# Thymus

The gland where T-cells are nurtured and matured. (Lymphocytes-to-be come from the bone marrow; the transformation of some cells into T-cells in the thymus begins early in the unborn child.) "Thymos" is Greek for both "warty-bumpy" and "feel-good", both of which makes sense. The gland is largest at puberty, and in sick children, it shrinks by depletion of its cells -- hence the myth that a large thymus caused "unexplained death in healthy children" (many of whom were smothered) and the whole stupid 1950's racket of radiating the gland in babies.

The first organ to become populated with lymphocytes in the unborn child. It's largest relative to body size right at birth. A holocrine gland (i.e., its secretion is whole cells; the other holocrine glands are the other lymphoid organs, the sebaceous glands, and the gonads.) In the front of the chest, two lobes, a real fibrous capsule from which extend septa to divide the gland into lobules, a blood supply composed of little arteries that run down the septa and break into arterioles that run between cortex and medulla, and only a few little lymphatics which follow the arteries. At puberty, the gland weighs around 40 gm.

Thymic epithelium (reticular cells, from endoderm) starts as cuboidal as in an endocrine gland, but when the gland is infiltrated by lymphocytes, they stretch the cells into star-shapes connected only at their (few) desmosomes. This forms the structural framework (reticular network, "cytoreticulum", what the thymus uses as stroma) of the gland, instead of the mesenchyme and reticulin of other lymphoid organs. The epithelium contains tonofilaments and secretory granules (probably thymosin and

other stuff).

The cortex in the functioning gland is almost all lymphocytes, mostly small-resting types, packed tight. New arrivals from the marrow are larger and appear mostly under the capsule. If you see a germinal center (lymphoid nodule) in the thymus, the person is sick. Don't expect to be able to distinguish the epithelial cells, endothelial cells, and macrophages (both major types) from each other. The capillaries here are surrounded by a space which may contain a mix of white cells, and which is in turn surrounded by a thin layer of collagen and a complete covering of thymic epithelial cell processes, so that blood does not contact the T-lymphocytes of the cortex. This is the famous "blood-thymus barrier", which macromolecules do not cross.

The medulla, away from the capsule, forms a continuous unit. In addition to epithelium and small lymphocytes as in the cortex, there's more of a mix of cells, with some fibrous tissue extending from the vessels, and a variable number of macrophages (both major types), eosinophils, plasma cells. This is why it stains paler. In the centers of the medullary lobules, you're likely to see thymic corpuscles ("Hassall's corpuscles"), areas where the interconnected thymic epithelial cells have decided to grow in whorls, mimicking hair (no I am not making this up). These can vary in size (up to 100 ), and show a host of other changes that mean nothing (cysts, microvilli, granules, mucus, grunge, etc., etc., etc.) The capillaries are not specially shielded here, and lymphocytes leave the thymus by entering them.

By the time you're fully grown, most of your T-cells have left your thymus and gone to live elsewhere. The epithelial cells remain, maybe in reduced numbers, and the gland becomes a storage depot for far. The best way to be sure you're looking at thymus in an adult is to spot Hassall's corpuscles, which stay forever.