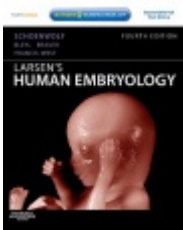
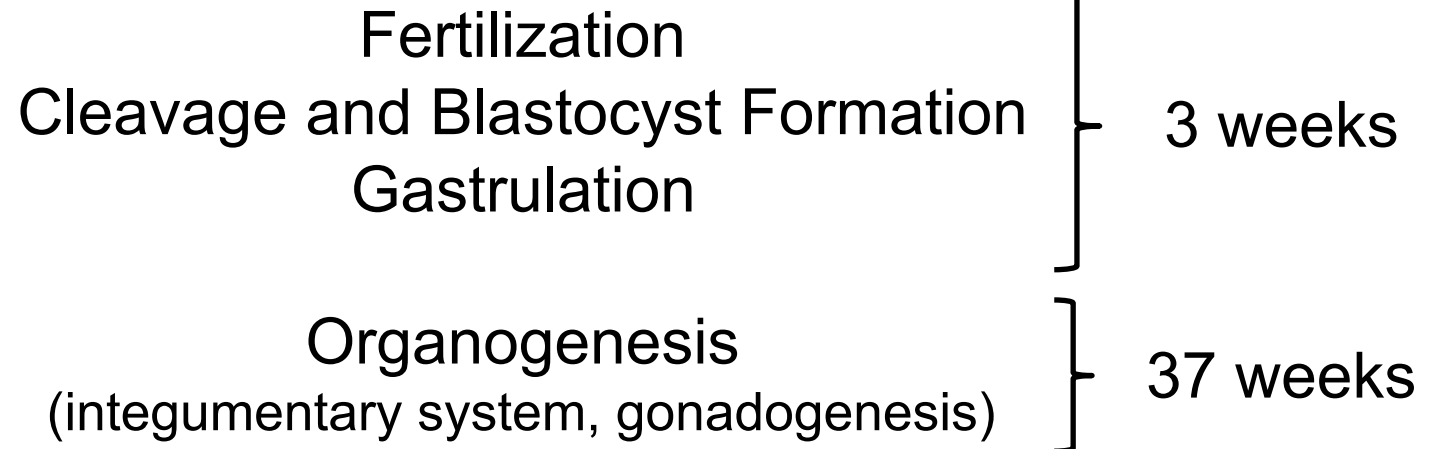
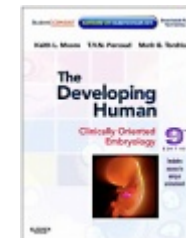


ANAT2341: lectures overview

EMBRYOGENESIS



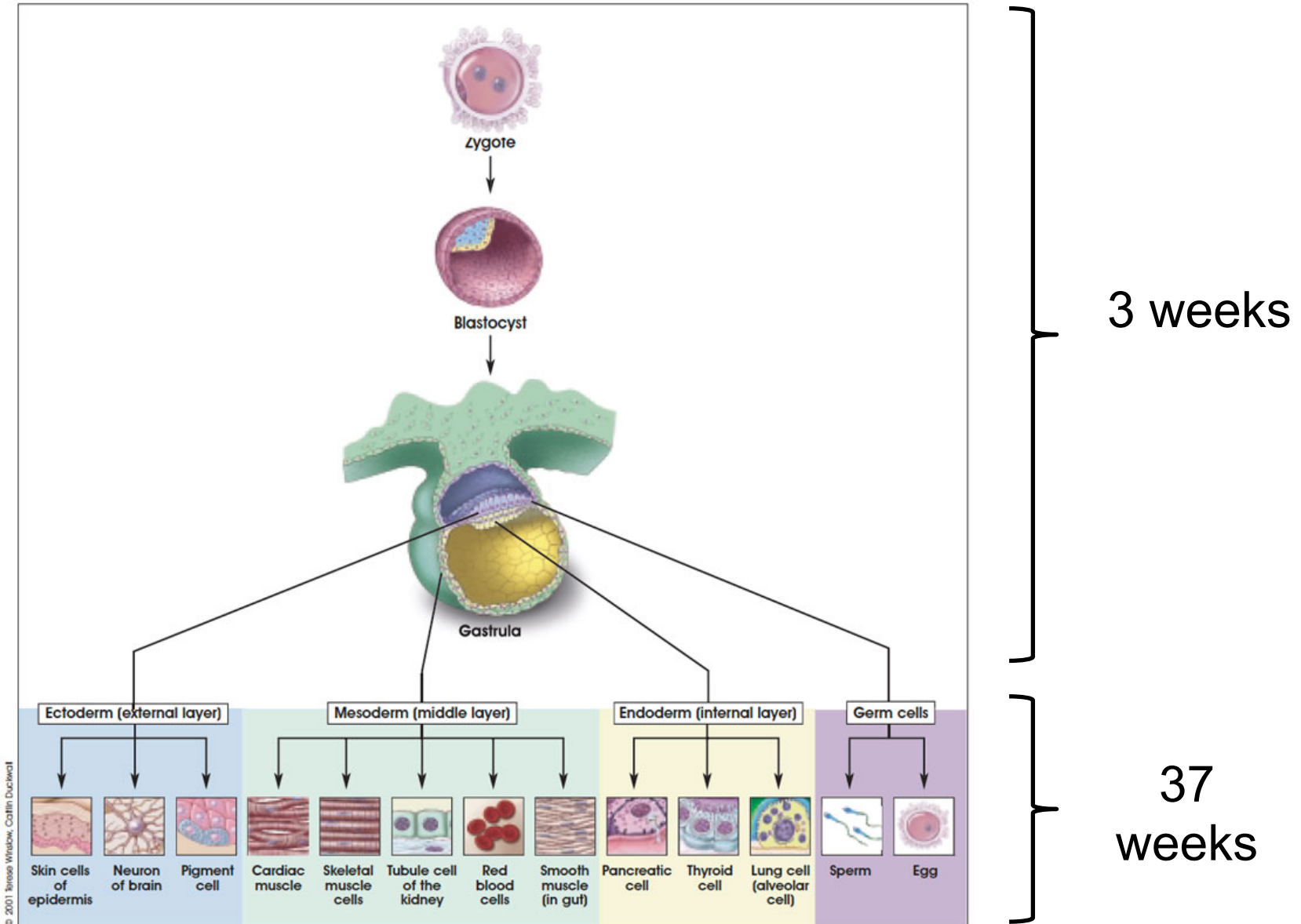
Resources ANAT2341:
<http://php.med.unsw.edu.au/embryology/>
Larsen's Human Embryology
The Developing Human: Clinically Oriented Embryology



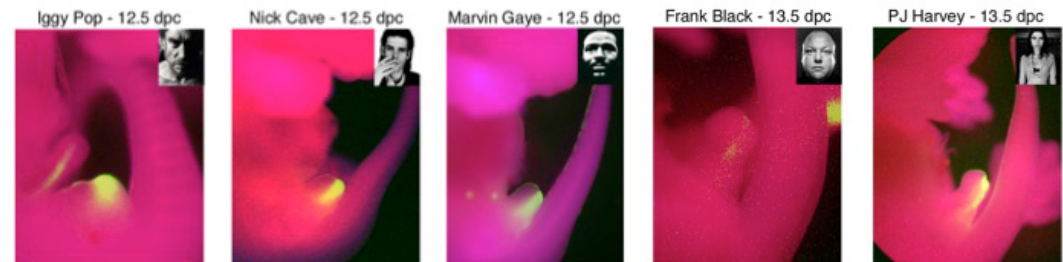
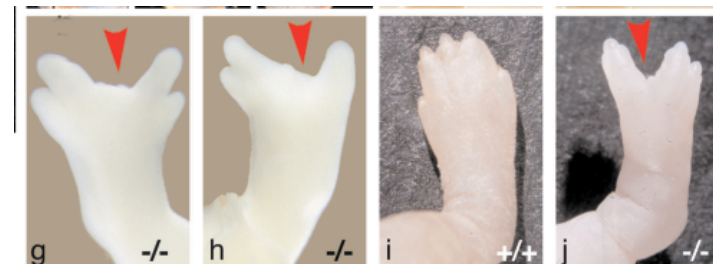
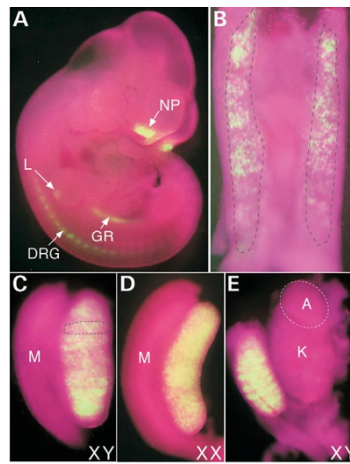
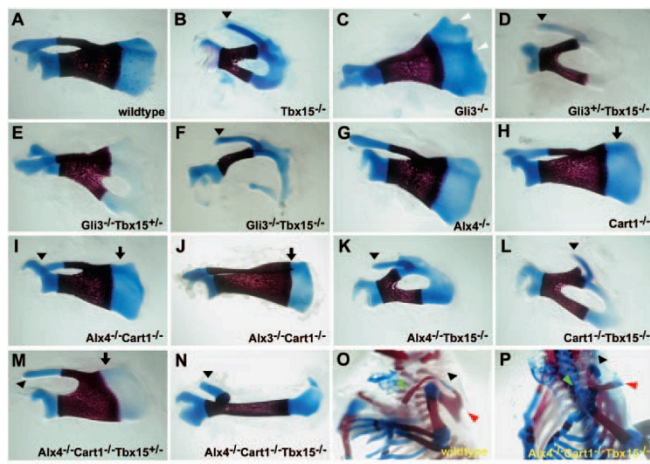
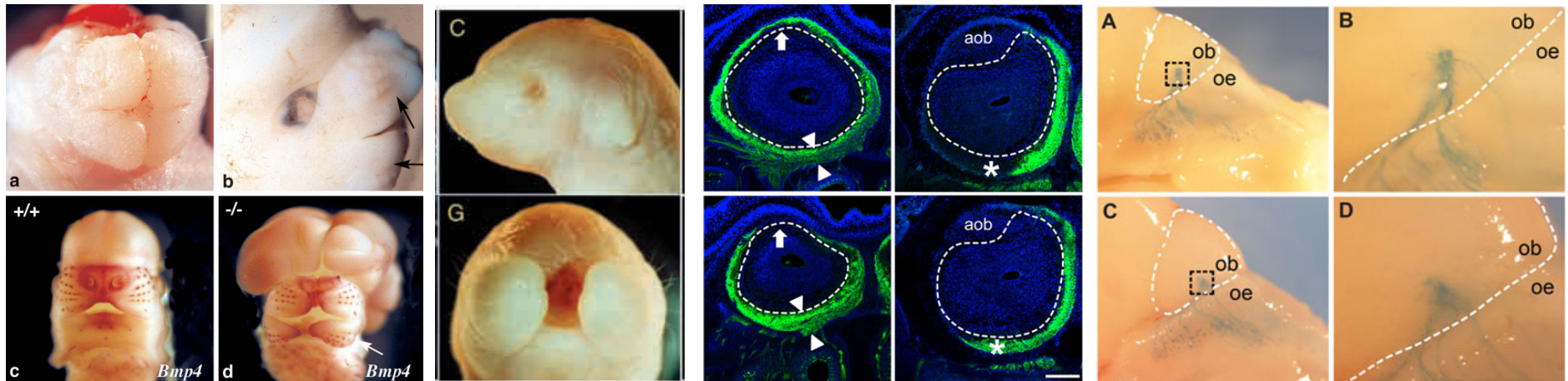
Dr Annemiek Beverdam – School of Medical Sciences, UNSW
Wallace Wurth Building Room 234 – A.Beverdam@unsw.edu.au

Lectures overview

Early embryogenesis



Images of my past



My Travels



Fertilization



Dr Annemiek Beverdam – School of Medical Sciences, UNSW
Wallace Wurth Building Room 234 – A.Beverdam@uq.edu.au

Fertilization lecture overview

Cell division, mitosis and meiosis

Gametogenesis: oogenesis and spermatogenesis

Fertilization

Dr Annemiek Beverdam – School of Medical Sciences, UNSW
Wallace Wurth Building Room 234 – A.Beverdam@uq.edu.au

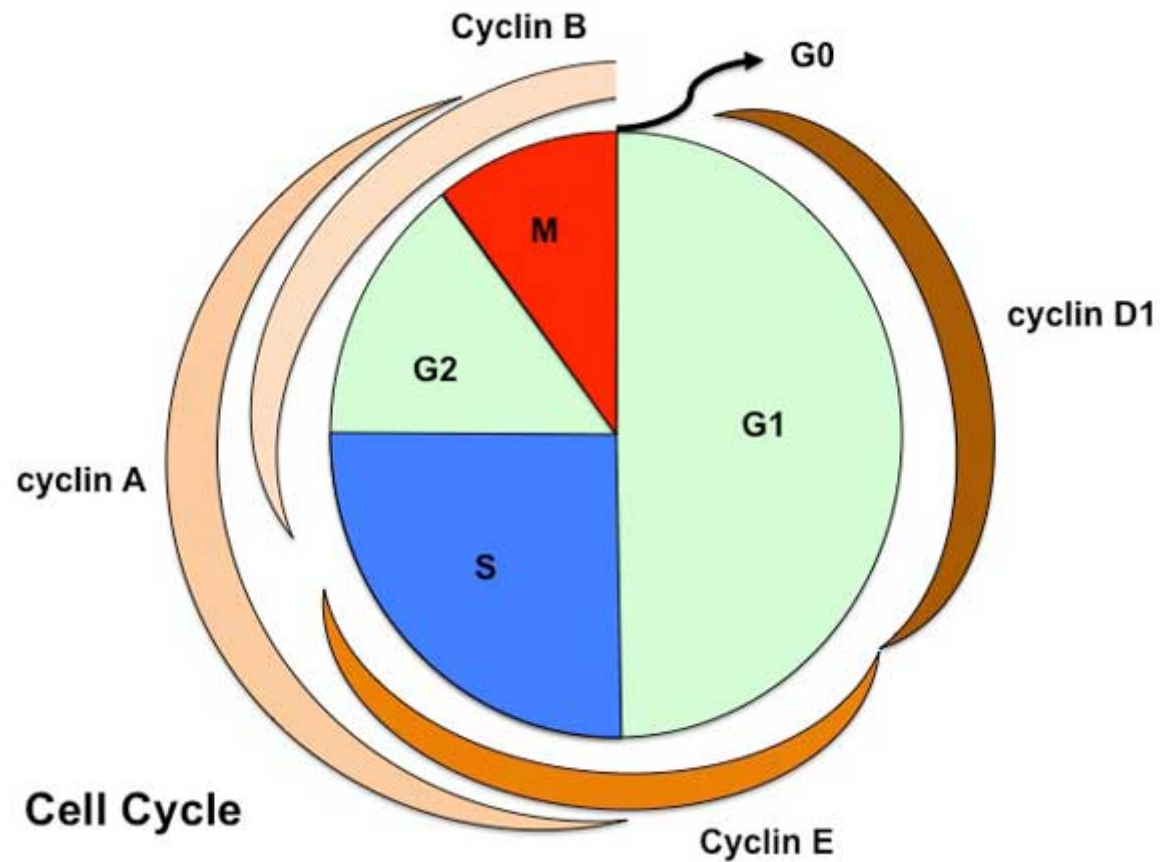
Cell Cycle

1 fertilized cell produces 10^{14} cells

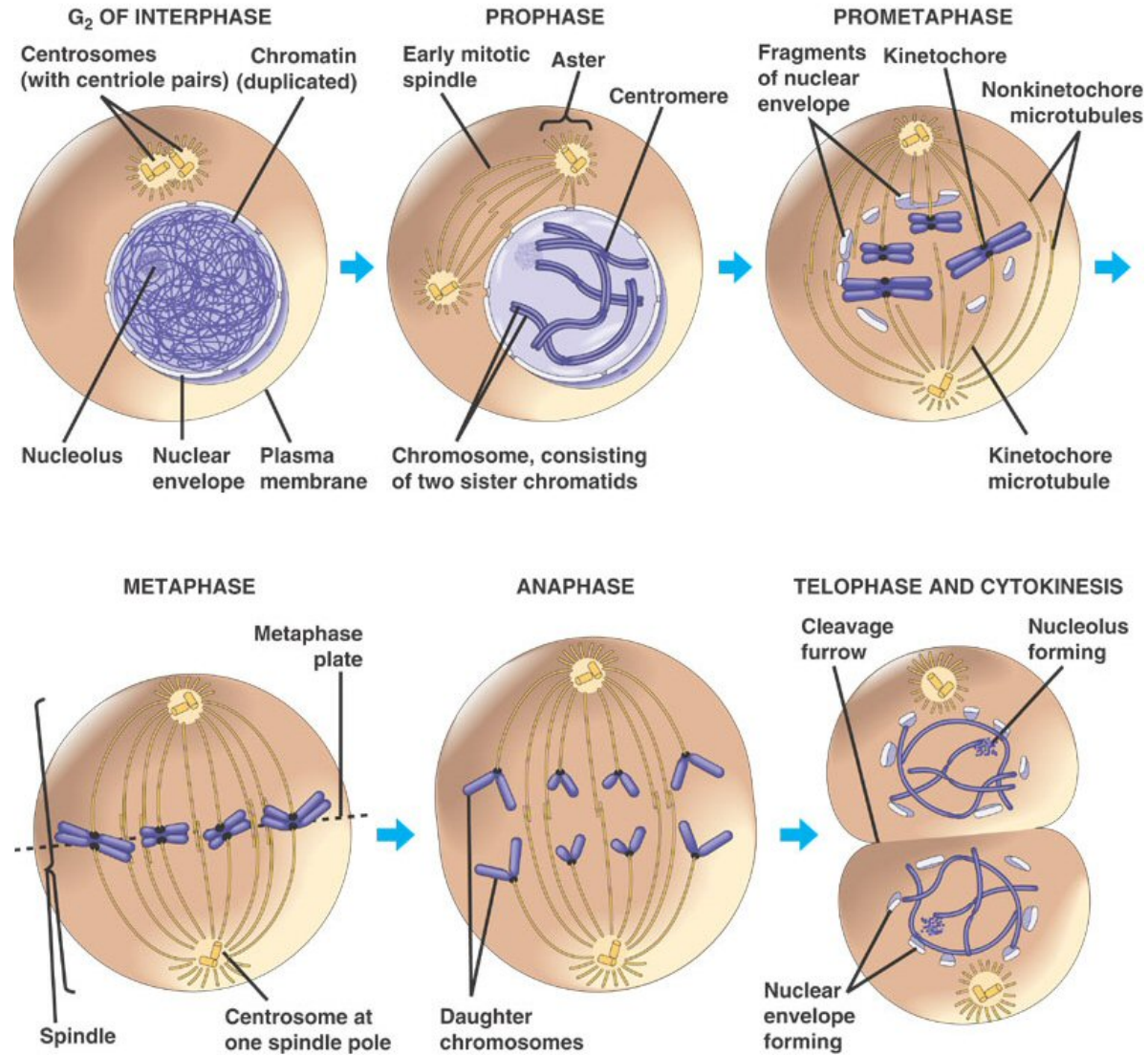
Regeneration vs Quiescence

Interphase vs mitosis

Mitosis vs meiosis



Mitosis



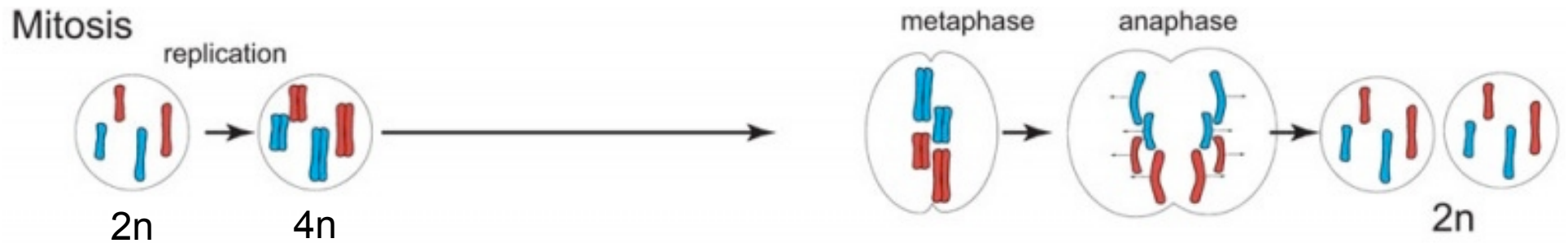
Mitosis

Occurs in all cells

Shuts down cellular function

Generation of two genetically identical daughter cells

$2n \rightarrow 4n \rightarrow 2n$

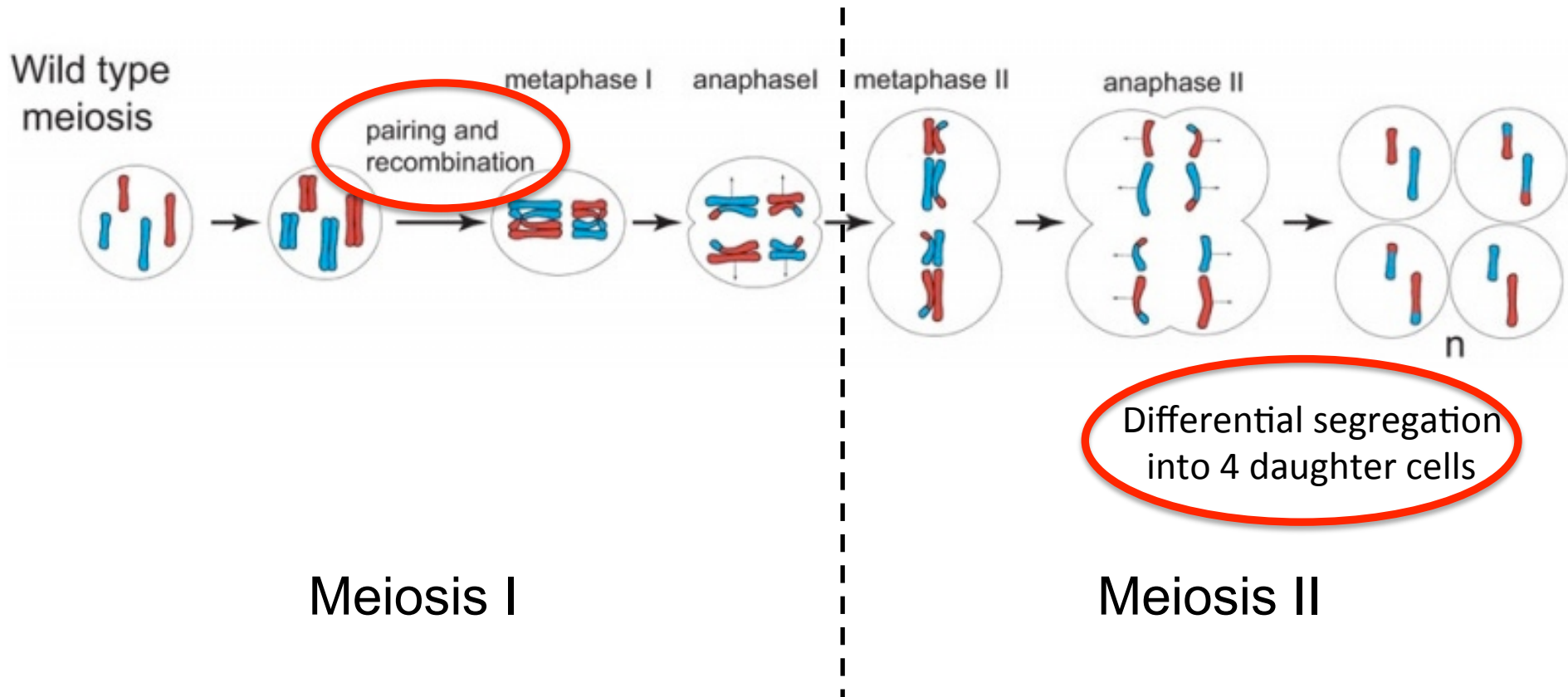


Meiosis

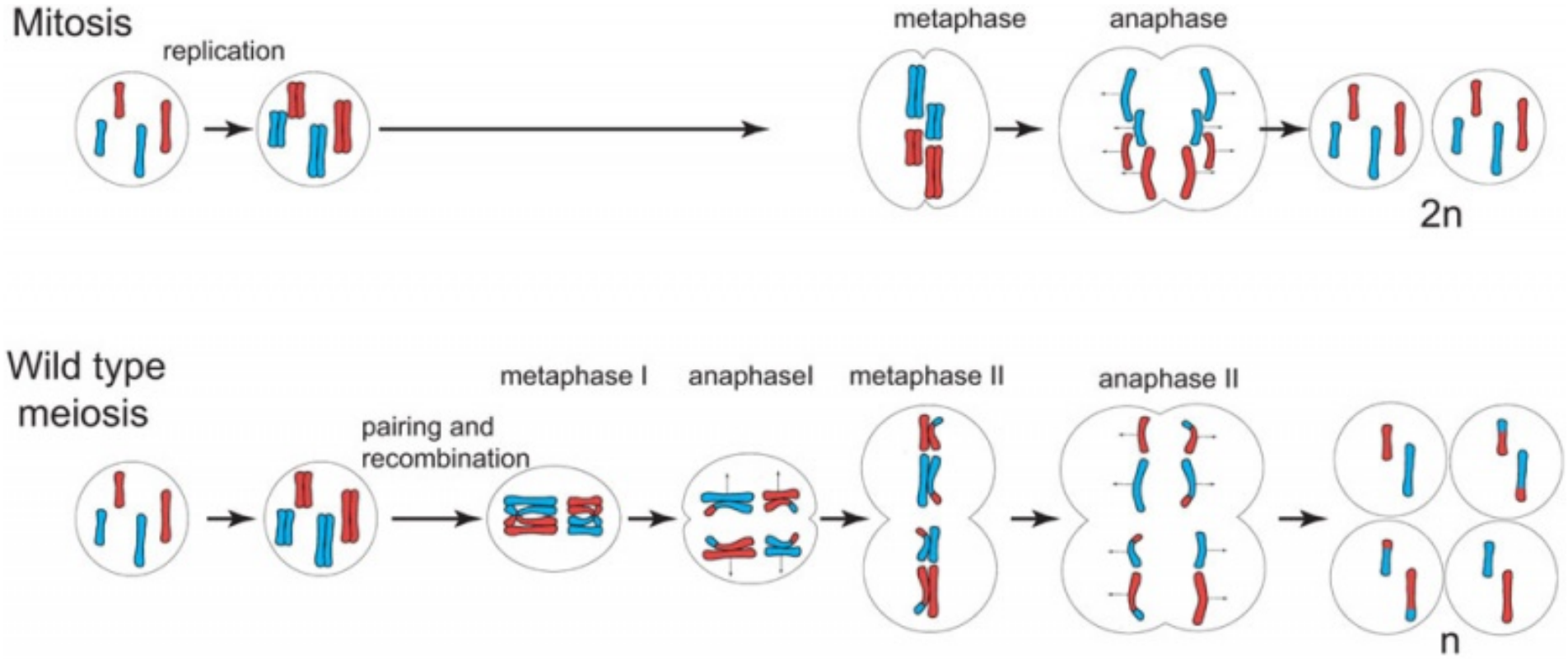
Occurs only in gametes

Generation of genetically different daughter cells

$2n \rightarrow 4n \rightarrow 2n \rightarrow n$



Mitosis vs meiosis



Gametogenesis

Reproductive system

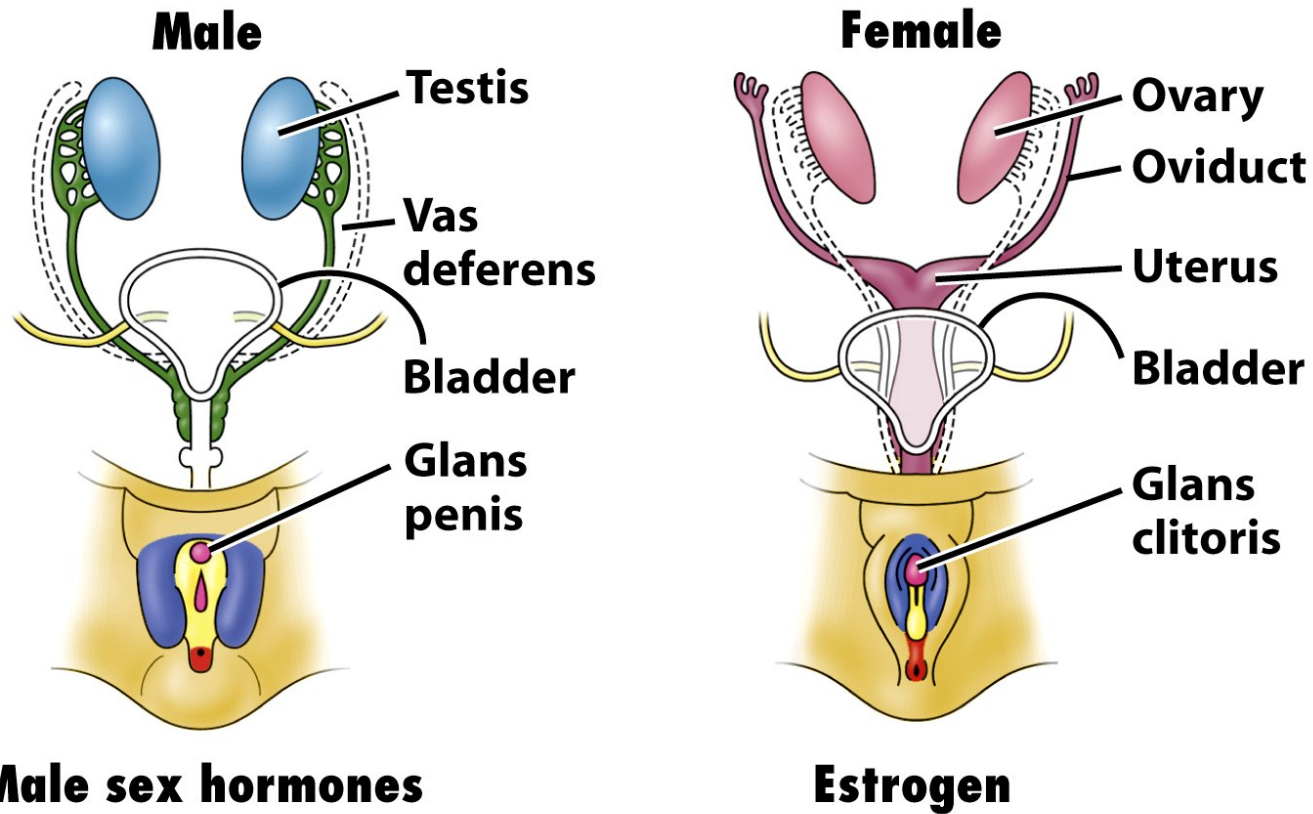
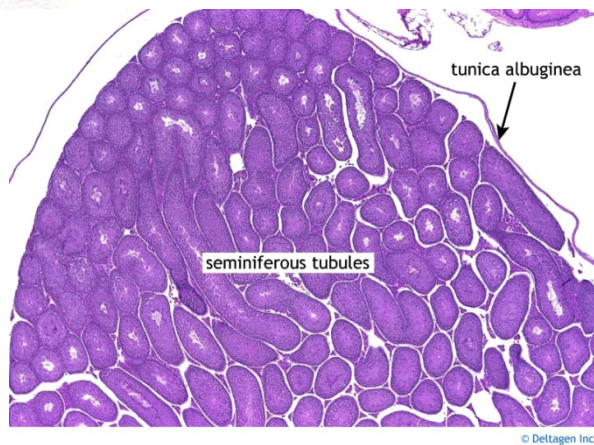
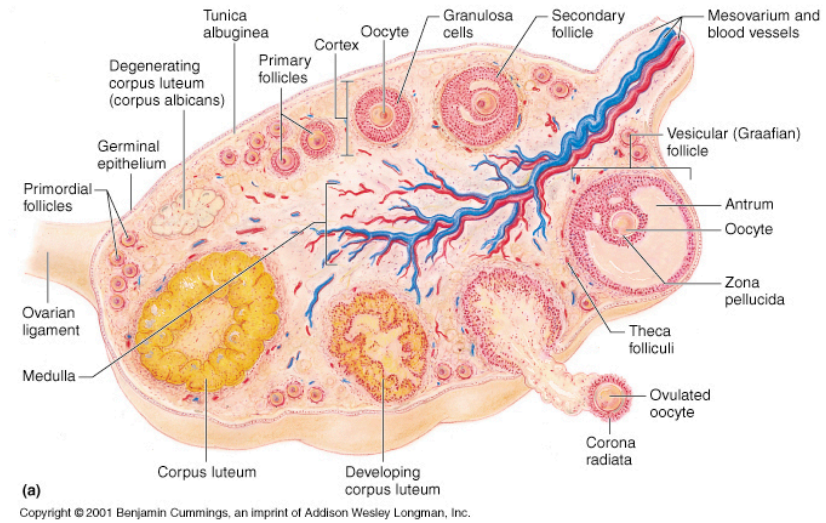
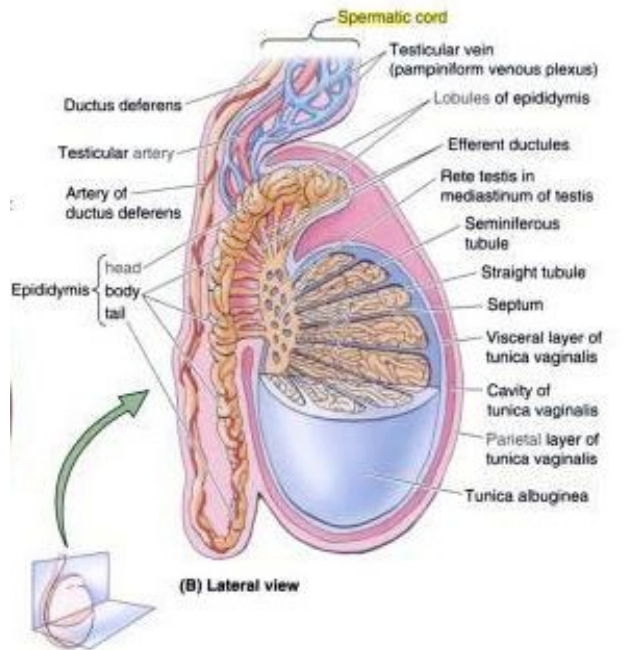
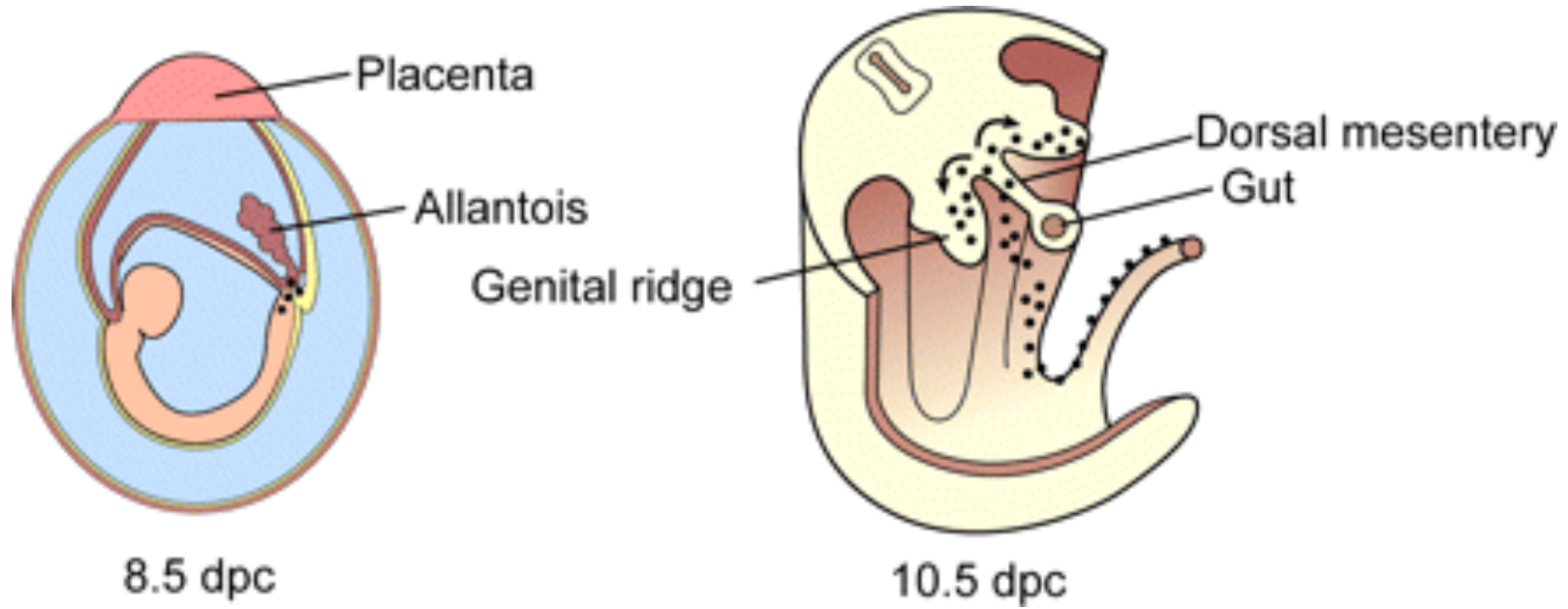


Figure 24-8 part 2 Discover Biology 3/e
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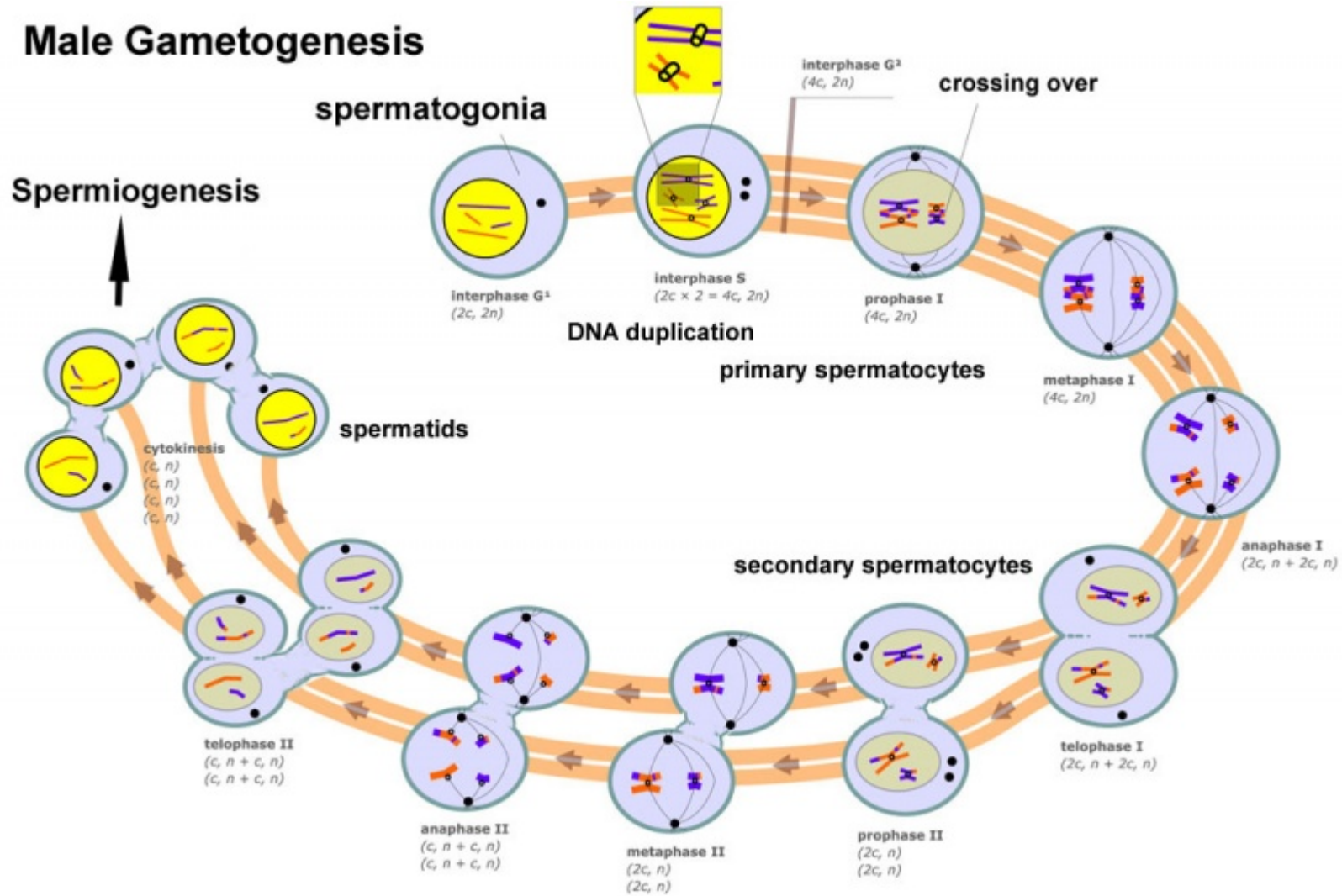
Gametogenesis Reproductive system



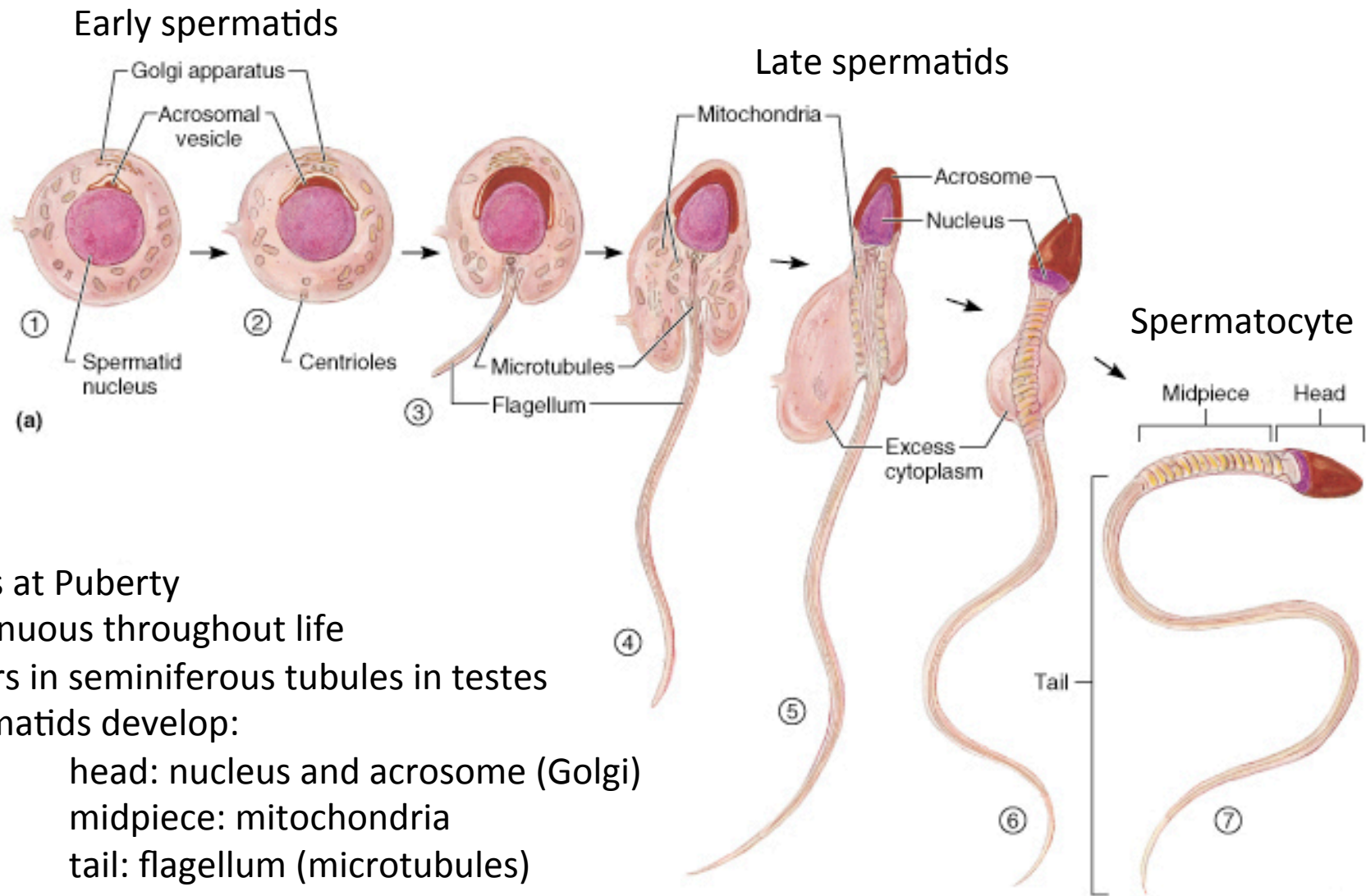
Gametogenesis



Spermatogenesis



Spermiogenesis



Starts at Puberty

Continuous throughout life

Occurs in seminiferous tubules in testes

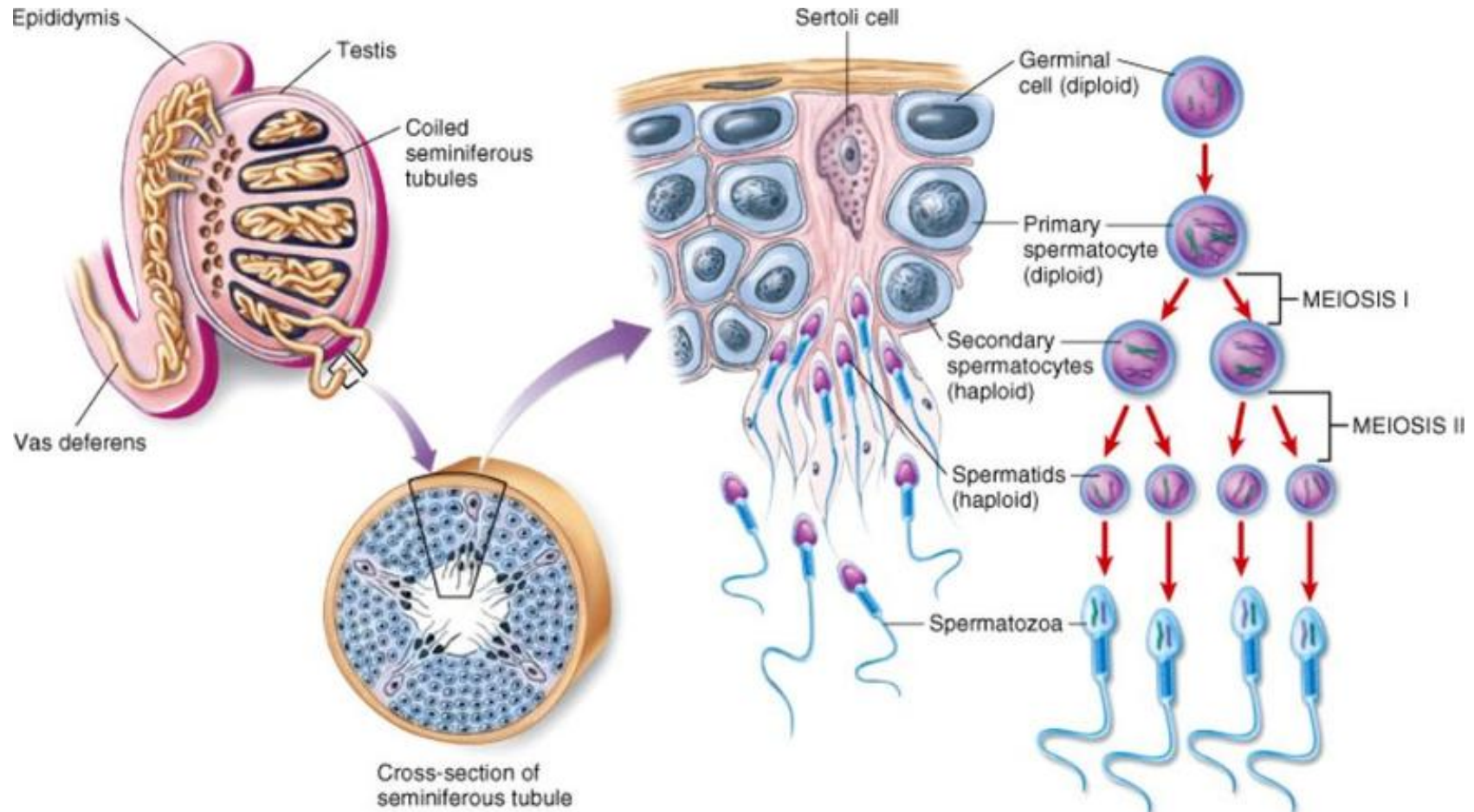
Spermatids develop:

head: nucleus and acrosome (Golgi)

midpiece: mitochondria

tail: flagellum (microtubules)

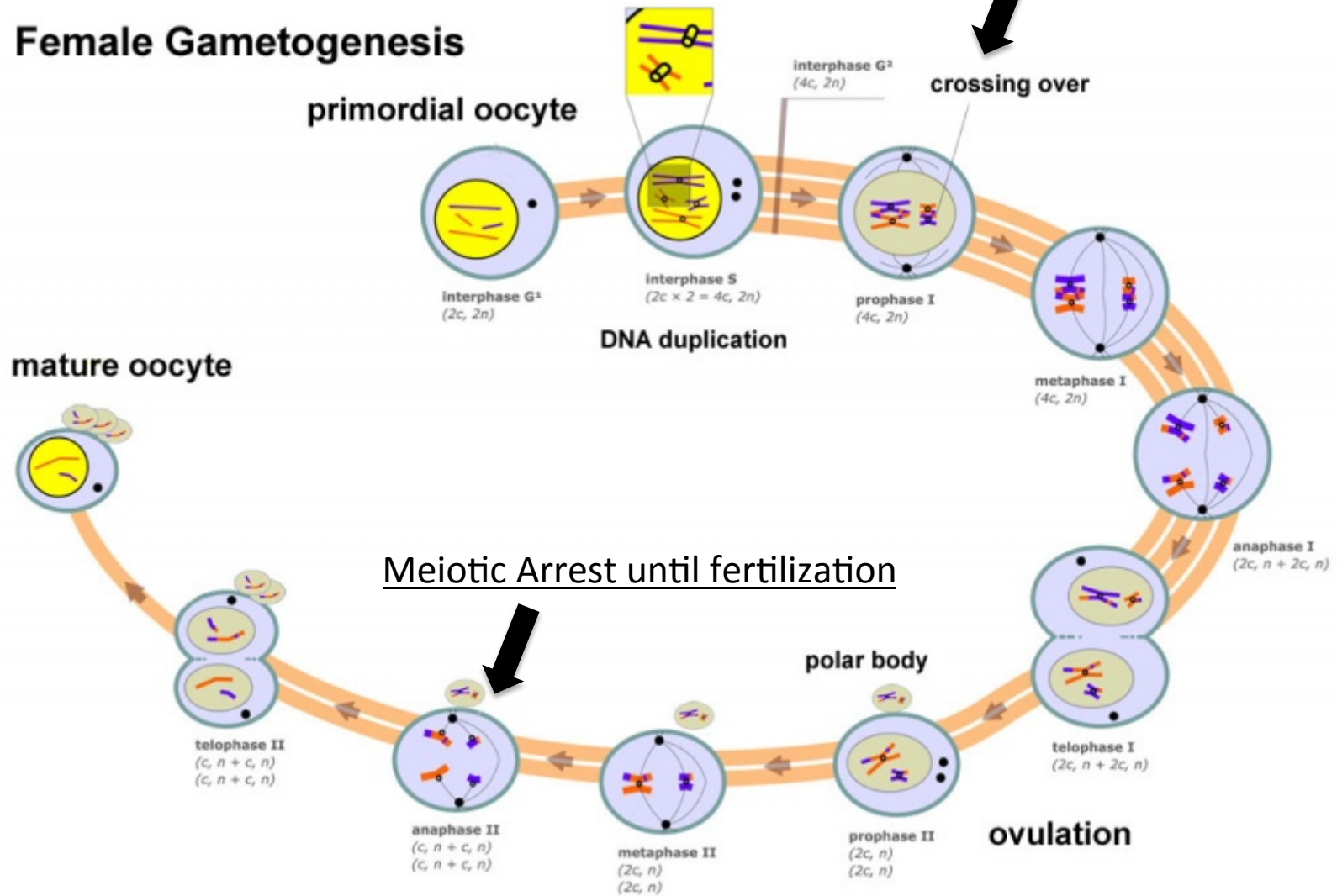
Spermatogenesis/spermiogenesis



Oogenesis

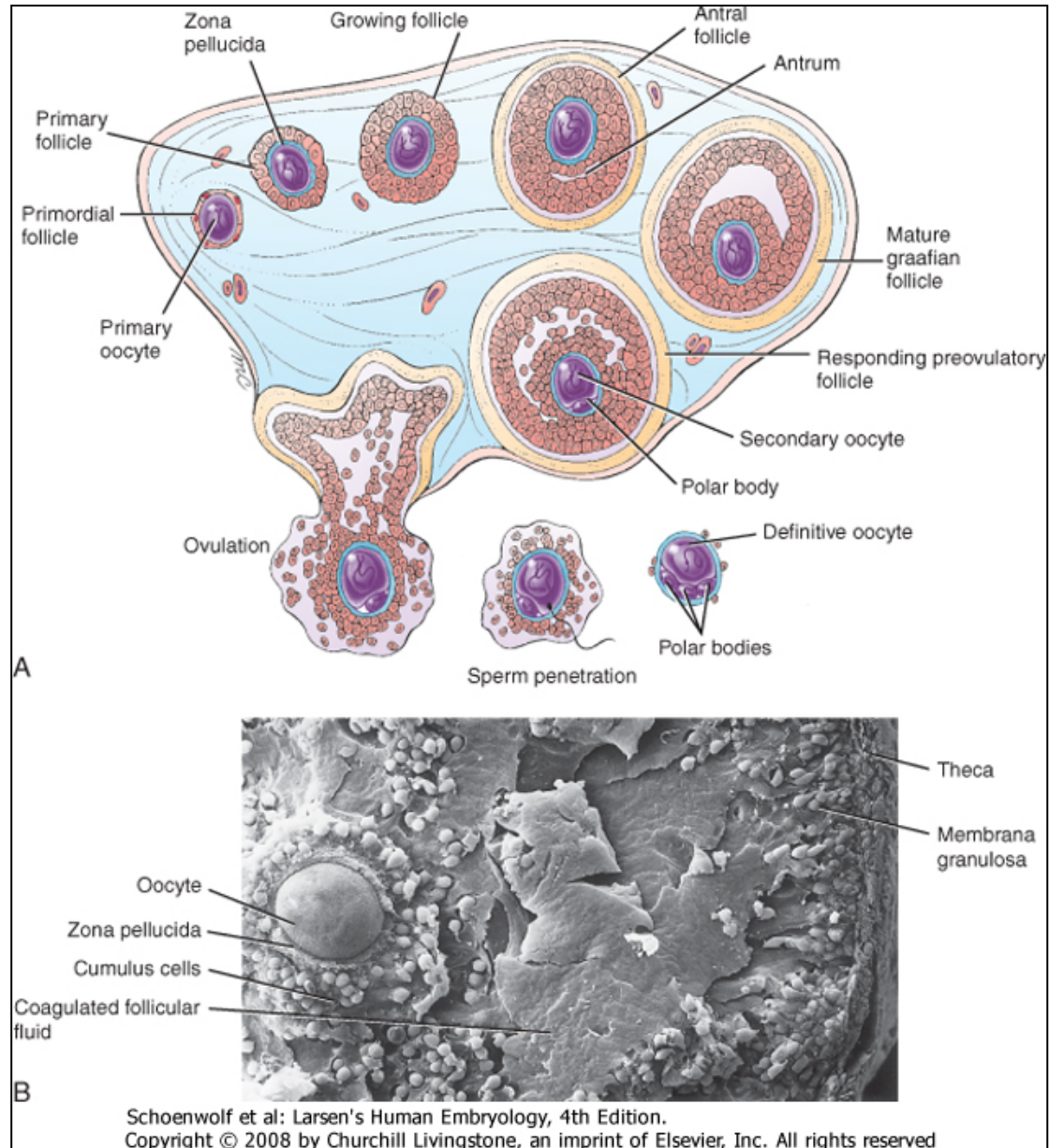
Meiotic Arrest @ week 12

Female Gametogenesis



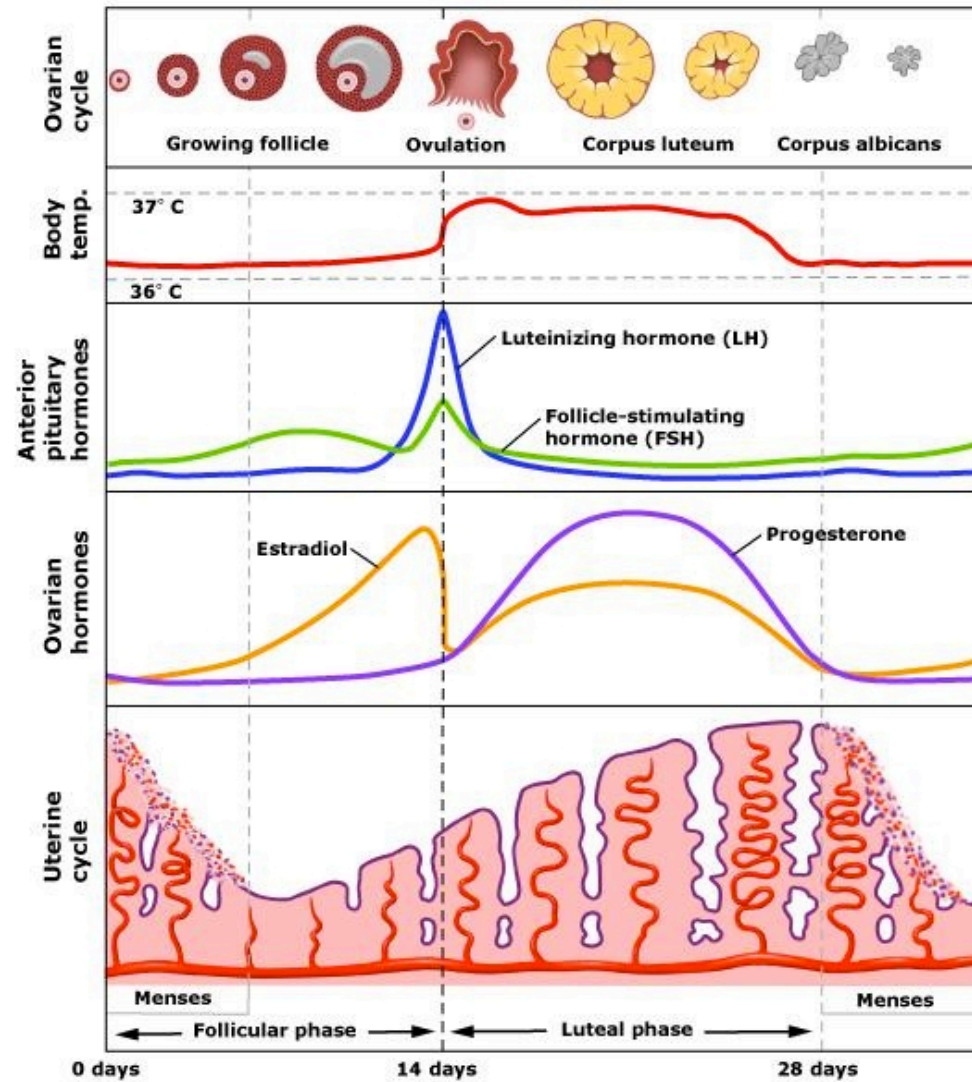
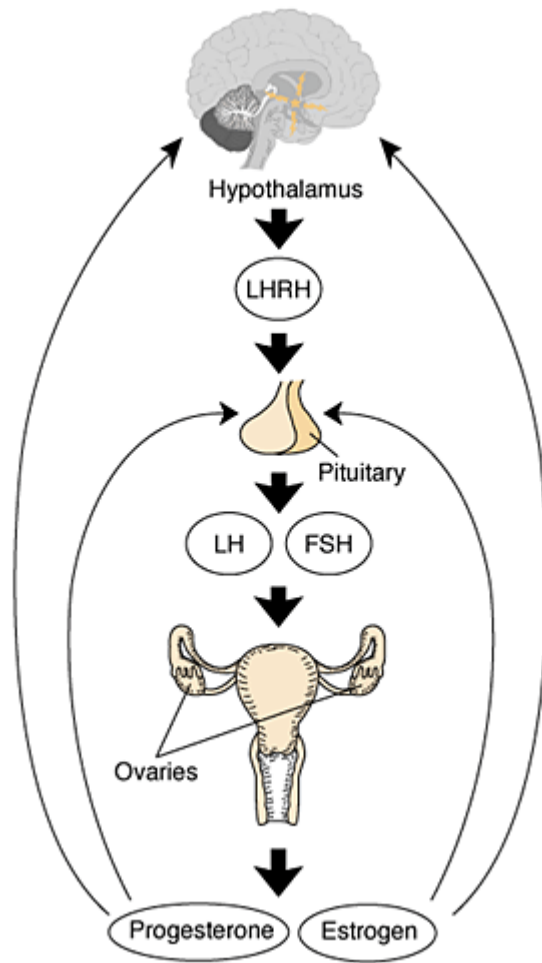
Primary oocyte generates 1 mature oocyte and 2 (or 3) polar bodies

Oogenesis



Oogenesis

Menstrual cycle



Oogenesis

Zona Pellucida

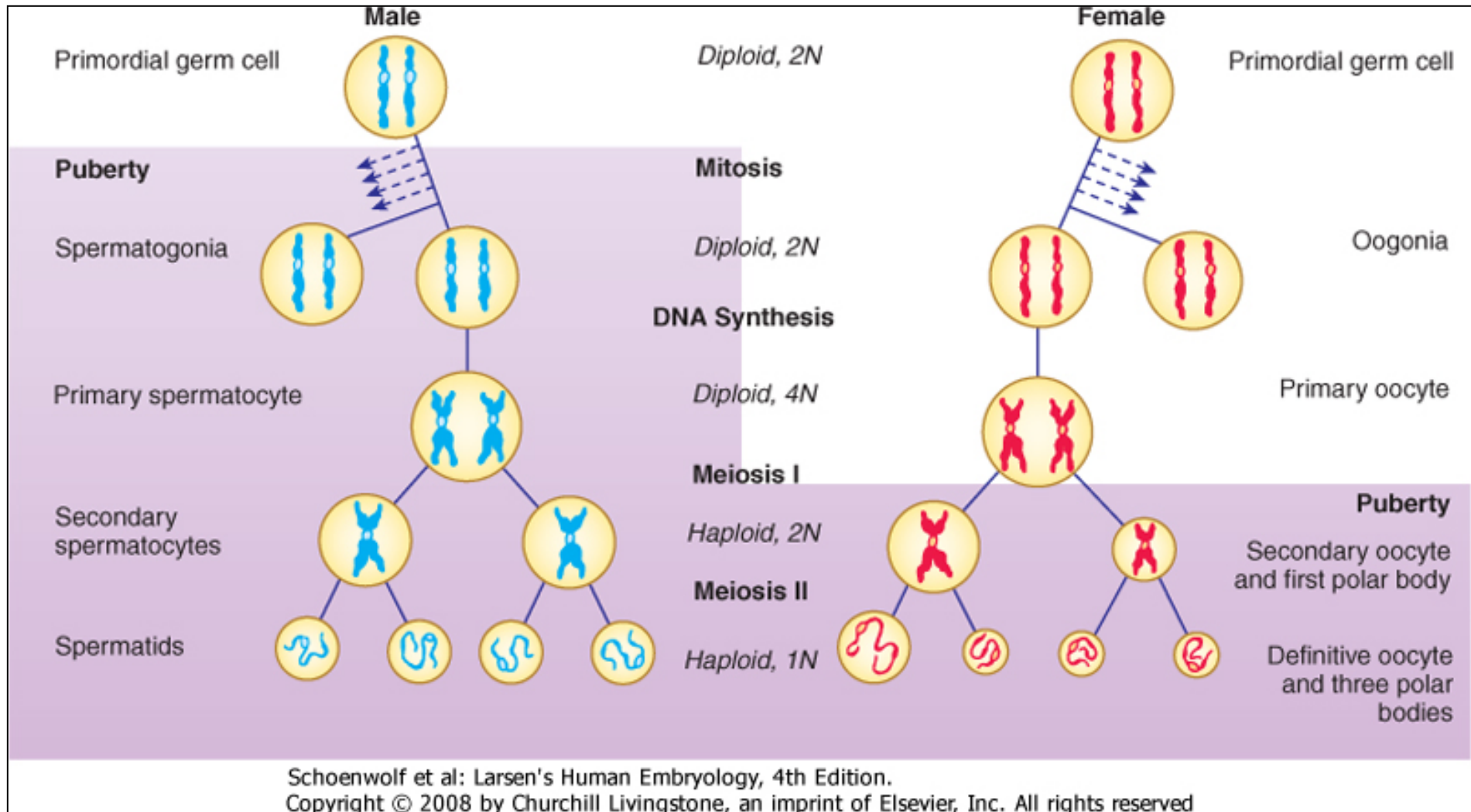


Produced by granulosa cells and oocyte

ZP1, ZP2, ZP3 glycoproteins:

Fertilization process/sperm binding/acrosome reaction

Gametogenesis



Mitotic arrest until puberty
 Continuous mitosis followed by meiosis from puberty
 1 primary spermatocyte: 4 spermatids (cytoplasmic bridges)
 Spermiogenesis in testes

Prophase I arrest prenatally
 Metaphase II arrest until fertilization
 1 primary oocyte: 1 oocyte, 3 polar bodies
 Oogenesis in ovary and oviduct

Gametogenesis

Female:

Oogenesis

Ovaries/oviduct

Meiotic arrest at prophase I until puberty

Meiotic arrest at metaphase II until fertilization

1 oocyte per month

Male:

Spermatogenesis

Testes

Mitotic arrest until puberty

Maturation of many spermatocytes throughout life

Fertilization

Ejaculation

Oocyte secretes chemotactic factors

Capacitation of sperm in female genital tract

Fertilization takes place in first 1/3 of oviduct

Zona Pellucida induces acrosome reaction

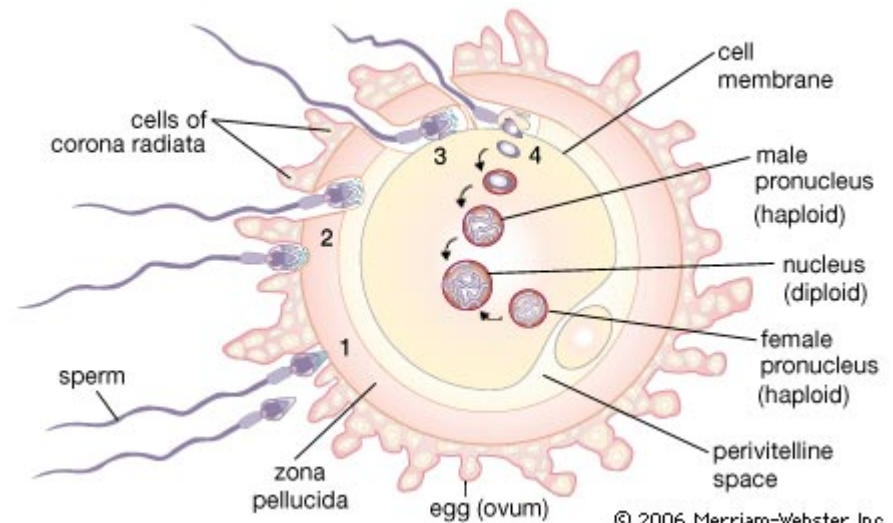
Membrane Fusion:

Cortical granule release: prevention of polyspermy

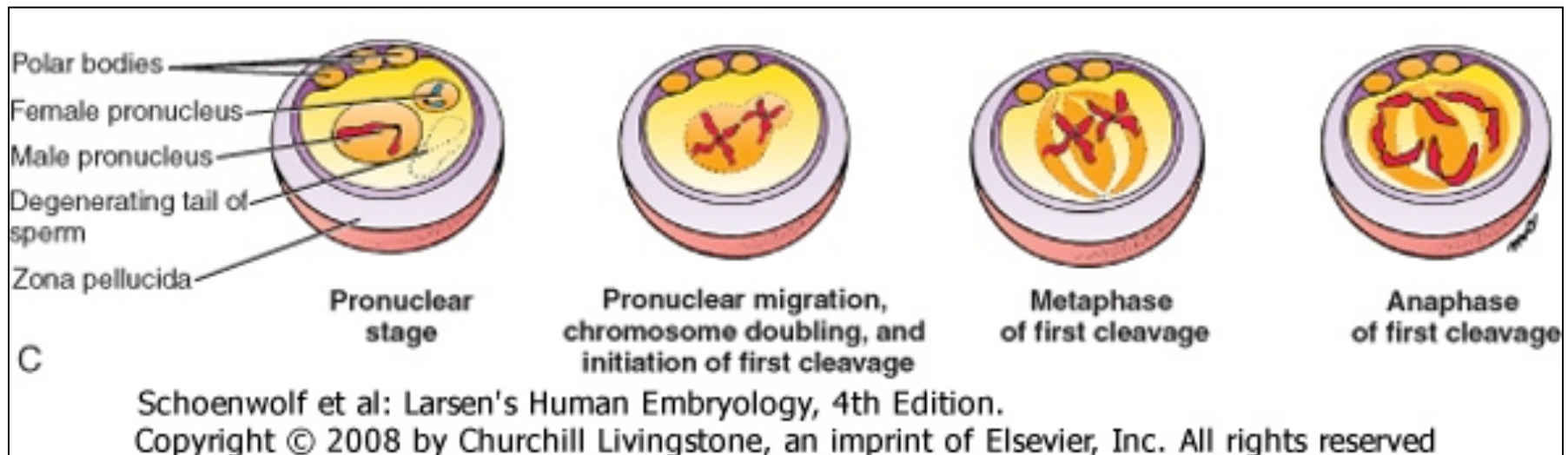
Oocyte resumes meiosis

Fusion of male and female pronuclei

Mitosis



Fertilization



http://php.med.unsw.edu.au/embryology/images/5/5f/Fertilization_003.mp4

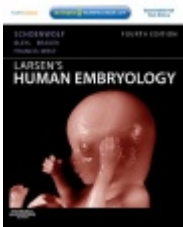
http://php.med.unsw.edu.au/embryology/images/9/95/Pronuclear_fusion_001.mp4

Fertilization lecture overview

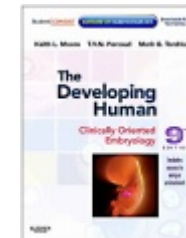
Cell division, mitosis and meiosis

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Fertilization



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Larsen's Human Embryology
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