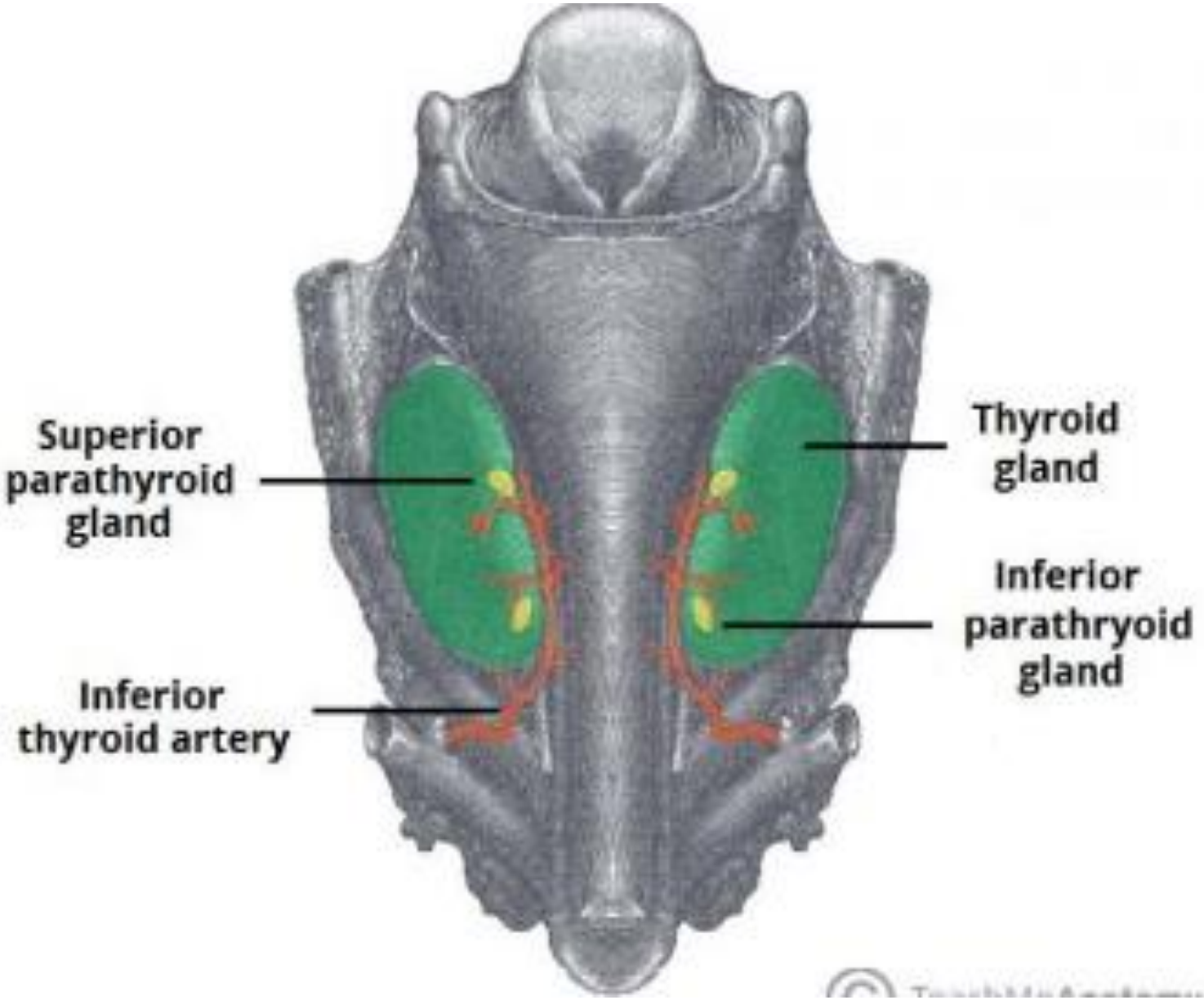
Parathyroid glands

- **The parathyroid glands are small endocrine glands located in the anterior neck. They are responsible for the production of parathyroid hormone, which acts to control calcium levels in the body.**
- **Each has a mass of about 40 mg. Usually, one superior and one inferior parathyroid gland are attached to each lateral thyroid lobe, for a total of four.**


Superior parathyroid gland
Thyroid gland
Inferior parathryoid gland
Inferior thyroid artery

Anatomical Location

- **The parathyroid glands are located on the posterior aspect of the lateral lobes of the thyroid gland. They are flattened and oval in shape, situated external to the gland itself, but within its sheath.**
- **The majority of people have four parathyroid glands, although variation in number is common.**
- **Anatomically, the glands can be divided into two pairs:**

1. **Superior parathyroid glands – They are located approximately 1cm superior to the entry of the inferior thyroid arteries into the thyroid gland (at level of the inferior border of the cricoid cartilage).**
2. **Inferior parathyroid glands – are usually found near the inferior poles of the thyroid gland.**

- **Microscopically, the parathyroid glands contain two kinds of epithelial cells . The more numerous cells, called chief (principal) cells, produce parathyroid hormone (PTH), also called parathormone. The function of the other kind of cell, called an *oxyphil cell, is not known.***

Vascular Supply

- **The posterior aspect of the thyroid gland is supplied by the inferior thyroid arteries. Thus its branches also supply the nearby parathyroid glands. Collateral circulation is delivered by the superior thyroid arteries, thyroid ima artery, and laryngeal, tracheal and oesophageal arteries.**
- **The parathyroid veins drain into the thyroid plexus of veins.**

- **Lymphatics**

deep cervical lymph node , paratracheal lymph nodes.

- **Nerves**

The parathyroid glands have an extensive supply of nerves, derived from thyroid branches of the cervical (sympathetic) ganglia.

Clinical aspect

- **Hyperparathyroidism- is an excess of parathyroid hormone in the bloodstream due to overactivity of one or more of the body's four parathyroid glands.**
- **Two types of hyperparathyroidism exist. In primary hyperparathyroidism, an enlargement of one or more of the parathyroid glands causes overproduction of the hormone, resulting in high levels of calcium in the blood (hypercalcemia).**
- **Secondary hyperparathyroidism occurs as a result of another disease that initially causes low levels of calcium in the body and over time, increased parathyroid hormone levels occur.**

- **Hypoparathyroidism is a rare condition that occurs when the parathyroid glands in the neck don't produce enough parathyroid hormone (PTH).**
- **The low production of PTH in hypoparathyroidism leads to abnormally low calcium levels in your blood and bones and to an increase of phosphorus in your blood.**

Pineal gland

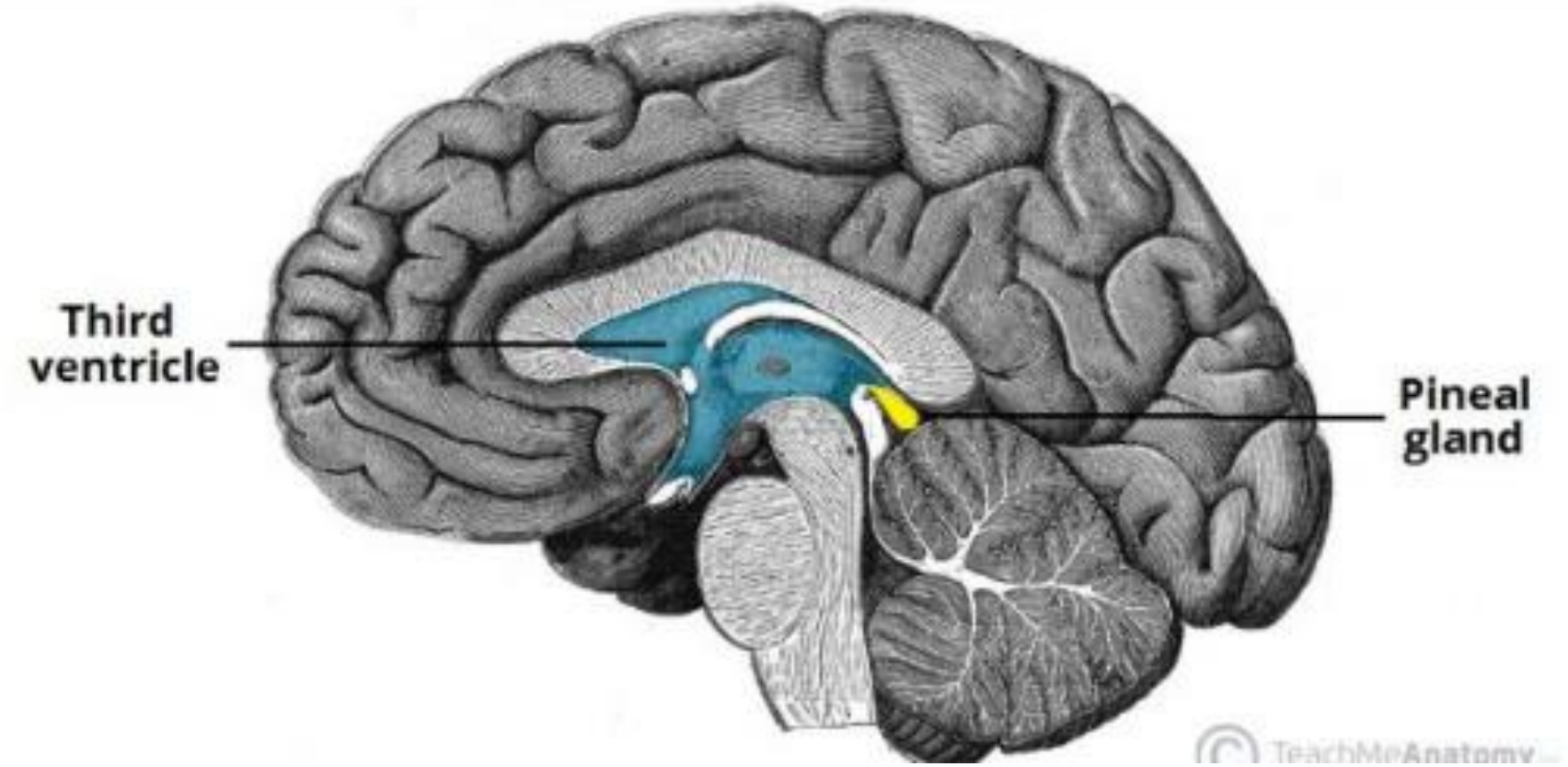
- **The pineal gland is a small endocrine gland located within the brain. Its main secretion is melatonin, which regulates the circadian rhythm of the body. It is also thought to produce hormones that inhibit the action of other endocrine glands in the body.**

Anatomical Structure

The pineal gland is small glandular body, approximately 6mm long. It is shaped like a pine cone, from which its name is derived. There are two types of cells present within the gland:

- **Pinealocytes – hormone secreting cells.**
- **Glial cells – supporting cells.**

In middle age, the gland commonly becomes calcified, and can be subsequently identified on radiographs and CT scans of the head.


Third ventricle
Pineal gland
© TeachMeAnatomy

Anatomical Position

- **The pineal gland is a midline structure, located between the two cerebral hemispheres. It is attached by a stalk to the posterior wall of third ventricle. In close proximity to the gland are the superior colliculi of the midbrain – paired structures that play an important role in vision.**

- **Vasculature**

posterior choroidal arteries are the main supply; they are a set of 10 branches that arise from the posterior cerebral artery.

- **Venous drainage is via the internal cerebral veins.**

- **Melatonin is a hormone in body that plays a role in sleep. The production and release of melatonin in the brain is connected to time of day, increasing when it's dark and decreasing when it's light. Melatonin production declines with age.**
- **Melatonin is also available as a supplement, typically as an oral tablet.**
- **People commonly use melatonin for sleep disorders, such as insomnia**

Clinical aspect

- **Pineal Gland Tumours**

THYMUS GLAND

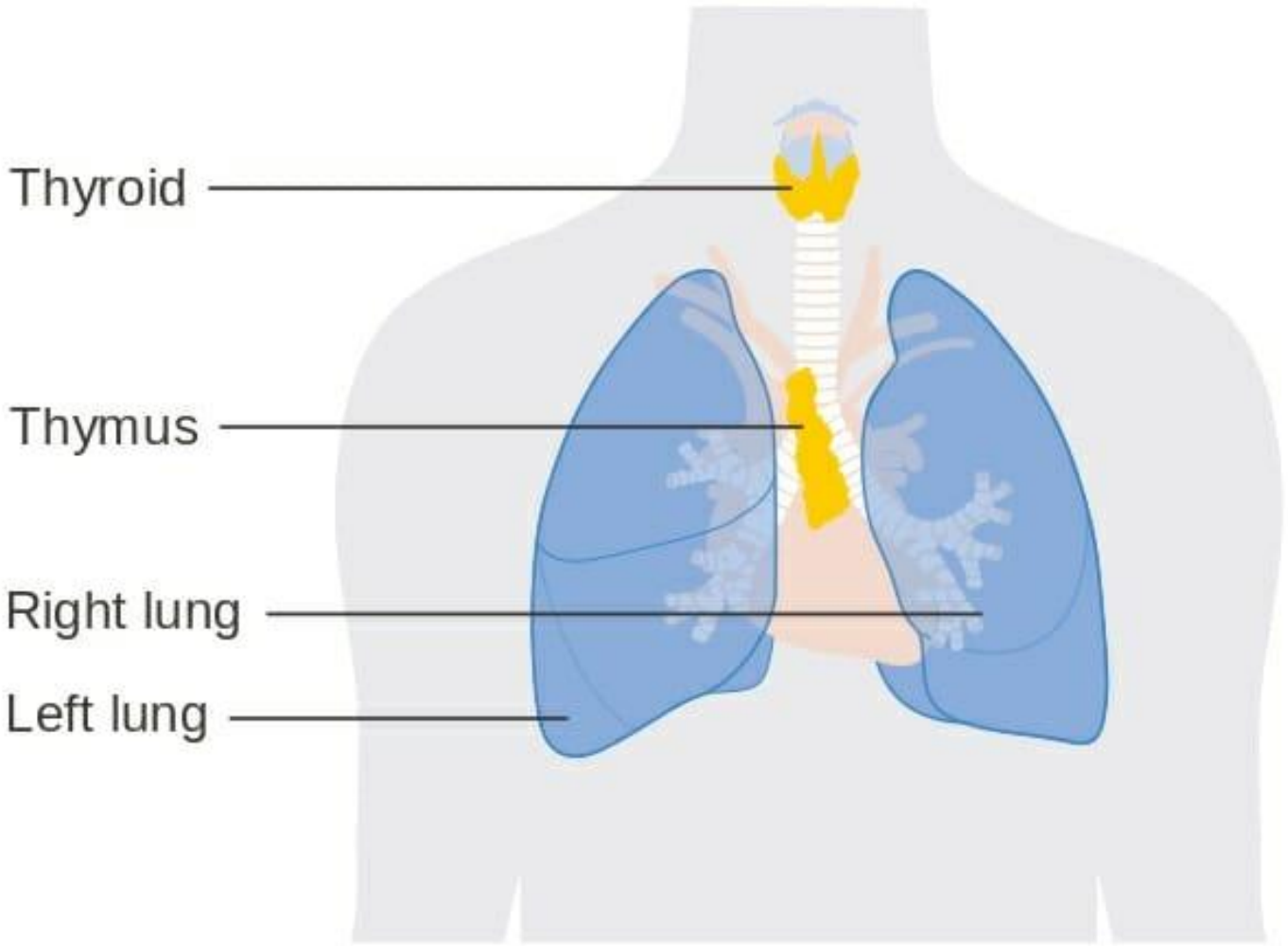
- **The thymus gland is a pink, lobulated lymphoid organ, located in the thoracic cavity and neck.**
- **In the adolescent, it is involved the development of the immune system.**
- **After puberty, it decreases in size and is slowly replaced by fat.**
- **Embryologically, the thymus gland is derived from the third pharyngeal pouch.**

Anatomical Structure and Position

The thymus gland has an asymmetrical flat shape, with a lobular structure. The lobules are comprised of a series of follicles, which have a medullary and cortical component:

- **Cortical portion – Located peripherally. It is largely composed of lymphocytes, supported epithelial reticular cells.**
- **Medullary portion – Located centrally. It contains fewer lymphocytes than the cortex, and an increased number of epithelial cells. Hassall's corpuscles are also present – these are concentric arrangements of epithelial reticular cells. Their function is unclear.**

- **The gland is mainly located within the thoracic superior mediastinum, posterior to the manubrium of the sternum. However, in some individuals, it can extend superiorly into the neck (reaching the thyroid gland), and inferiorly into the anterior mediastinum (lying in front of the fibrous pericardium).**


Thyroid
Thymus
Right lung
Left lung

Vasculature

- **The arterial supply to the thymus gland is via the anterior intercostal arteries and small branches from the internal thoracic arteries. Venous blood drains into the left brachiocephalic and internal thoracic veins.**

Clinical Relevance

DiGeorge Syndrome

- **DiGeorge syndrome is a genetic syndrome caused by the deletion of part of chromosome 22. The clinical findings vary greatly between individuals.**
- **Congenital heart defects**
- **Thymic aplasia**

- **Cleft palate**
- **Hypoparathyroidism.**
- **Individuals with an absent thymus are susceptible to recurrent infections due to an underdeveloped immune system.**