

## Reproductive System laboratory module

### Male reproductive system

#### Objectives:

- 1) Identify the appearance and location of developing gametes and Sertoli cells in the seminiferous tubule and Leydig cells in the interstitial spaces.
- 2) Determine wall structure of epididymis.

**110 testis.** This slide shows a cross-sectional view of one testicular lobule. Each lobule contains 4-5 seminiferous tubules, but these tubules are coiled within the lobule so you will see a mixture of cross-sectional, oblique and longitudinal profiles. The cross-sections are the best ones to use for this exercise. Gametes develop in waves along each seminiferous tubule, so there will be several stages of gamete development in the tubules in each slide. You should be able to identify gametes in all stages of development by searching through a number of cross-sectional tubule profiles. Identify examples of the most easily observed stages first, then look for the more difficult stages.

**Primary spermatocytes:** these should be the easiest to find. They occur in the outer one-third of the tubule wall (the "outer" boundary of the tubule is the basement membrane, furthest away from the lumen), and have a round nucleus in which the chromatin occurs as dark threads or clumps.

**Secondary spermatocytes** are not common since the gametes rapidly pass through this phase to form spermatids, so these cells will be difficult to identify.

**Spermatids:** early spermatids are difficult to distinguish from secondary spermatocytes. Late spermatids have narrow, pointed nuclei, and occur in the inner half of the tubule wall. As the process of spermiogenesis continues, nuclei become more compressed and narrower, and flagella develop.

**Spermatozoa:** located closest to the lumen; if these are present their nuclei will be thin and their tails will be directed into the lumen.

**Spermatogonia:** located around the outside of the tubule next to the basement membrane. The nuclei of these cells are small and round; darker-staining nuclei represent type B spermatogonia which will develop into primary spermatocytes.

**Sertoli cells:** these are support cells for the developing gametes, which are embedded in Sertoli cell cytoplasm. Only the nuclei of Sertoli cells will be visible. These are usually located near the basement membrane, may be are oval or triangular-shaped, larger than those of gametes, and relatively pale-staining.

**Interstitial cells (Leydig cells):** testosterone-secreting cells located in the loose connective tissue between seminiferous tubules. They usually occur in clusters and have central round or oval nuclei that stain slightly darker than the cytoplasm.

**94 epididymis:** This is a long (> 5 meters) coiled duct in which spermatozoa undergo maturation to become viable sperm. The epithelium of the duct is simple tall columnar; these cells have long microvilli called "stereocilia" (even though they are not motile) which extend into the lumen to absorb testicular fluid. There is a thin layer of circularly oriented smooth muscle around the outside of the duct profiles that helps move the sperm

along the duct by peristalsis. There are also a few profiles of efferent ductules on this slide. These carry immature spermatozoa from the seminiferous tubules and rete testis to the epididymis. The epithelium of the efferent ductules is simple cuboidal or columnar with cilia which help move the spermatozoa toward the epididymis.

## Female reproductive system

### Objectives:

- 1) Identify gametes and their supporting follicular structures at different stages of development.
- 2) Determine regional differences in the structure of the oviduct wall.

**213 cat ovary:** cats, unlike humans, are normally polyestrous (produce more than one ovum at a time) so there will be several Graafian follicles in each section of the ovary. Identify the follicular stages.

**Primordial follicle:** most numerous, located mostly around the outside edge of the ovary. Oocyte is surrounded by a single layer of thin, flat cells.

**Unilaminar primary follicle:** oocyte is larger than that of a primordial follicle and is surrounded by a single layer of cuboidal granulosa cells. A blue zona pellucida may be visible.

**Multilaminar primary follicle:** oocyte is larger than in a unilaminar follicle, with a prominent zona pellucida. There are multiple layers of granulosa cells present.

**Secondary (antral) follicle:** a cavity, the antrum, containing follicular fluid (liquor) forms in the mass of granulosa cells. In larger secondary follicles the antrum enlarges and pushes the oocyte off to one side. Identify the theca interna and theca externa. What is secreted by the cells of the granulosa and theca interna?

**Graafian (mature) follicle:** largest follicle type in the ovary. Identify the cellular layers in this structure. What is the next phase in the development of this follicle?

**51 oviduct:** there are several sections of oviduct on most slides, from different regions. Collagen fibres will be stained blue, blood orange. Identify the regions from which the sections on your slide were taken. What event usually occurs in the oviduct? The structure of the epithelium is most easily visible in the section in which it is most highly folded. Some of the epithelial cells are ciliated; can you see any evidence of this? Locate the loose connective tissue supporting the epithelium, and identify smooth muscle and blood vessels in the oviduct wall.