

Fertilization Quiz Questions and Answers PDF

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What is the primary site of fertilization in humans?

- Uterus
- Fallopian tubes ✓
- Ovaries
- Cervix

The primary site of fertilization in humans is the fallopian tubes, where the sperm meets the egg after ovulation. This location is crucial for successful conception and subsequent implantation in the uterus.

Discuss the significance of genetic variation introduced during fertilization.

Genetic variation is crucial for evolution and adaptation, as it increases the genetic diversity within a population, allowing for better survival and adaptation to changing environments.

What are the initial stages of zygote development following fertilization?

The initial stages include cleavage (rapid cell division), formation of a morula, and then a blastocyst, which eventually implants in the uterine wall to continue development.

What factors can affect fertilization success? (Select all that apply)

- pH levels ✓
- Temperature ✓
- Blood pressure
- Health of gametes ✓

Fertilization success can be influenced by various factors including the health and viability of sperm and eggs, timing of ovulation, the presence of reproductive health issues, and environmental conditions. Additionally, lifestyle factors such as stress, nutrition, and substance use can also play a significant role.

Which structure in the sperm contains enzymes necessary for penetrating the egg?

- Nucleus
- Midpiece
- Tail
- Acrosome ✓

The acrosome is a cap-like structure located at the head of the sperm that contains enzymes essential for breaking down the outer layers of the egg, allowing for fertilization.

What is the term for the initial cell divisions of a zygote?

- Meiosis
- Cleavage ✓
- Differentiation
- Fertilization

The initial cell divisions of a zygote are known as cleavage. This process involves rapid mitotic divisions that lead to the formation of a multicellular structure called a blastula.

What is the result of fertilization in terms of cell formation?

- Gamete
- Embryo
- Zygote ✓
- Blastocyst

Fertilization results in the formation of a zygote, which is a single cell that contains genetic material from both the sperm and the egg. This zygote will undergo multiple rounds of cell division to develop into an embryo.

Which of the following contribute to genetic variation during fertilization? (Select all that apply)

- Random fertilization ✓**
- Identical twins
- Crossing over during meiosis ✓**
- Independent assortment of chromosomes ✓**

Genetic variation during fertilization is primarily contributed by processes such as independent assortment of chromosomes and crossing over during meiosis, as well as random fertilization of gametes.

What prevents polyspermy after the first sperm enters the egg?

- Chemotaxis
- Acrosome reaction
- Cortical reaction ✓**
- Sperm capacitation

Polyspermy is prevented by the fast block and slow block mechanisms. The fast block involves a rapid change in the egg's membrane potential, while the slow block involves the release of cortical granules that modify the zona pellucida to create a physical barrier against additional sperm.

Explain the role of the cortical reaction in preventing polyspermy.

The cortical reaction involves the release of enzymes from cortical granules in the egg, which modify the zona pellucida to prevent additional sperm from binding and penetrating the egg.

Describe the process of sperm capacitation and its importance in fertilization.

Sperm capacitation is a series of physiological changes that sperm undergo to become capable of penetrating and fertilizing an egg. It involves changes in the sperm membrane and increased motility.

What are the key differences between internal and external fertilization? Provide examples of organisms for each type.

Internal fertilization occurs inside the body (e.g., mammals), while external fertilization occurs outside the body (e.g., fish and amphibians). Internal fertilization often involves direct transfer of sperm, whereas external fertilization involves releasing gametes into the environment.

How does in vitro fertilization (IVF) assist in human reproduction?

IVF involves extracting eggs and sperm, fertilizing them outside the body in a lab, and then implantating the resulting embryos into the uterus, assisting individuals with fertility issues.

Which mechanisms prevent polyspermy? (Select all that apply)

- Fast block** ✓
- Slow block** ✓
- Chemotaxis
- Acrosome reaction

Polyspermy is prevented by several mechanisms, including the fast block (depolarization of the egg membrane) and the slow block (cortical granule reaction), which modify the egg's outer layer to prevent additional sperm from entering.

Which of the following are stages of fertilization? (Select all that apply)

- Sperm capacitation** ✓
- Gastrulation
- Acrosome reaction** ✓
- Cortical reaction** ✓

Fertilization involves several key stages, including sperm penetration, fusion of gametes, and formation of the zygote. Understanding these stages is crucial for comprehending the reproductive process.

In which organisms does external fertilization commonly occur? (Select all that apply)

- Fish** ✓
- Birds
- Amphibians** ✓
- Mammals

External fertilization is commonly found in aquatic organisms such as fish and amphibians, where eggs and sperm are released into the water for fertilization. This method is less common in terrestrial organisms due to the need for a moist environment for sperm to reach the egg.

How many chromosomes does a human zygote have?

- 23
- 46** ✓
- 69
- 92

A human zygote contains a total of 46 chromosomes, which is the result of the fusion of a sperm cell and an egg cell, each contributing 23 chromosomes.

Which term describes the movement of sperm towards the egg guided by chemical signals?

- Chemotaxis** ✓
- Phototaxis
- Geotaxis
- Thermotaxis

The movement of sperm towards the egg is known as chemotaxis, which is guided by chemical signals released by the egg. This process is crucial for successful fertilization as it directs sperm to the egg's location.

Which process involves the release of enzymes from the sperm to penetrate the egg?

- Capacitation
- Acrosome reaction** ✓
- Cortical reaction
- Implantation

The process that involves the release of enzymes from the sperm to penetrate the egg is called acrosome reaction. This reaction allows the sperm to break down the protective layers surrounding the egg, facilitating fertilization.

Which processes are involved in plant fertilization? (Select all that apply)

- Pollination** ✓
- Fertilization** ✓
- Germination
- Photosynthesis

Plant fertilization involves several key processes including pollination, fertilization of the ovule, and the development of the zygote into a seed. These processes ensure the successful reproduction and genetic diversity of plant species.