

EXECUTIVE SUMMARY [NON-CONFIDENTIAL, NON-TECHNICAL ABSTRACT FOR PUBLIC INFORMATION OR PROGRAM PROMOTION]: State in layman's terms the application's broad, long-term objectives and specific aims, making reference to the potential public benefits of the project relevant to California. Do not include proprietary or confidential information. This may be distributed before the funding decision has been finalized.

Successful completion of sexual reproduction in animals requires a partitioning of chromosomes into the gametes (sperm and eggs), such that each gamete has half as many chromosomes as the starting cells. Fusion of two gametes at fertilization then restores the parental number of chromosomes. Surprisingly, this chromosome partitioning is imprecise in humans – in 10 - 30% of pregnancies the embryo has an incorrect number of chromosomes, typically leading to pregnancy loss or developmental defects such as Down syndrome among embryos carried to term. The objective of this project is to better understand the means through which organisms carry out this chromosome partitioning. Partitioning requires the formation of physical connections known as crossovers between pairs of chromosomes. However, little is known about how organisms ensure that each chromosome pair forms at least one crossover. The proposed research will use the techniques of genetics and molecular biology to determine what stage(s) of crossover formation are regulated. The long-term objective is to establish an active research lab involving undergraduate students in the study of the mechanisms through which organisms regulate this important chromosome partitioning.