

# Biology IV

Sexual Reproduction

Gametes and Fertilization

Which of the following organisms are able to create an offspring with each other?

- **Tiger**
- **Lion**
- **Donkey**
- **Horse**
- **Cow**
- **Whale**
- **Dolphin**

How do we get animals like...



A liger



A jaglion



A zebroid



A tigon



How do we get  
animals like...



**A zonkey**  
**A beefalo**



**A narluga**  
**A wolphin**



A red speech bubble graphic with a white outline, containing the word "Video" in white text. The bubble has a tail pointing downwards and to the left.

Video

[https://www.youtube.com/watch?v=D3MgXRJ\\_fys&ab\\_channel=Seeker](https://www.youtube.com/watch?v=D3MgXRJ_fys&ab_channel=Seeker)

**Why can't Mules have Babies?**

[https://www.youtube.com/watch?v=6Hfelo\\_qAw0&ab\\_channel=MinuteEarth](https://www.youtube.com/watch?v=6Hfelo_qAw0&ab_channel=MinuteEarth)

## What is sexual reproduction?

Sexual reproduction occurs when offspring is produced by two parents. The offspring will be genetically varied due to the combination of genes between the two parents.

- Parent one will contribute half of its DNA to the offspring while parent two will contribute half of its DNA to the offspring





## Advantages of Sexual Reproduction

- Genetic variation/diversity
  - Genetic variation allows some individuals in a population to survive if there is a change in the environment
  - Example: If the environment changes...
    - Some individuals will be less successful at living and reproducing.
    - Other individuals may have certain features (due to genetic differences) that allow them to live and reproduce in the new conditions more easily.

## Disadvantages of Sexual Reproduction

- It takes time as individuals have to find a mate
  - As the individual is searching for a mate, it may expose them to predators, disease, or harsh environmental conditions
- Fewer offspring are produced which means that it takes longer for a population to grow
- Offspring take longer to reach maturity and therefore, reproduce
- Offspring require time and energy to raise until they are independent from their parents



## What are gametes?

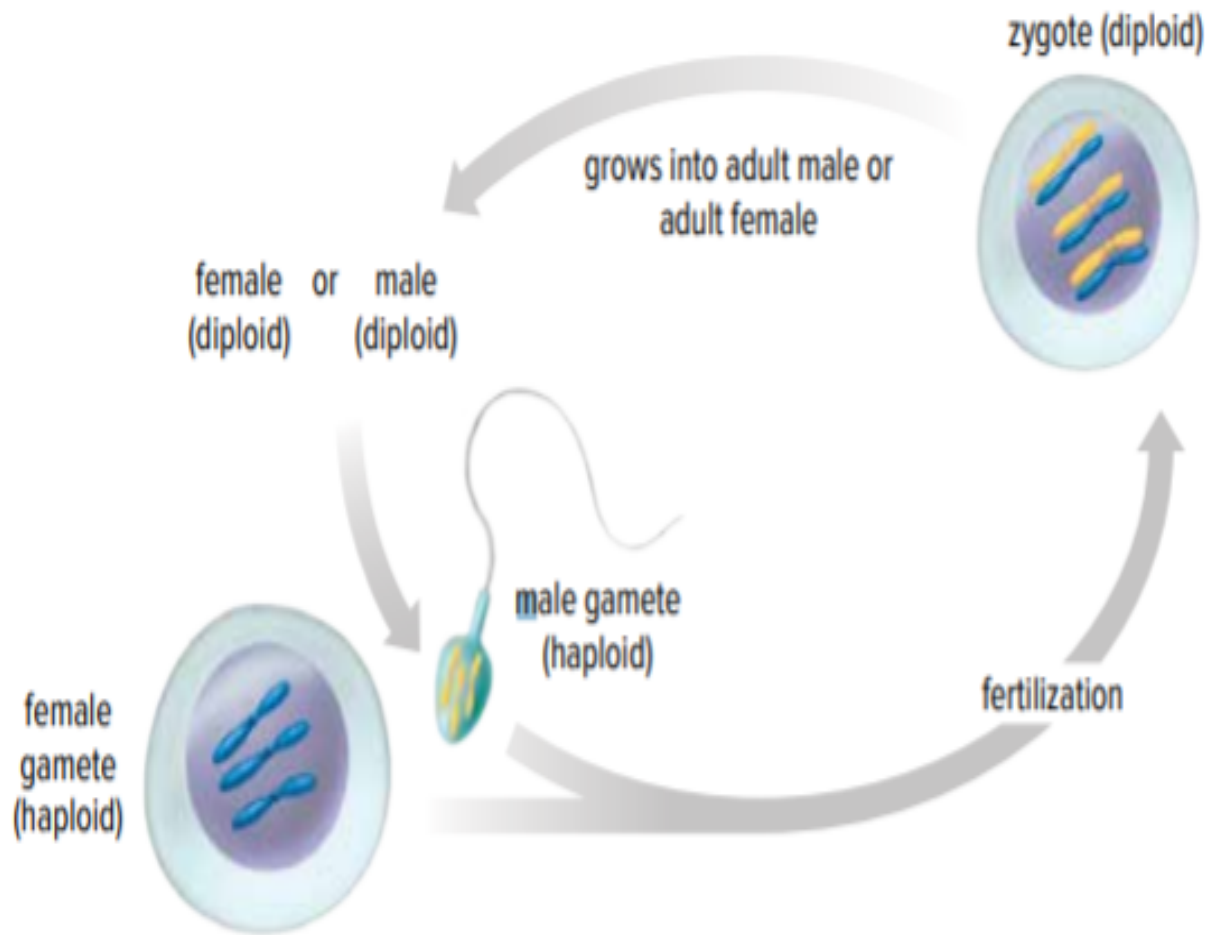
- In sexual reproduction, two cells and their genetic material combine to produce one cell that develops into an offspring. The cells which combine their genetic material together are called sex cells or gametes.
- The male parent will contribute one gamete called the sperm cell
  - These are produced in the testes
- The female parent will contribute one gamete called the ovum or egg cell
  - These are produced in the ovaries

What are gametes?

- Gametes carry half the number of chromosomes when compared to other body cells
- Example: In a regular body cell, humans have 46 chromosomes (23 pairs). Chromosomes that are paired together are called homologous chromosomes. In human gametes, the gametes will contain only 23 chromosomes.

<b>Organism</b>	<b>Number of Chromosomes in Gametes</b>	<b>Number of Chromosomes in Body Cells</b>
<b>Humans</b>	<u>23</u>	46
<b>Cat</b>	<u>19</u>	38
<b>Dog</b>	39	<u>78</u>





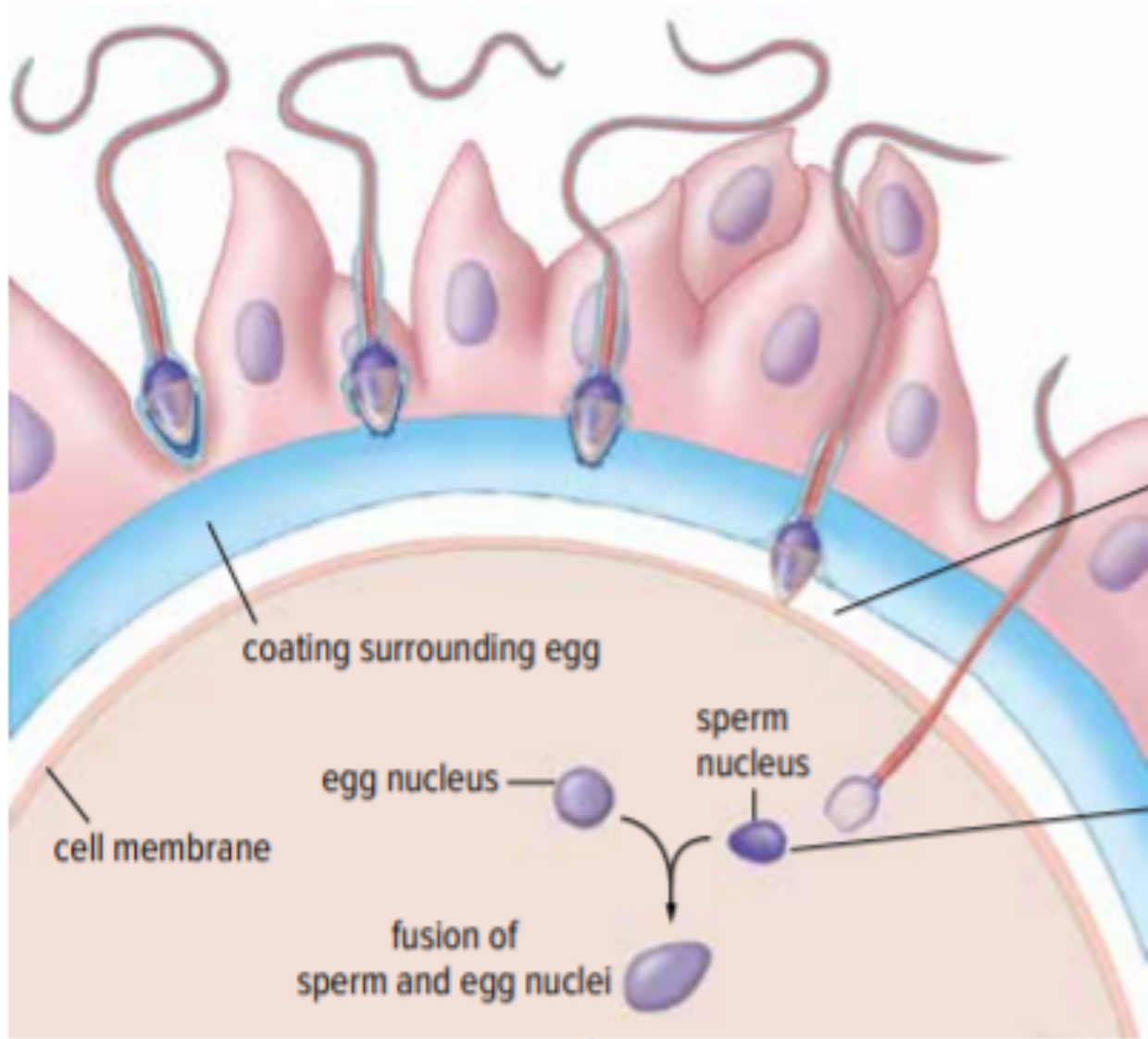
Gametes are considered to be haploid cells because they contain half the normal number of chromosomes whereas regular body cells are diploid cells (they have the full number of chromosomes)

## Fertilization

When male and female gametes combine together, this is a process called fertilization.

The nuclei of the gametes will fuse together and form one singular cell called a zygote.

This will be the first cell that will eventually develop into a new organism. The zygote will be considered a diploid cell.



**Figure 1.17** When a sperm cell fertilizes an egg cell, the two nuclei fuse and a zygote forms.

Sperm cells reach a jelly-like coating surrounding the egg cell and release substances that digest a path through the coating. This helps sperm cells get closer to the cell membrane of the egg.

The head of one sperm cell eventually enters the egg cell, where the sperm nucleus fuses with the egg nucleus.