

The Effects of *cisd* Gene Family Disruption in *Caenorhabditis elegans* Fertility

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Up to 30% of the 50 million infertile people worldwide are affected by unexplained infertility, which could result from a Cisd gene mutation. The CDGSH iron sulfur domain (Cisd) family consists of three mammalian genes: Cisd1, Cisd2 and Cisd3. Others have shown through in vivo cell culture experiments that Cisd genes have a role in regulating iron and reactive oxygen species homeostasis and that Cisd mutations cause irregular free iron levels. Free iron is similar to the elevated iron caused by the human disease hemochromatosis, as both can cause bodily harm. Excess iron is deposited into organs and glands, often leading to infertility in both sexes. Given the similarities in iron levels between *cisd* mutations and hemochromatosis, this project hypothesizes that *cisd* gene mutations display an infertility phenotype. To test this, the model organism *Caenorhabditis elegans* was utilized as its genome contains three *cisd* genes that code for proteins homologous to human Cisd genes: *cisd-1*, homologous to Cisd1 and Cisd2, and *cisd-3.1* and *cisd-3.2*, homologous to Cisd3. The control strain N2 wild-type and mutant strains *cisd-1(tm4993)*, *cisd-3.1(pn24)* and *cisd-3.2(pn64)* were used to test for infertility. After worm growth synchronization, three experiments were conducted: sterility assays, embryo lethality assays, and fecundity assays. Compared to N2, the assays found the following results: *cisd-1(tm4993)* and *cisd-3.2(pn64)* display low sterility percentages, *cisd-3.2(pn64)* animals have significant quantities of embryo lethality, and *cisd-1(tm4993)* and *cisd-3.2(pn64)* have significantly reduced offspring numbers. Together, these results suggest the *cisd* genes may have a role in fertility in *C. elegans*.

Awards Won:

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