ENDOCRINE SYSTEM
HISTOLOGY LABORATORY

Slides: END 1-9

Pituitary (Slide End 1)

Examine under low magnification initially. Identify the anterior, intermediate, and posterior lobes and the hypophyseal cavity or cleft, if present.

A. Pars Distalis

1. Identify the capillaries surrounding the cords of parenchymal cells
2. The parenchymal cells are composed of several different types based on staining characteristics
   a. Acidophils - cytoplasm is reddish
   b. Basophils - cytoplasm is bluish
   c. Chromophobes - cytoplasm: faint to no stain.

B. Pars Intermedia

1. This part is separated from the pars distalis by colloid-filled cysts.
2. The blue-stained parenchymal cells are of different size and vary in shape from cuboidal to spindle shaped.

C. Pars Nervosa

1. The majority of the tissue contains unmyelinated nerve fibers and pituicytes.

Thyroid (Slides End 2, 3)

A. The structural and functional unit is the follicle.

B. A follicle is a sac-like structure with a central matrix and lined with a single layer of epithelial cells. These cells may vary from squamous type (low cuboidal) to tall columnar depending on its functional state.
C. The follicles are filled with gelatinous colloid which is the stored product of the lining cells. The amount of colloid in the follicles is believed to indicate the activity of the thyroid. A thyroid active in secretion contains small amounts of thin fluid colloid.

D. In H and E stains, colloid appears acidophilic. However, it stains intensely with PAS stain..... WHY?

E. On your slide, note that the follicle cells lining the follicle possess a basophilic cytoplasm; the nucleus may also be located in the basal region of the cell. These cells secrete thyroglobulin. Locate the parafollicular cells grouped between the follicles. These cells are larger than the follicle cells and their cytoplasm appears clear. They secrete calcitonin.

F. The follicles are surrounded by reticular fibers. Locate capillaries in close association with the follicles. Other connective tissue elements may also be located in the stroma.

**Parathyroid: (Slides End 2 & 4)**

The parenchyma consists of densely packed groups of cells arranged in compact masses or as anastomosing cords of cells. Reticular fibers and fat form the stroma. In man, two main types of epithelial cells have been identified:

A. The **principal** or **chief cells** are most abundant. These are polygonal 7-10 µm in diameter. The cytoplasm is poorly stained and is clear due to the presence of large amounts of glycogen. The chief cells secrete parathormone.

B. **Oxyphil** cells are not nearly so numerous as principal (chief) cells. The oxyphil cells appear singly or in clusters and are much larger than the chief cells. Also, the cytoplasm of the oxyphil cell stains acidophilic due to the large accumulation and packed mitochondria. These cells appear at about 6-7 years of age and increase in number to puberty. There is no known function for the oxyphil cell.

**Endocrine Pancreas: (Slides End 6, 8, & 9)**

Identify the **pancreatic islets** (of Langerhans) situated among the pancreatic acini. These are composed of cords of cells supplied with a rich capillary network. The **Alpha**, **Beta**, and **Delta** cell types cannot be differentiated with this routine H and E stain.
**Suprarenal Gland**  (Slides End 5 & 7)

**Capsule:** The capsule is made up of a tough fibroelastic covering.

**Parenchyma:** The parenchymal cells of the cortex are located between the capsule and medulla reveal three different types of arrangements called **zones**. The zones are not sharply defined from one another. Locate and be able to identify the capsule and the three zones:

**Zona Glomerulosa:**
This is the outermost narrow zone under the capsule. The cells are grouped into little, irregular clusters with capillaries between them.

**Zona Fasciculata:**
This is the broadest zone and is located just under the zona glomerulosa. The cells are radially arranged in fairly straight cords one or two cells wide perpendicular to the surface, with straight capillaries between them. The cells are called spongiocytes because of their spongy appearance.

**Zona Reticularis:**
This is the innermost layer with cells arranged in cords that run in various directions and anastomosing with one another.

The suprarenal **medulla** is an irregularly arranged mass of cells. It is highly vascularized. Many of the cells are large and ovoid and contain fine granules. These cells are arranged in clumps and irregular cords. Large ganglion cells are also present. Locate this part of the suprarenal gland and identify the two cell types.