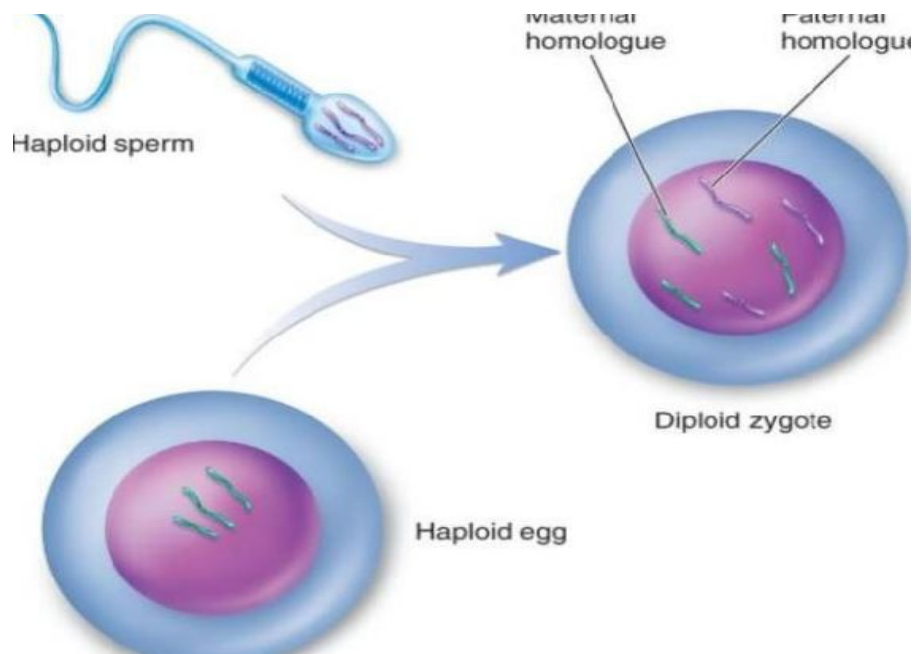


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## **GAMETES**



Sexual reproduction refers to the sexual germ cells (gametes) produced by the parents, through the combination of bisexual germ cells (such as sperm and egg cells), become the fertilized egg, and then the fertilized egg develops into a new individual, called sexuality reproduction. Extensive variation in gene combinations in sexual reproduction can increase the ability of offspring to adapt to natural selection. Randomly combined genes in offspring of sexual reproduction may or may not be beneficial to the species, but at least increase the chances of a few individuals surviving in an unpredictable and ever-changing environment, thereby benefiting the species. Sexual reproduction can also promote the spread of favorable mutations in the population. If two individuals in a species have favorable mutations at different sites, in the asexual reproduction population, the two mutants will compete until one elimination, it is impossible to retain both favorable mutations at the same time. However, in sexual reproduction populations, through mating and recombination, these two favorable mutations can simultaneously enter the genome of the same individual and simultaneously

spread in the population. For the above reasons, sexual reproduction accelerates the process of evolution. In the more than 3 billion years of biological evolution on Earth, the first two billion years of life have remained in the asexual reproduction stage, and the evolution has been slow, and the evolution rate has accelerated significantly since the last 1 billion years. In addition to changes in the earth's environment (such as the emergence of the oxygen-containing atmosphere, etc.), the occurrence and development of sexual reproduction is also a major cause.

## **Gametes**

Gametes refer to mature cells produced by the reproductive system when the organism is sexually reproducing, referred to as germ cells. Gametes are divided into male gametes and female gametes. The female gametes of animals and plants are usually called egg cells, and the male gametes are called sperm. Sperm is quite small, but it can move and enter the egg cell in a scorpion shape. The egg cell is quite large and non-swimming. For example, the egg cell volume of sea urchin is 10,000 times that of sperm cells. Although the male and female gametes are different in volume, the nuclear DNA they provide for the offspring is equal, that is, each provides a set of genomes. However, due to the large size of the egg cells, the cytoplasmic structure and cytoplasmic DNA of the daughter cells are basically provided by the egg cells. Gametes play an important role in biological calculations. Through genetic maps, the flow of genes and the pattern of progeny genotypes can be clearly observed. The number of gametes in the first generation of hybrids and the relative traits in hybrids is  $2^n$  (n is the logarithm of relative traits). When a living body forms a gamete, the paired genetic factors are separated from each other and enter different gametes. Gametes contain only one of each pair of genetic factors. When fertilized, the combination of male and female gametes is random. Due to the genus of gametes formed by meiosis, the diversity of chromosome composition, the difference in genetic material of different gametes, and the randomness of the combination of egg cells and sperm in the process of fertilization, the offspring of the same parent must be diverse.