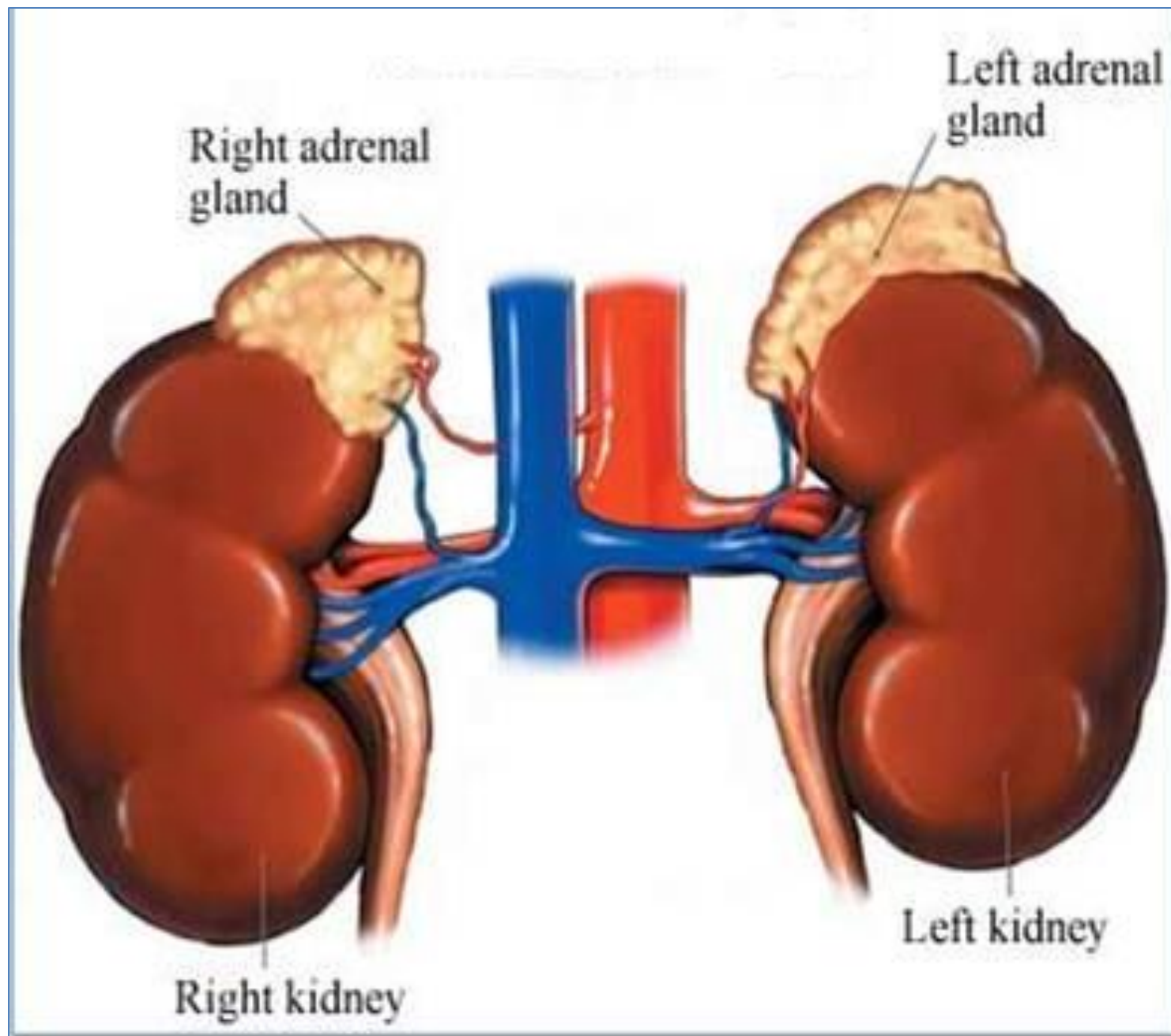
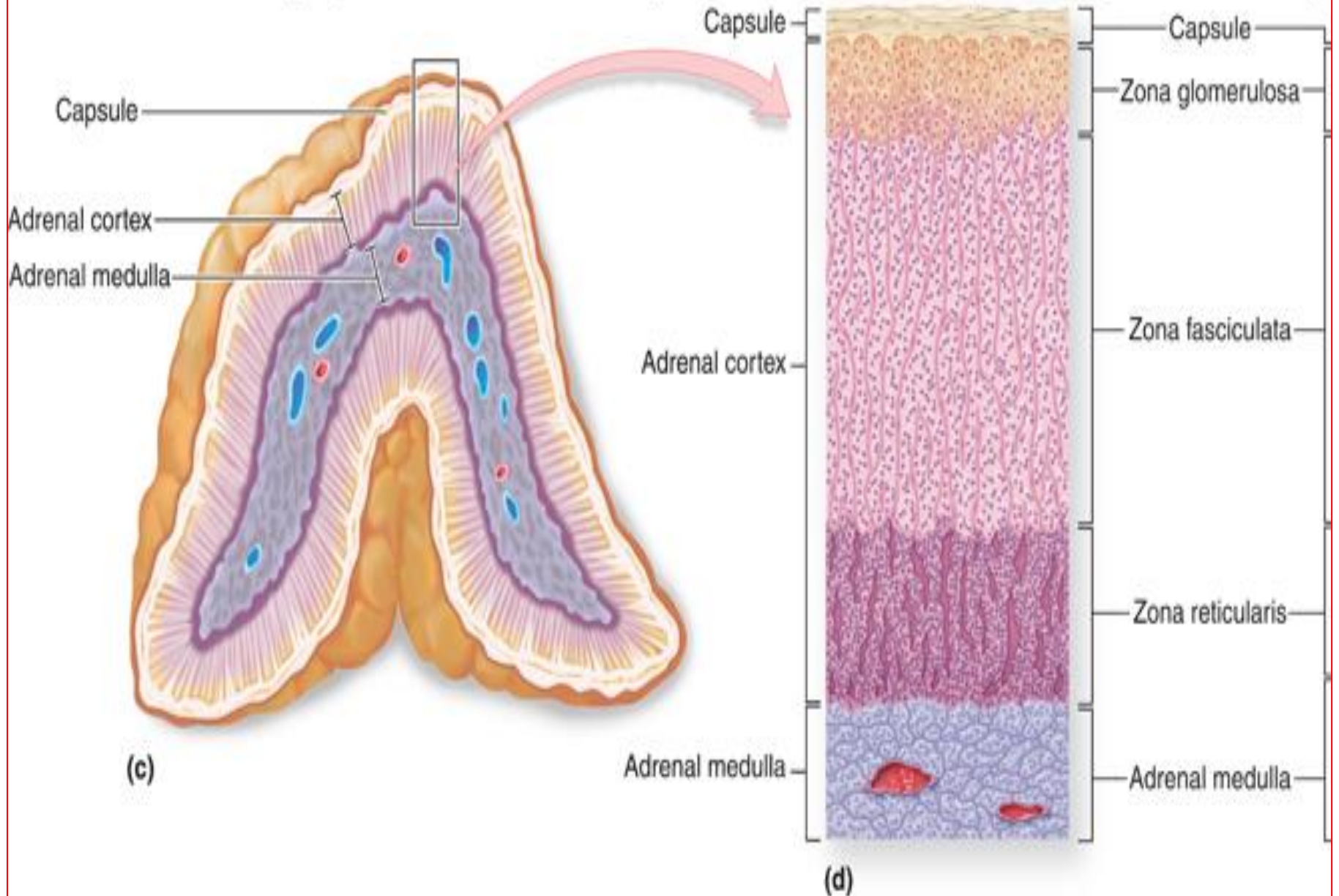


ADRENAL GLAND OF MAMMAL

- The adrenal glands are small, triangular in shape and bilaterally positioned on the superior poles of the kidneys.
- Each gland is highly vascularised and weighs between 4 and 8 g in normal adult, depending on age.
- The glands are covered with a thick connective tissue capsule from which trabecule extend into the parenchyma carrying blood vessels and nerves.



- The adrenal gland combines two distinct neuroendocrine systems, namely cortex and medulla in one organ.
- **1. The outer cortex** is the steroid-secreting portion. It occupies 90 percent of the gland and is yellow due to its high lipid content.
- **2. The inner medulla** is the catecholamine-secreting portion. It is reddish brown in colour and lies deep in the cortex and forms centre of the gland.
- Embryologically, the cortical cells originate from the mesodermal mesenchyme, where as medulla originates from neural crest cells that migrate into the developing gland.



Histology and Functions of Adrenal Cortex.

- In the adult, adrenal cortex is divided into following three zones on the basis of the arrangement of the parenchymal cells.
- **1. Zona glomerulosa:** It is the narrow outer zone which lies under a fibrous capsule and occupies **15 percent** of the cortical volume.
- The cells of this zone are arranged in closely packed ovoid clusters and curved columns that are continuous with cellular cords in the zona fasciculata.
- Cells of zona glomerulosa synthesize and secrete **mineralocorticoids**, mainly **aldosterone** and **deoxycorticosterone**.
- Aldosterone functions in the control of blood pressure.

- **2. Zona fasciculata:**
- The thick middle zone of cortex that constitute about **80 percent** of the cortical volume.
- The cells of this zone are large and polyhedral. They are arranged in long straight cords.
- One or two cells thick, which are separated by the sinusoidal capillaries.
- The zona fasciculata secrete **glucocorticoids**, so – called because of their role in regulating gluconeogenesis and glycogenesis.
- The main glucocorticoids are **hydrocortisone** (cortisol) and **corticosterone**.
- Cortisol is known to act on different cells or tissue to increase metabolic availability of glucose and fatty acids.

- 3. Zona reticularis:
- The inner zone that constitute only 5 percent of the cortical volume.
- The cells of the zona reticularis and their nuclei are more deeply stained.
- They are arranged in anastomosing cords, separated by fenestrated capillaries. The cells have few lipid droplets. Both light and dark cells are present. In the dark cells, abundant large lipofuscin pigment granules and deeply staining nuclei are evident.
- Zona reticularis secrete weak androgenic steroids (dehydroepiandrosterone or DHA) and some glucocorticoids (hydrocortisone)

Histology and Functions of Adrenal Medulla

- The central part of adrenal gland, the medulla, is composed of a parenchyma of large pale-staining epitheloid cells, called **chromaffin cells** (so called because they react with chromate salts), connective tissue, numerous sinusoidal blood capillaries and nerves.
- Chromaffin cells are **modified neurons** and are of two types, one type of cells synthesizes **adrenaline (epinephrine)** and the other type chromaffin cell synthesizes **noradrenaline (nor epinephrine)**. Both of this hormone synthesis is controlled by **sympathetic** and **parasympathetic** nerves.