected with Sex Reversal know what the disease is, and that there is nothing wrong with them. After the removal of the non functional gonads, the life expectancy of these patients is normal.

Proposed Cure

- ▶ I have two proposed cures , one for males(XX) and one for females(XY).
- ▶ In males, the SRY gene is translocated onto one of the X chromosomes, therefore I have proposed RNAi, or RNA interference, in which SRY RNAi so the SRY can not be expressed. This would lead to a female phenotype (XX) being expressed.
- ▶ There have been experiments in which SRY RNAi has successfully silenced the SRY gene in mice resulting in a female XY gonad.
- ▶ In females, the SRY gene is deleted from the Y chromosome. I have proposed using viral vectors to inject the SRY gene into the nucleus in order to restore normal function.
- ▶ Downsides to these methods are that they have to be done prenatally, before the child can develop and produce the negative phenotypes that come with sex reversal. Another downside is that it is hard to do this without affecting the mother or being too invasive.



References

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