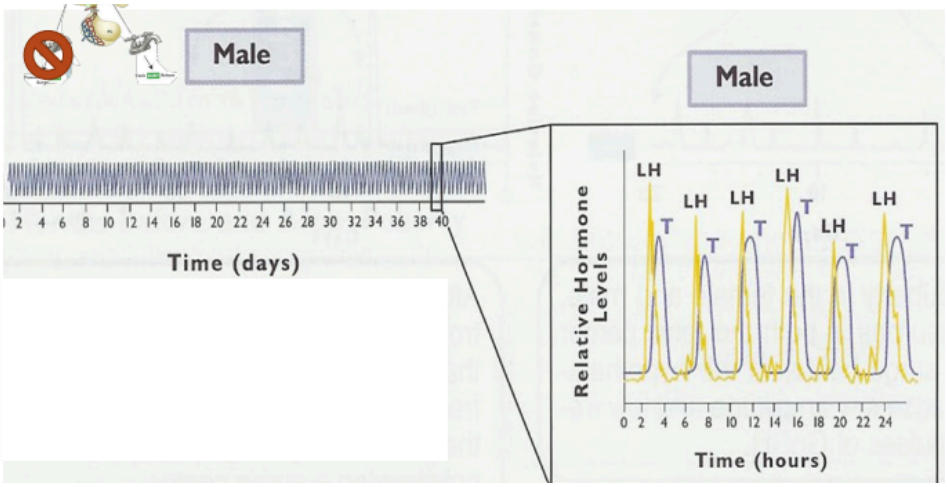
KEY Spermatogenesis

Spermatogenesis

1. What kind of hormone release do males have?
   - Tonic (episodic) release

2. What causes the Tonic release of LH and FSH?
   - GnRH

3. How often do LH episodes occur? What is released soon after an LH release?
   - Every 2-6 hours
   - Testosterone is secreted soon after each LH episode



Male 2-Cell 2-Gonadotropin Theory

4. What receptors do Leydig cells have and where are they located?
   - LH
   - Interstitial Space
   - Produce Testosterone

5. What receptors do Sertoli cells have and where are they located?
   - FSH and testosterone
   - Tubular compartment
   - Produce Androgen Binding Hormone, DHT, Inhibin, Estrogen

Phases of Spermatogenesis

6. What are the three phases of spermatogenesis?
   - Proliferation, meiosis, and differentiation

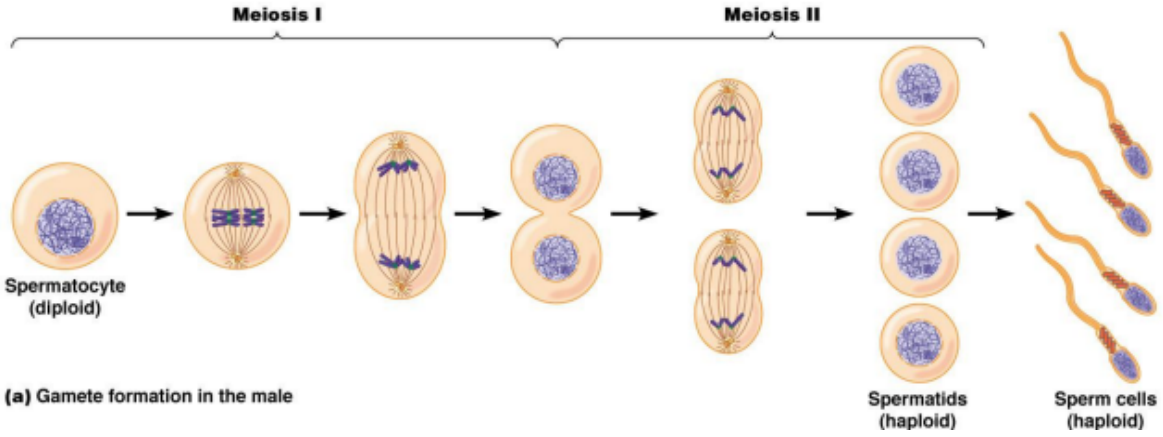
7. What happens during Proliferation and what sperm cells are present during this phase?
   - Generates spermatogonia committed to becoming more advanced cell types, undergoes mitotic divisions
   - Spermatogonia = most primitive type of cells in seminiferous tubules

   Types:
   A - undergoes mitotic divisions
   I (Intermediate)
   B - mitotic division results in primary spermatocytes

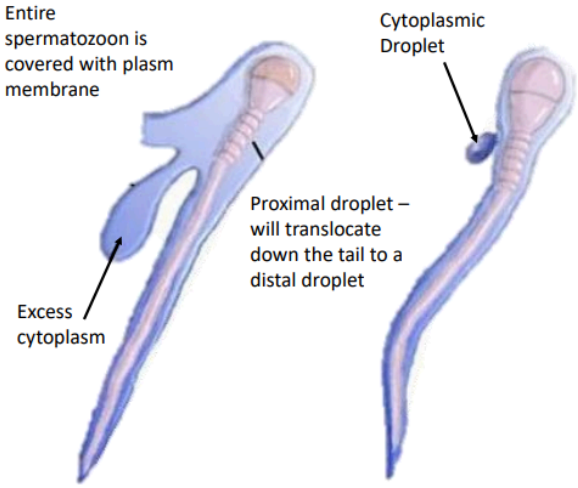
8. What causes apoptosis?
   - Season, disease, trauma/heat, hormone levels, normal process in spermatogenesis

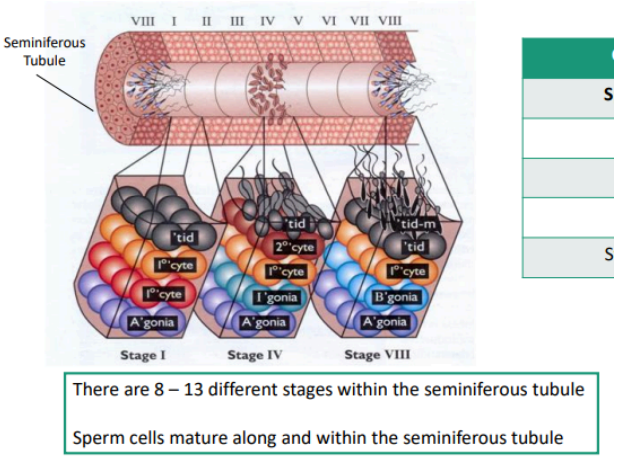
9. What happens during the Meiosis phase?
   - Responsible for producing the haploid state (1N)

   1st meiotic: genetic diversity via DNA replication and crossover, division produces secondary spermatocytes
   2nd meiotic: division creates spermatids (1N) from the secondary spermatocytes



10. What happens during the Differentiation Phase and what are the phases this is broken into?
    - NO CELL DIVISION, Morphological change in shape
    Head = nuclear material
    Midpiece = mitochondria helix, tail
    Golgi Phase
    - The golgi apparatus takes proteins and folds them to create sealed droplets called vesicles, or acrosomal vesicle (intracellular vesicle within the spermatid, precursor to acrosome - contains proteolytic enzymes needed to penetrate Zona Pellucida)
    - Centrioles move to opposite pole of golgi
    Cap Phase
    - Primitive flagellum forms and begins to project towards the lumen of the seminiferous tubule
    - Granules from acrosomal vesicles “flatten” and make a “cap” over the nucleus
    Acrosomal Phase
    - Sperms head takes shape → nucleus begins to elongate (acrosome continues to spread and mitochondria move to the neck)
    Maturation Phase
    - Entire spermatozoon is covered with plasma membrane, excess cytoplasm turns into cytoplasmic droplet





11. What is the cycle of the Seminiferous Epithelium?
    Progression through a complete series of cellular associations at one location along seminiferous tubule

12. Compartments of the seminiferous tubule

Basal	- Mitosis Spermatogonia (A,I,B), Primary Spermatocytes
Adluminal	- Meiosis Primary spermatocytes, Secondary spermatocytes, spermatids - Spermiogenesis
Luminal	- Spermiation

13. What is Spermiation?
    Release of spermatozoa from Sertoli cells into the lumen of the seminiferous tubules

14. Which type of sperm is most sensitive to heat stress?
    Spermatids