

By: Sachin 2008, Science Editor

[First Sex Chromosome Gene Connected to Meiosis and Male Sterility](#)

The TEX11 gene

Just having a XY sex chromosome formula won't make you a man. Nor the XX formula makes you a woman. Increasing evidence shows that human sex is not caused by sex chromosomes, but by genes placed on those chromosomes. Over 50 genes involved in sex expression have been found so far. 7 operate in the brain even before the gonads are formed. Now add a new one: a team at the University of Pennsylvania has detected a gene, TEX11, on the X chromosome, which, when mutated, turns the males sterile and female almost devoid of fecundity. This is the first meiosis-specific gene connected to sterility. The research published in the journal *Genes & Development* shows that mutated TEX11 provokes azoospermia (insignificant sperm) levels in mice, pointing to a genetic cause of man sterility. Men have just one X chromosome coming from their mother, thus just one copy of the mutated TEX11 gene is enough to produce sterile boys from fertile mothers (the gene behaves like other X chromosome-linked disorders, such as color blindness, hemophilia and muscular dystrophy). Meiosis is the type of cell division that halves the DNA amount in the nucleus, producing the gametes (sperm and eggs). For this purpose, homologous chromosomes form couples, join through synapsis, recombine (change DNA bits) and segregate. This way paternal and maternal DNA recombine, and the resulting gametes are genetically diverse. Impaired meiosis is a main factor of infertility or malformed fetuses. 15 % of couples worldwide experience infertility, but X chromosomes have been for long out of suspicion for meiosis-caused infertility as the X chromosome is silenced during male meiosis. Most fertility researches analyzed the Y chromosome and autosomes (non-sex chromosomes). But the same research team had revealed that about 30 % of the germ cell-specific genes are placed on the X chromosome. And the sex chromosomes were involved in meiosis. Even if the X-chromosome genes are silenced during later stages of male meiosis, they are active in the early stages. TEX11 was involved in forming discrete foci on meiotic chromosomes as meiotic recombination machinery. Male mice devoid of TEX11 did not form chromosomal synapsis during meiosis. Homologous chromosomes could not form a pair during meiosis and less crossovers (recombination sites) emerged during early meiosis. These failures made spermatocytes (sperm-forming cells) unable to participate in later stages of the genetic recombination, resulting male infertility. TEX11 could act by interacting with SYCP2, part of the protein complex that mediates synapsis during meiosis, delivering a physical link for both synapsis and gene recombination. Screening of the TEX11 gene could deliver a pre-birth diagnosis for men sterility.