A Monohybrid Cross Example Using Mendel’s Sweet Peas

In genetics, the term *hybrid*—found in the words *monohybrid*, *dihybrid*, and *trihybrid*—indicates a cross between two heterozygous individuals. Mono, di-, and tri- refer to the number of alleles that are involved in that cross. We are going to now consider a cross between two individuals that are heterozygotes for one trait: the shape of the pea in sweet pea plants. This is obviously known as a monohybrid cross. Our example will focus on a pea’s shape, which (as Mendel discovered in his work) can be either round or wrinkled. Round is completely dominant to wrinkled; thus, homozygous-dominant and heterozygous individuals will have round peas. Alternatively, homozygous-recessive individuals will have wrinkled peas. We will conduct a monohybrid cross for pea shape.

Our monohybrid cross example:

Rr x Rr

\[
\begin{array}{c|c|c}
\text{RR} & \text{Rr} & \text{rr} \\
\hline
\text{RR} & \text{round} & \text{round} \\
\text{Rr} & \text{round} & \text{wrinkled} \\
\text{rr} & \text{wrinkled} & \text{wrinkled} \\
\end{array}
\]

The gametes for each individual could be either R or r, with a 50% chance for either.

\[
\begin{array}{c|c|c}
\text{R} & \text{r} \\
\hline
\text{R} & \text{RR} & \text{Rr} \\
\text{r} & \text{Rr} & \text{rr} \\
\end{array}
\]

In this case, the genotypic ratio would be 1:2:1. Another way to think of this would be 1 individual with the genotype RR, 2 individuals with the genotype Rr, and 1 individual with the genotype rr. Because we are dealing with an allele that exhibits complete dominance, the phenotypic ratio would be 3:1, or 3 round to 1 wrinkled.