**What does genetic recombination mean?**

In mitosis, every daughter cell is exactly like the parent cell. Meiosis and sexual reproduction, however, result in a re-assortment of the genetic material. This re-assortment, called **genetic recombination,** originates from three events during the reproductive cycle:

* + **Crossing over.** During prophase I, non-sister chromatids of homologous chromosomes exchange pieces of genetic material. As a result, each homologue no longer entirely represents a single parent.
  + **Independent assortment of homologues.** During anaphase I, homologous chromosomes separate and go to opposite poles. Which chromosome goes to which pole depends upon the orientation of a tetrad (pair of homologs) at the metaphase plate. This orientation and subsequent separation is random for each tetrad. For some chromosome pairs, the chromosome that is mostly maternal may go to one pole, but for another pair, the maternal chromosome may go to the other pole.
  + **Random joining of gametes.** Which sperm fertilizes which egg is to a large degree a random event. In many cases, however, this event may be affected by the genetic composition of a gamete. For example, some sperm may be faster swimmers and have a better chance of fertilizing the egg.

**\*\*\*Search the internet for images of “Genetic Recombination”**

**What is Gene Linkage?**

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| --- | --- |
| There are some traits that are often inherited together – Why?  Answer: The genes are on the same chromosome and positioned so that they “cross-over” together in Prophase I and “assort together” in Anaphase I! |  |

**\*\*\*Search the internet for images of “Gene Linkage”**