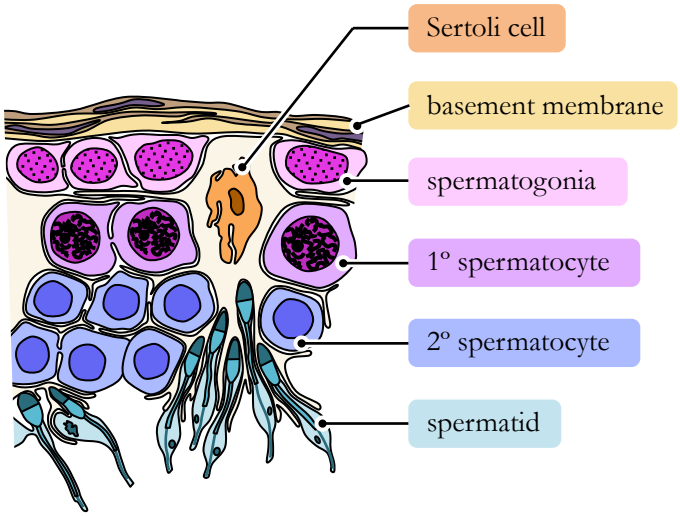
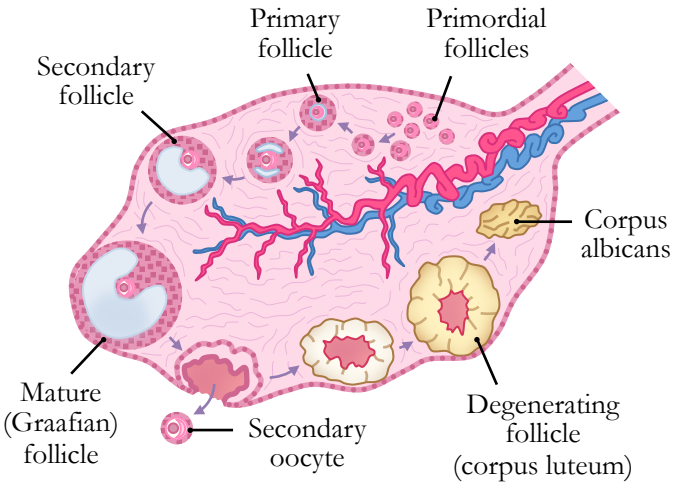
TOPIC 11.4: GAMETOGENESIS

Male Reproductive Tissue



Female Reproductive Tissue



Spermatogenesis

Spermatogenesis occurs in seminiferous tubules and involves mitosis, cell growth, two meiotic divisions and differentiation

- Four gametes are produced per germ cell
- Each gamete differentiates into a spermatozoa
- Gametes are produced continuously from puberty

This process is induced by **testosterone** (from Leydig cells)

- Sertoli cells nourish the developing spermatozoa

Oogenesis

Oogenesis occurs in the ovaries and involves mitosis, cell growth, two (unequal) meiotic divisions and differentiation

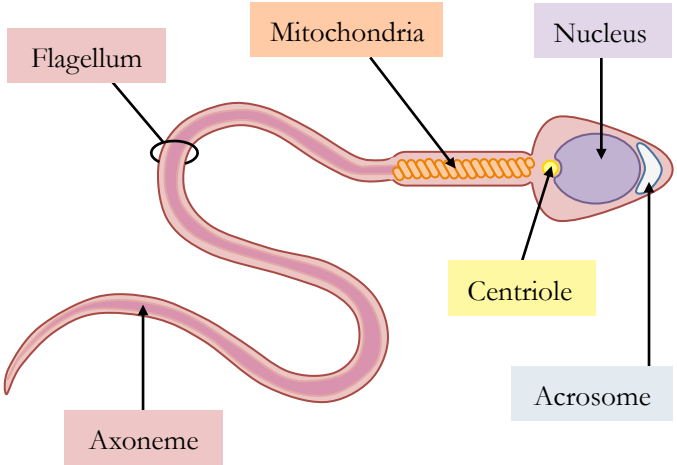
- Only one gamete is produced per germ cell due to the unequal division of cytoplasm (polar bodies degenerate)
- The process occurs in staggered stages:
  - ⇨ Begins in foetal development *(arrested in Prophase I)*
  - ⇨ Continues via menstrual cycle *(arrested in Metaphase II)*
  - ⇨ Only completed following fertilisation by sperm

Sperm

A human spermatozoa consists of three main sections:

- **Head** – contains nucleus, acrosome and centriole
- **Midpiece** – contains mitochondria (ATP source)
- **Tail** – Flagellum bends to facilitate movement

Structure of a Human Sperm

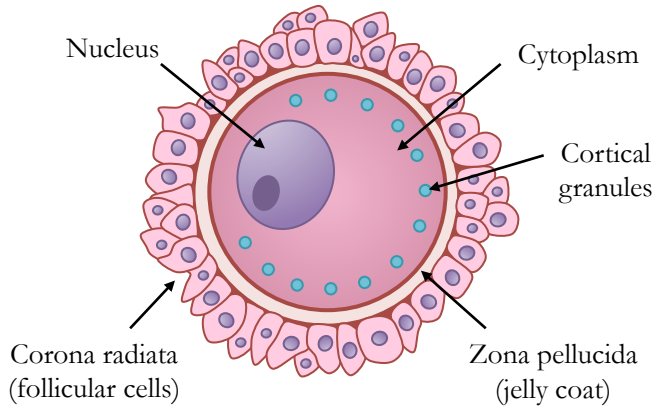


Egg

A human egg cell (ovum) is surrounded by two layers:

- **Zona pellucida** – a jelly coat that mediates sperm entry
- **Corona radiata** – follicular cells that nourish the egg (meiosis only completed when sperm provides centriole)

Structure of a Human Egg



N.B. Egg cells are arrested in metaphase II until fertilisation and do **not** have a condensed nucleus – drawings include this structure to indicate the haploid DNA