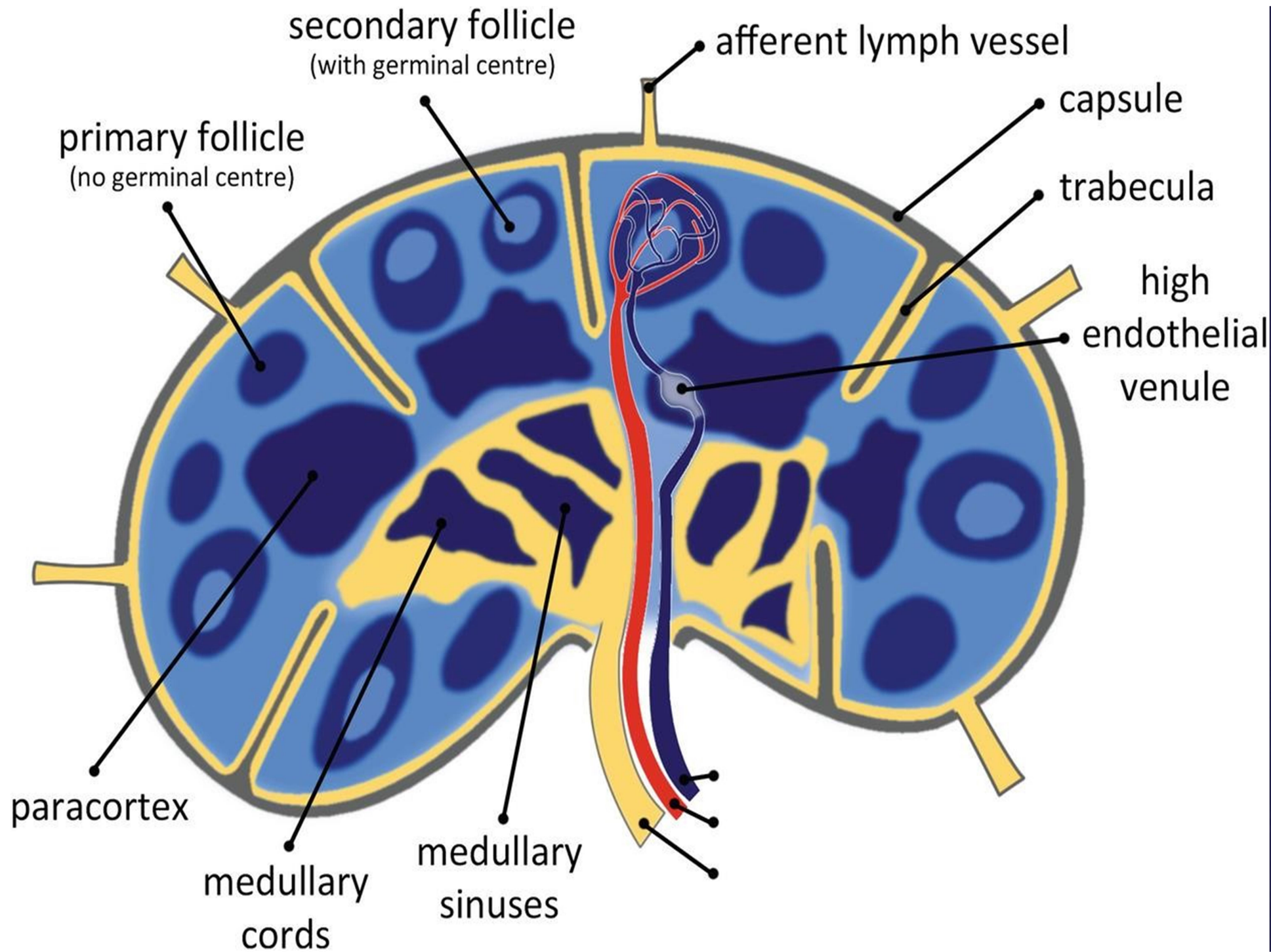


Histology of the lymph glands

{ By:-Dr .Elham majeed
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Lymph nodes)Lymph Glands):-

Lymph nodes are distributed through the body along the course of the lymphatic vessels, they are found in the axilla and the groin ,along the great vessels of the neck ,and in large number in the thorax and abdomen , especially in mesenteries, The convex surface of the lymph node is pierced by numerous afferent lymph vessels.

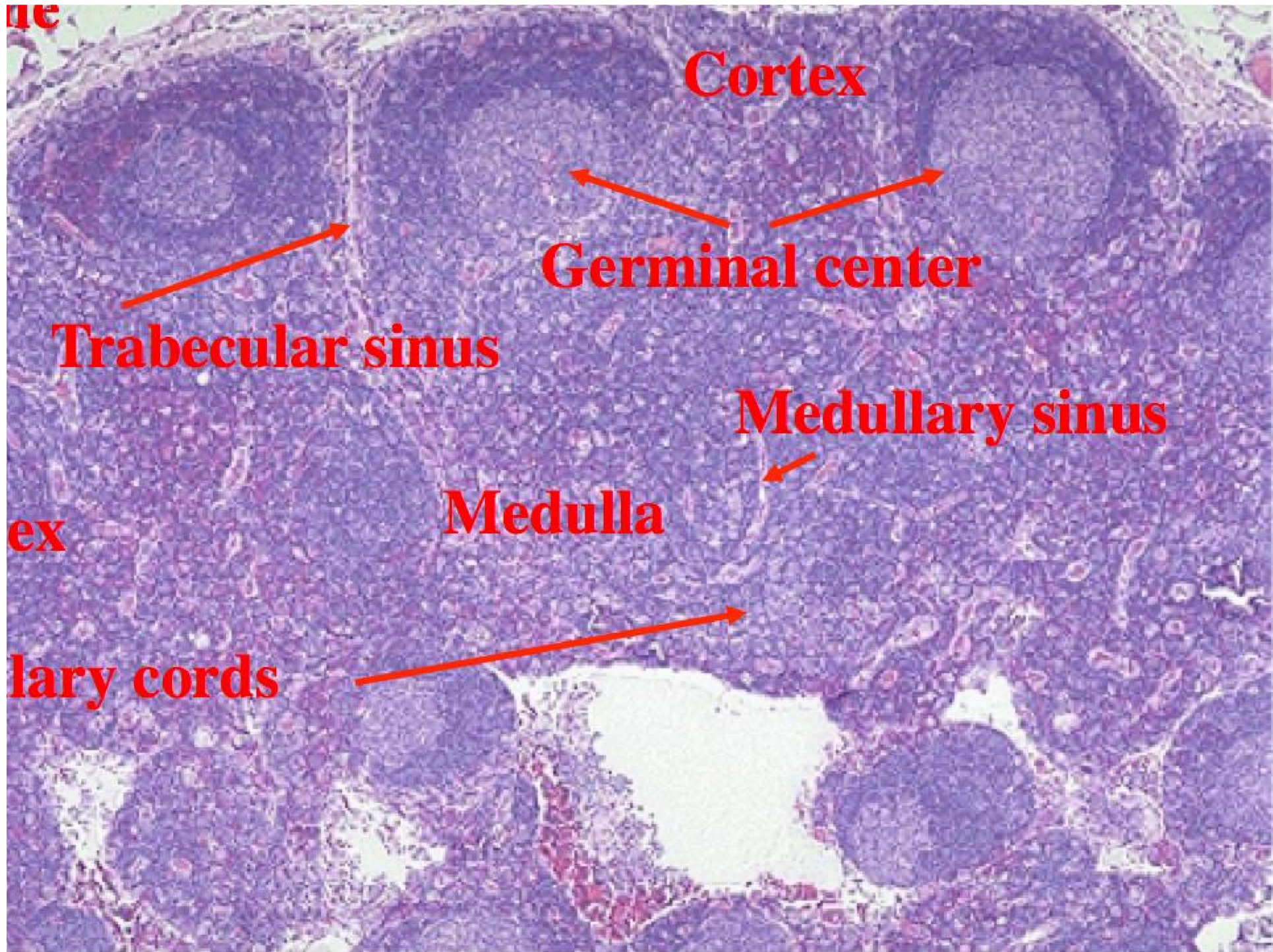
Lymph nodes are bean shape, encapsulated by dense connective tissue comprised of elastin and collagen fibers along with interspersed fibroblasts . They extend to the deeper areas of the lymph node by way of the trabecular extensions of the cortex. As the trabeculae penetrate the lymph node, they continue as reticulum fibrils (type III , collagen) that offer additional structural support to the gland, The convex surface of the gland pierce by afferents lymphatic vessels that conduct the lymph to the lymph node. The most common cells of the lymph nodes are lymphocytes, macrophages, APCs, plasma cells and reticular cells and other , follicular dendritic cell are present within nodules .

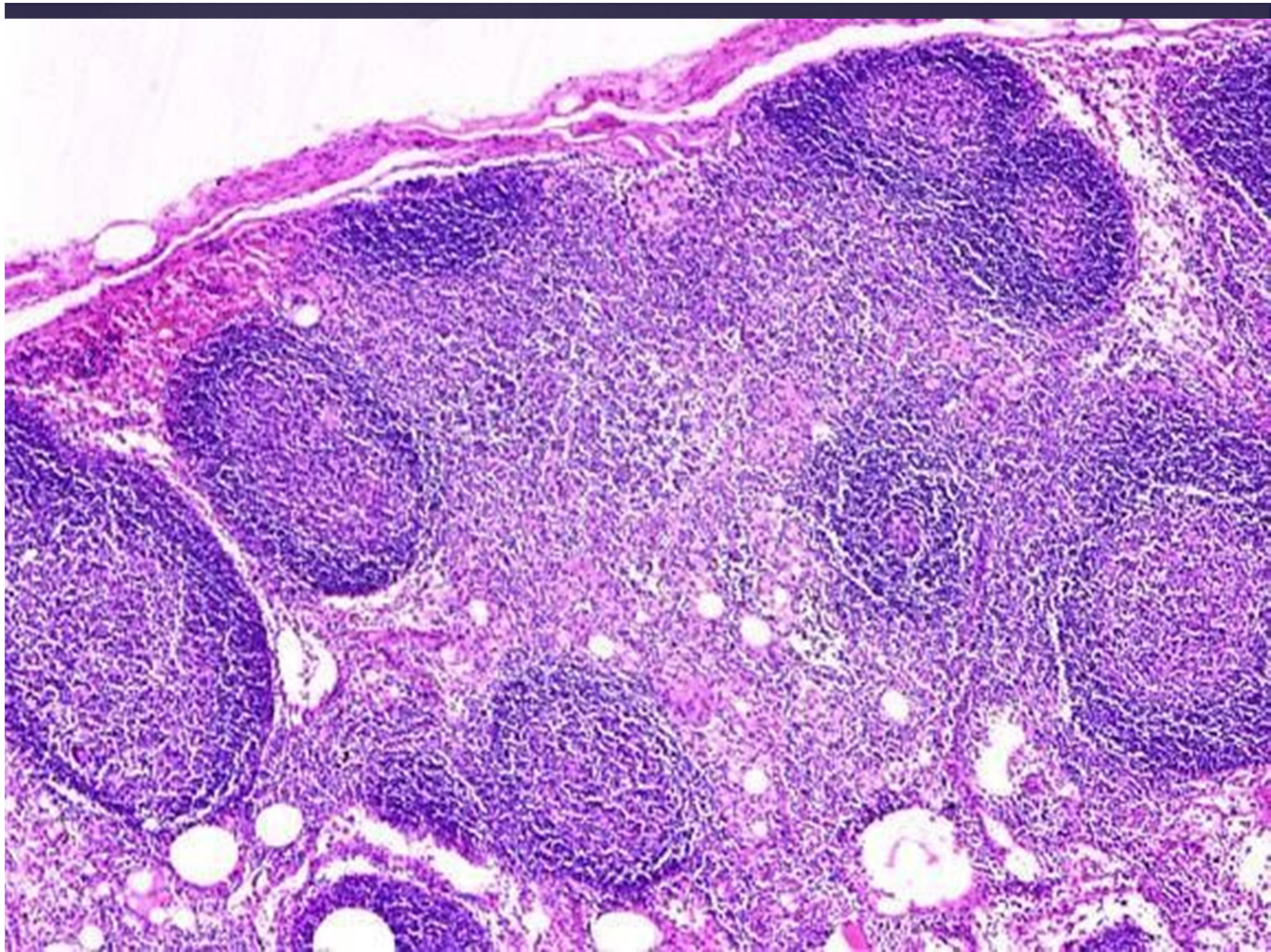
The different arrangement of the cells within the nodes creates two regions, a cortex and a medulla the cortex can be subdivided into an outer cortex and an inner cortex or (paracortical region).

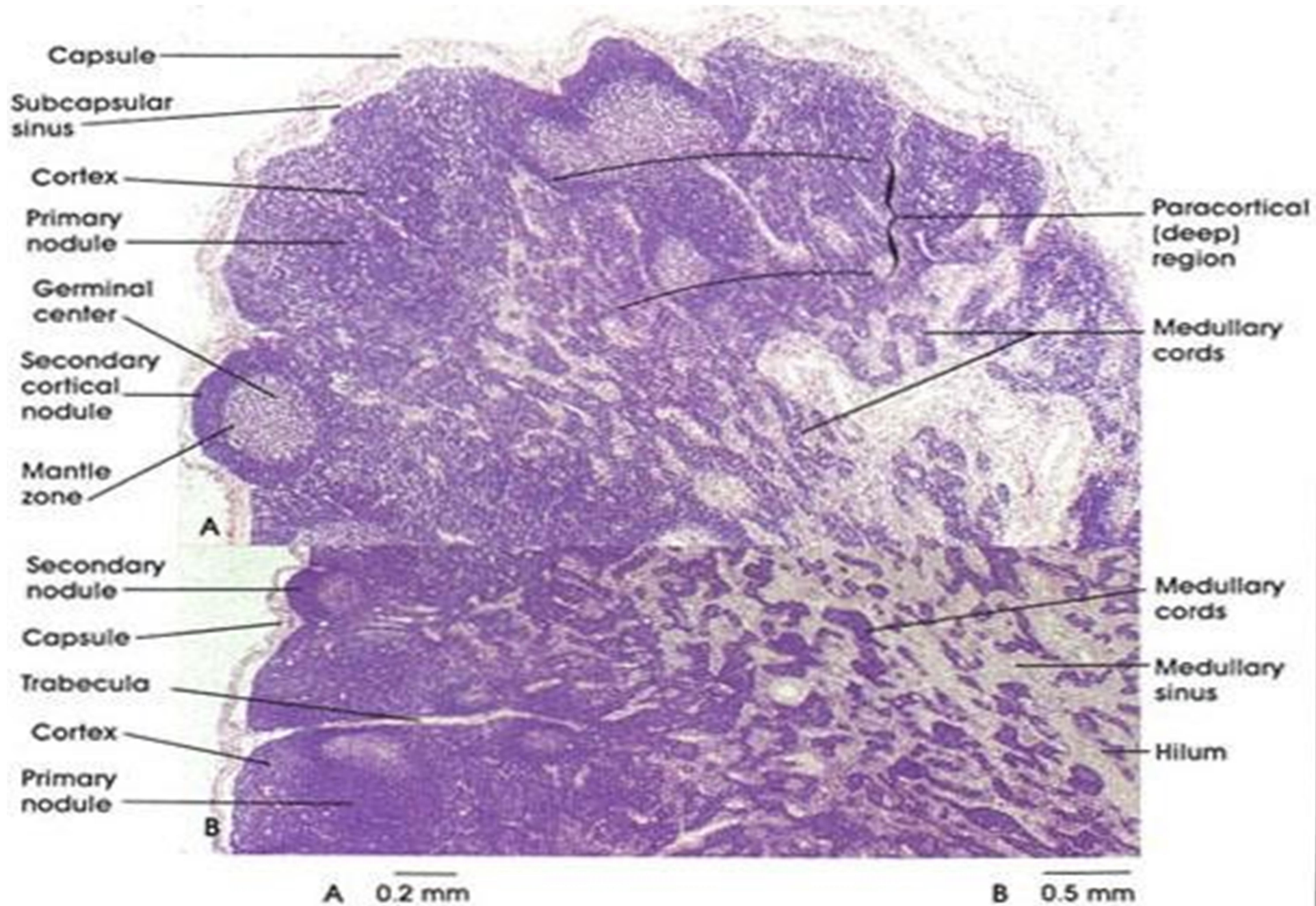
Outer cortex

The outermost layer is the **cortex**. It is made up of a subcapsular sinus, cortical sinus and lymphoid nodules. The **subcapsular sinus** is the first space that lymph fluid from the afferent vessels enters within the node , they composed of loose network of reticular cells and fibers . The fluid then travels from here to the **cortical sinuses**; which are branches of the subcapsular sinus. The cortical sinuses are also known as **the intermediate or**

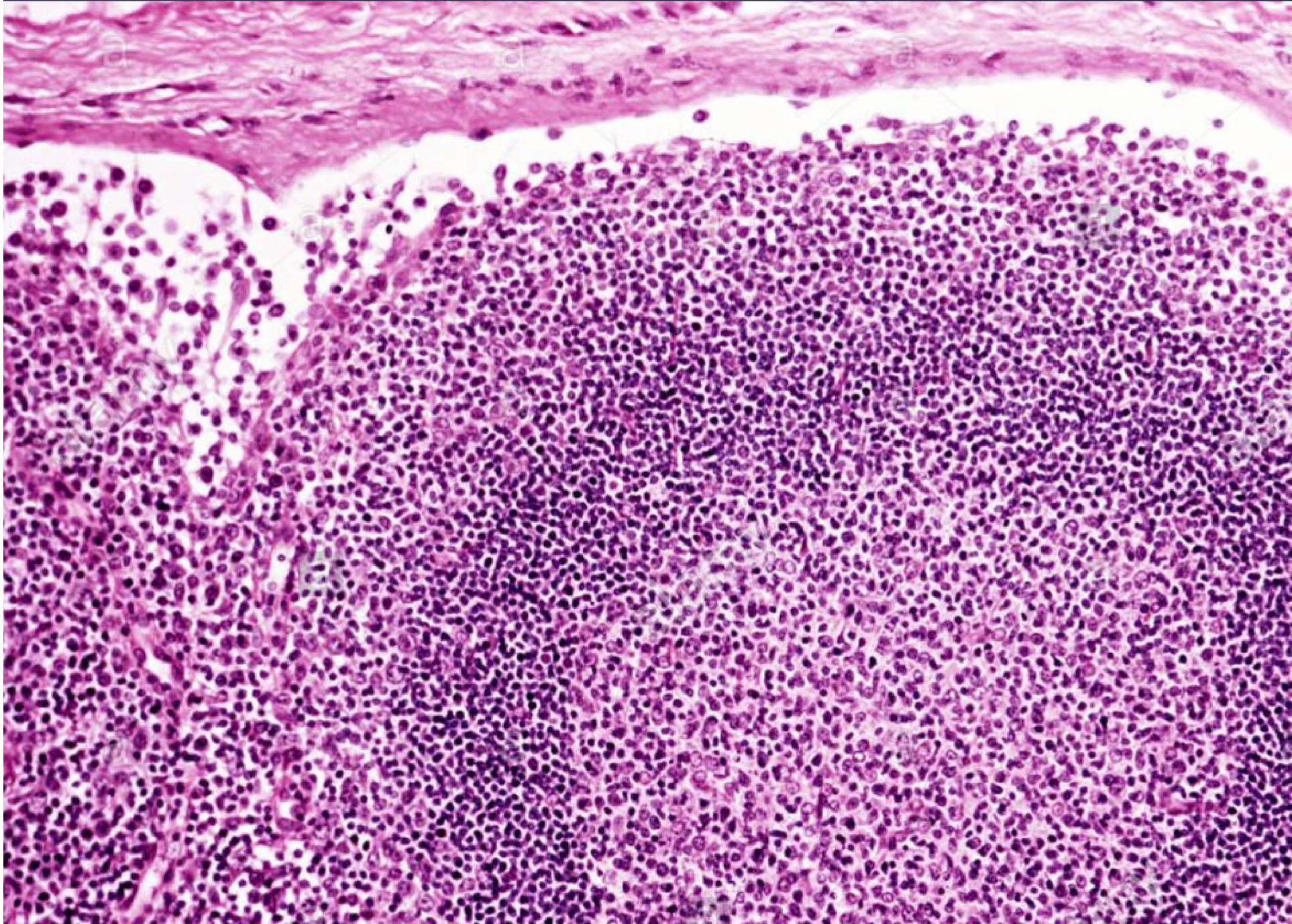
trabecular sinuses because they travel along the trabecular network within the lymph node and share the same structure with the subcapsular sinus.







Cross sectional analysis of a lymph node reveals that it is subdivided into three regions:



characterized by intense basophilic staining, small cytoplasmic volume and a heterochromatic nucleus. Other cells in the mantle zone include **follicular dendritic cells** as well as the occasional **helper T lymphocyte** and **macrophages**. The fate of B cells in the mantle zone can go one of two ways. These cells either remain in the lymph node and mature into antibody secreting **plasma cells** and remain in the lymph node, or they transform into **memory B cells** that re-enter the systemic circulation.

The other two zones of the germinal center are the light zone and dark zone. The **light zone** contains **centrocytes** that interact with follicular dendritic cells that express intact antigen on their surface. Centrocytes with high affinity binding to the follicular dendritic cell antigen will persist, while those with weak binding undergoes apoptosis. While resident macrophages help to clean up apoptotic B cells, **helper T cells** support the remaining B cells and foster the cellular maturity.

In the **dark zone** of the germinal center, the **centroblasts** are highly mitotic and have a strong likelihood of producing mutated antibodies. These are the source cells for the light zone.

Deep to the cortical layer is the **paracortex**. Its margins blend with the superficial cortex and deep medulla. The principal distinguishing features are the **absence of lymphoid nodules** and the **large number of T lymphocytes** within the stroma of the paracortex.

The paracortex also has unique venules known as **high endothelial venules (HEVs)**. Most of the lymphocytes that enter the lymph node do so via these channels. They are made up of cuboidal endothelium . These specialized vessels are also present in the mucosa associated lymphatic tissue distributed throughout the gastrointestinal tract. However, they are at their highest level of development within the lymph nodes.

Medulla

The deepest layer of the lymph node is the medulla. It is subdivided functionally and histologically into two other regions; which are the **medullary cords** and sinuses. The cords are populated by **plasma cells**, as well as **B – cells and T – cells**. The cells are arranged in cord-like projections extending centrally from the paracortex.

Interlacing between the cords are distended areas lined by discontinuous endothelium. The luminal surface of the sinuses also contains a vast network of reticular cell processes. They act as the final point of filtration of circulating lymph. The **medullary sinuses** are the terminal continuations of the peripherally located cortical sinuses. They eventually culminate at the hilum of the lymph node to form efferent lymphatic vessels.

Lymph circulation inside the lymph node:-

Lymph vessels are lined by a single layer of squamous endothelium. They are fitted with **valves** that promotes unidirectional flow of lymph from the afferent lymph vessels to the lymph node and then to the efferent lymph vessels. The afferent lymph vessels bring lymph into the subcapsular space. Of note, the subcapsular space extends around the entire lymph node except at the hilum. The lymph then flows through the cortical



sinuses and to the medullary sinuses then leaves the lymph node through the afferent vessels