SUMMARY

This work was done to study the Histological structure and electron microscopy of the rabbit spleen.

25 albino rabbits of about 2-3 kilograms were used in this study, and their spleens were examined microscopically using the usual stains. The histological structure can be summerized as the follow :

* It is structurally formed from stroma (capsule, trabeculae and reticular network) and parenchyma (white and red pulps).
* The capsule is surrounded by a peritoneal coat formed from flat mesothelial cells with large oval nucleus and a scanty amount of cytoplasm. It conists of collagneous, elastic and reticular fibers in association with some smooth muscle cells between them, the elastic fibers are increased in the deep part of the capsule. It is thickened at the hilus where blood vessels enter the organ.
* The trabeculae come from the inner side of the capsule and penetrate the parenchyma dividing the spleen into lobules, also they arise from the hilum and carry the largest blood vessels. Their structure is similar to the capsule but the amount of the elastic fibers are found to be increased, there are also trabeculae connecting two surfaces of the capsule indicating the lobulation of the spleen.
* A reticular network fills the spaces between the capsule, trabeculae and hilum. The reticular fibers are more

* The splenic artery which is a muscular artery passes in the trabeculae to be trabecular arteires, then into the white pulp to become central arteries then diminshes in size to become central arterioles which later ends by giving penicillar arteries which is terminated by capillaries.
* The ellipsoids are not seen in the rabbit spleen.
* The splenic vein drains the trabecular veins into which pulp veins end and the venous sinuses end into the pulp veins. The venous sinuses are well developed in the rabbit spleen.

The Ultrastructure :

The electron microscopy of the rabbit spleen reveals that :

* The flat mesothelial cells of the capsule have small irregular microvilli at their free surface, their nucleus are large, oval with scanty heterochromatin. Their cytoplasm contains ribosomes, microtubules and glycogen-like granules.
* The capsular fibroblasts form the main cellular content and are flat, stellate, spindle shaped with oval nucleus containing peripheral heterochromatin and nucleolus and their cytoplasm contain Golgi zone, a lmited number of rough surfaced endoplasmic reticulum, mitochondria, collagenous fibrils and bundles of microfibrils.

*The capsular smooth muscle cells are not well developed in the rabbit, their cytoplasm contain fine filaments, mitochondria, ribosomes, endoplasmic reticulum,

glycogen deposites, microtubules, dense bodies and the thin filaments are associated with the plasmalemma.

* A cell intermediate between fibroblast and smooth muscle cell is present in the capsule and is characterized by dense fibrillar cytoplasm, small mitochondria, dense bodies, glycogen-like granules, large bundles of collagen and occasionally some elastic fibers.

* The inner surface of the capsule is lined by a large sinus with endothelial cells resting on a bsaement membrane.

* The trabeculae are composed of fibroblasts, fibrocytes, collagen, elastic fibers and basement membrane-like material, the smooth muscle cells are fewer in number.

* The white pulp is formed of admixture of lymphocytes, reticular cells, plasma cells, macrophages, erythrocytes and platelets.

* No germinal centers could be observed in rabbit spleen, but in the central area of the white pulp the cells are close to each other than in the periphery.

* The lymphocytes are arranged in clumps or nests and separated by a basement membrane-like material and collagen fibers.

* There are three types of lymphocytes, small, medium and large sized.

* The reticular cells of the white pulp are large with small nuclear-cytoplasmic ratio and the cytoplasm is loaded with (rough surfaced endoplasmic reticulum, more ribosomes,

Golgi zone, mitochondria, vesicles and microtubules.

* The fibroblasts of the white pulp have a dilated rough endoplasmic reticulum, smooth endoplasmic reticulum filled with fine flocculent material and is continuous with extracellular basement membrane-like materila.
* The plasma cells of the white pulp are located at the periphery and characteized by thin cartwheel appearance of the nucleus and rough surfaced endoplasmic reticulum, Mitochondria, and ribosomes.
* Macrophages of the white pulp are found at the periphery of the white pulp with large and less heterochromatin nucleus, and characteristic phagocytic vacuoles.
* The marginal zone contains more lymphocytes, platelets, plasma cells, and macrophages.
* The marginal sinus is lined with endothelial cells resting on a fenestrated basement membrane allowing cells to pass in both directions of the sinus wall.
* Unmyelinated nerve fibers rich in vesicles, and mitochondria, (terminal segments of the nerve) are seen running close to the central arteries and arterioles.
* The red pulp is formed of Billroth cords and venous sinuses and is of variable thickness.
* The reticulum of the sinus wall and pulp cords are homogenous, structureless with no clear difference in-between.
* The reticular cells of the red pulp are of two types :
  ** Primative reticular cells, produce reticular fibers and their cytoplasm contain rough surfaced endoplasmic,

mitochondria, and Golgi zone .

** The phagocytic reticular cells cover the cordal side of the venous sinus and structurally similar to the macrophages.

* The most common cells in the red pulp are erythrocytes with variable shapes, neutrophils, eosinophils, basophils, lymphocytes, plasma cells, platelets and megakarycytes.
* Occasionally myelinated nerve fibers are found in the red pulp near the central arterioles.
* The endothelial cells of central arteries are tall and their infranuclear portion are very close, with or without desmosomes, and their cytoplasm contain ribosomes, many vacuoles, rod shape dense bodies, and a little amount of smooth endoplasmic reticulum and mitochondria
* The internal elastic lamina of a large central artery is a fenestrated band of elastic fibers and marks the media and adventitia.
* The media of the large central artery have 1-2 smooth muscle cells.
* The external elastic lamina of large central artery is a fenestrated network of elastic fibers between media and adventitia.
* The adventitia is formed mainly of collagenous fibers, elastic fibers, fibroblasts and reticular cells.
* The central arterioles of the white and red pulp are identical to central arteries but of variable sizes.

* The transition of arteriole into capillary is known by replacement of smooth muscle by pericyte and the elastic lamina by amorphous basement membrane.
* The endothelial cells of the large capillaries rest on a doubled basement membrane. It surrounds the pericyte while in smaller ones it is a single layer and without pericyte.
* The venous sinus wall is trilaminar, and is formed of endothelial cells, basement membrane and parasinusoidal cells.
* The endothelial cells are spindle shaped, their cytoplasm contains moderate number of mitochondria, Golgi zone polyribosomes, numerous vesicles, vacuoles, mitochondria and filaments giving a rigidity to the cell. A mild interdigitations are present between adjacent cells.
* The parasinusoidal cells are reticular cells, macrophages or granular leukocytes.
* The cells on the luminal and cordal side of the basement membrane have filamentous intracytoplasmic densifications in the plasmalemma.
* The pulp venule is trilaminar, its endothelial cells are spread out and thin on the basement membrane with several mitochondria, Golgi zone, rough surfaced endoplasmic reticulum , intermediate filaments and intercellular junctions between the adjacent cells.
* The basement nembrane follow the abluminal surface of the endothelial cells, the apertures in the venule wall are interendothelial discontinuities.

* The trabecular vein is formed of endothelial cells of the same inclusions as pulp venule lying on a continous basement membrane and subendothelial extracellular material of variable thickness.
* The splenic circulation is of open type as no evidence of capillary-venous junction was noticed.