The genomes of plants and animals consist of several long DNA molecules that are called chromosomes. Most organisms carry two copies of each chromosome: one inherited from mother, and one from father. This means that an individual has two copies of each gene. Some of these gene copies may be identical, but other gene copies will have sequence differences, because they were different in their parents. In consequence, those different genes may behave in a slightly different way, for instance one version may be not so active as the other one.

The sex cells (eggs and sperm) that pass half of each parent's genes on to its offspring are made in a process called meiosis. Before the pairs of each chromosome are separated to make two new sex cells, sections of genetic material can be swapped between a chromosome-pair to produce chromosomes with unique combinations of genetic material. This process is called 'crossover'.

The number of 'crossovers' is tightly controlled. However, genes that are responsible for this control have not been yet identified in plants. In the proposed project the scientists are planning to identify one such a gene. For this purpose they crossed two plant individuals that have a lot of sequence differences. Then, they grow them for a few generations and finally measured how many crossovers occurred in the progeny of those plants. They found that some plants had much more crossovers than the other. This suggested that a gene, which controls crossovers, has two different versions. In the next step the researchers looked for those differences in chromosome sequence and tried to find those that associate with change in crossover numbers. However, this method is not perfect, so at the moment they know only in what chromosome section is the gene controlling crossover located.

In the course of the project the researchers aim to identify which gene from this chromosome fragment is responsible for the variation in crossover numbers. Then, they will try to characterize how this gene works and what are the differences between its two versions. They believe that this knowledge will help to understand the very complex process of meiosis and crossover. In the future, the discovery of the control gene may be useful for directing crossover in crop breeding.