Title: X-Inactivation and the PGC7 Gene
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X-inactivation is a process by which one of the copies of the X chromosome present in female mammals is inactivated. X-inactivation ensures that the number of X chromosomes expressed in males and females is equal. X-inactivation is important not only for dosage compensation, but for proper development and health of female mammals. Failure to choose and completely silence one X chromosome often means immediate death for the developing embryo. In mice, when X inactivation is removed several days after conception, several embryos will develop, but the females that are born will not live past three weeks. In humans, there is an increased risk of cancer when X-chromosome dosages exceed physiological levels. For example, removing a Barr body or gaining an inactivated X-chromosome is linked to blood, breast, ovarian, and testicular cancers. PGC7, expressed in germ cells, is an important maternal factor for protecting DNA methylation, which is known to be essential for human X-chromosome inactivation. The purpose of this study is to demonstrate if the PGC7 gene, also known as the Stella gene, plays a direct role in X-chromosome inactivation. The results showed that the mouse cells containing the PGC7 gene have X-chromosome inactivation, while the PGC7 deficient cells do not. The hope is that this study can be repeated to determine if the PGC7 gene has the same function in humans as it does in mice. Understanding the mechanisms that are involved in X chromosome inactivation will allow for prevention of X-inactivation failures.

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