What is Gametogenesis?

Worksheet

Gametogenesis converts diploid (2n) cells into haploid (n) gametes through meiosis; in males this is spermatogenesis, producing four sperm, while in females it is oogenesis, producing one egg and up to three polar bodies.

Questions

1. How many functional gametes result from one primary spermatocyte?

A) 1
B) 2
C) 4
D) 8

2. What is a polar body?

A) A backup sperm
B) A small cell with little cytoplasm produced during oogenesis
C) A type of egg
D) A hormone

3. When is meiosis II completed in oogenesis?

A) Before birth
B) At puberty
C) At ovulation
D) Upon fertilization

4. Which process is continuous, producing millions of gametes per day?

A) Oogenesis
B) Spermatogenesis
C) Both equally
D) Neither

5. Compare the number of functional gametes produced from one primary spermatocyte vs one primary oocyte.

6. Explain why oogenesis produces polar bodies but spermatogenesis does not.

7. Explain at what point meiosis II is completed in oogenesis.

8. Define: What is gametogenesis?

9. Define: How many sperm come from one primary spermatocyte?

10. Define: How many eggs come from one primary oocyte?

Answer Key

1. C) 4 - Meiosis I and II each split the cell, giving 4 spermatids that all become sperm.

2. B) A small cell with little cytoplasm produced during oogenesis - Polar bodies form from unequal cytoplasm division in oogenesis and later degenerate.

3. D) Upon fertilization - The secondary oocyte is arrested in metaphase II until a sperm cell triggers completion.

4. B) Spermatogenesis - Spermatogenesis runs continuously from puberty onward; oogenesis releases one egg per cycle.

5. A primary spermatocyte (2n) undergoes meiosis I to form 2 secondary spermatocytes Each secondary spermatocyte undergoes meiosis II to form 2 spermatids each All 4 spermatids differentiate into functional sperm: total = 4 sperm A primary oocyte (2n) undergoes meiosis I unequally to form 1 secondary oocyte plus 1 polar body Meiosis II, completed only if fertilized, forms 1 egg plus 1 more polar body: total = 1 functional egg

6. In oogenesis, cytoplasm divides unequally during meiosis so most of it stays with one large cell The smaller cells that receive little cytoplasm become polar bodies, which degenerate This conserves nutrients and organelles for the future zygote In spermatogenesis, cytoplasm divides roughly equally, so all four products survive as sperm

7. The secondary oocyte arrests in metaphase II after ovulation It stays arrested unless a sperm cell penetrates it Sperm entry triggers completion of meiosis II This produces the mature ovum and the second polar body

8. The process of forming haploid gametes from diploid germ cells through meiosis.

9. Four functional sperm.

10. One functional egg, plus up to three polar bodies.