

Anatomical basis of spread of breast cancer

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Breast anatomy

- Each **breast** has 15 to 20 sections, or lobes, that surround the **nipple**. Each **breast** has 15 to 20 sections, or lobes, that surround the **nipple** in a radial manner, like spokes on a wheel. Inside these lobes are smaller sections, called lobules. At the end of each lobule are tiny "bulbs" that produce milk.

Breast anatomy

Anterolateral dissection

Pectoralis major muscle (deep to pectoral fascia)

Serratus anterior muscle

External oblique muscle

Clavicle

Subclavius muscle

2nd rib

Pectoralis major muscle

Pectoral fascia

Intercostal muscles

Intercostal vessels and nerve

Lung

6th rib

Suspensory ligaments of breast (Cooper's)

Areolar glands (of Montgomery)

Areola

Nipple

Lactiferous ducts

Lactiferous sinus

Fat

Gland lobules

Suspensory ligaments of breast (Cooper's)

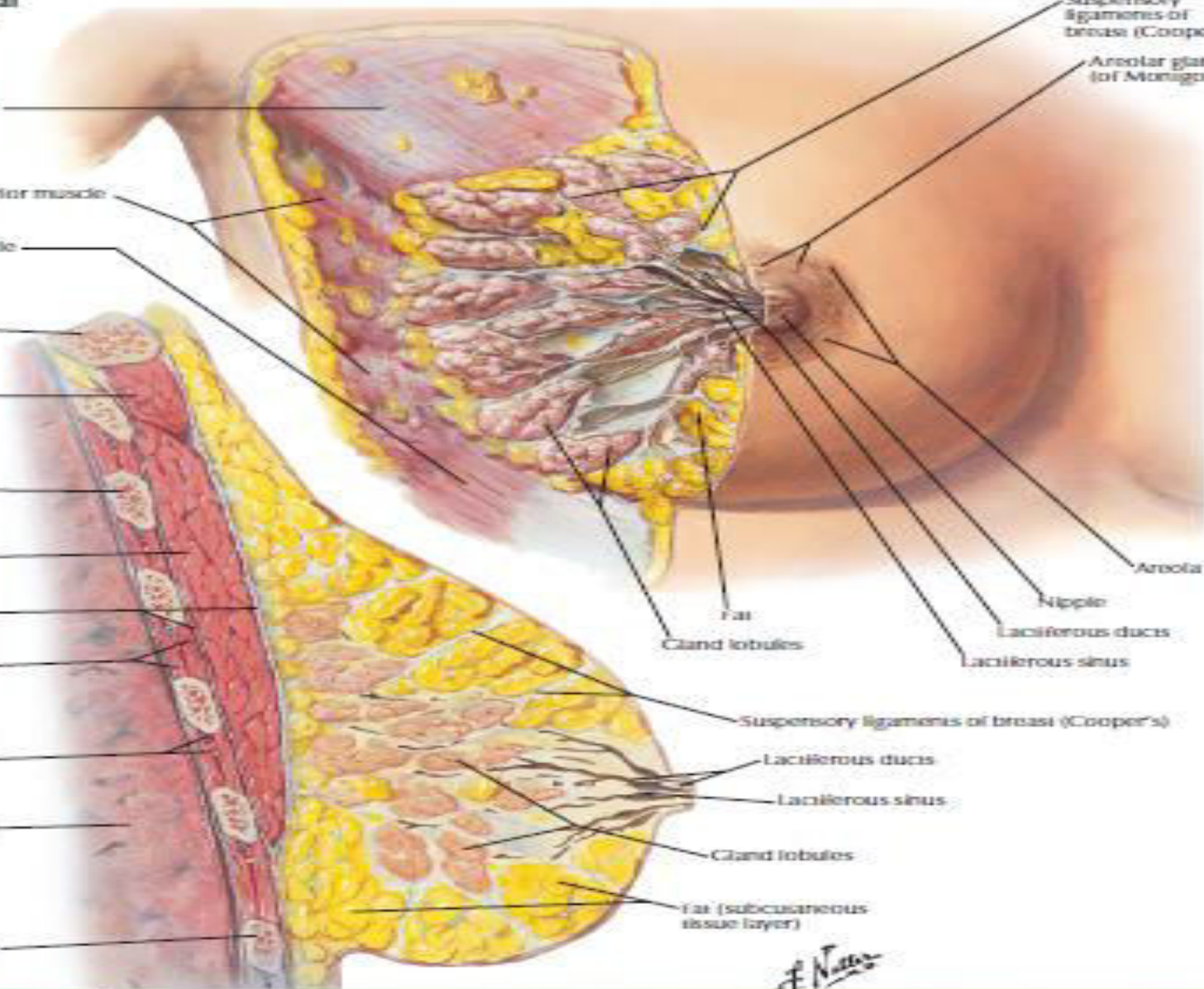
Lactiferous ducts

Lactiferous sinus

Gland lobules

Fat (subcutaneous tissue layer)

F. Netter

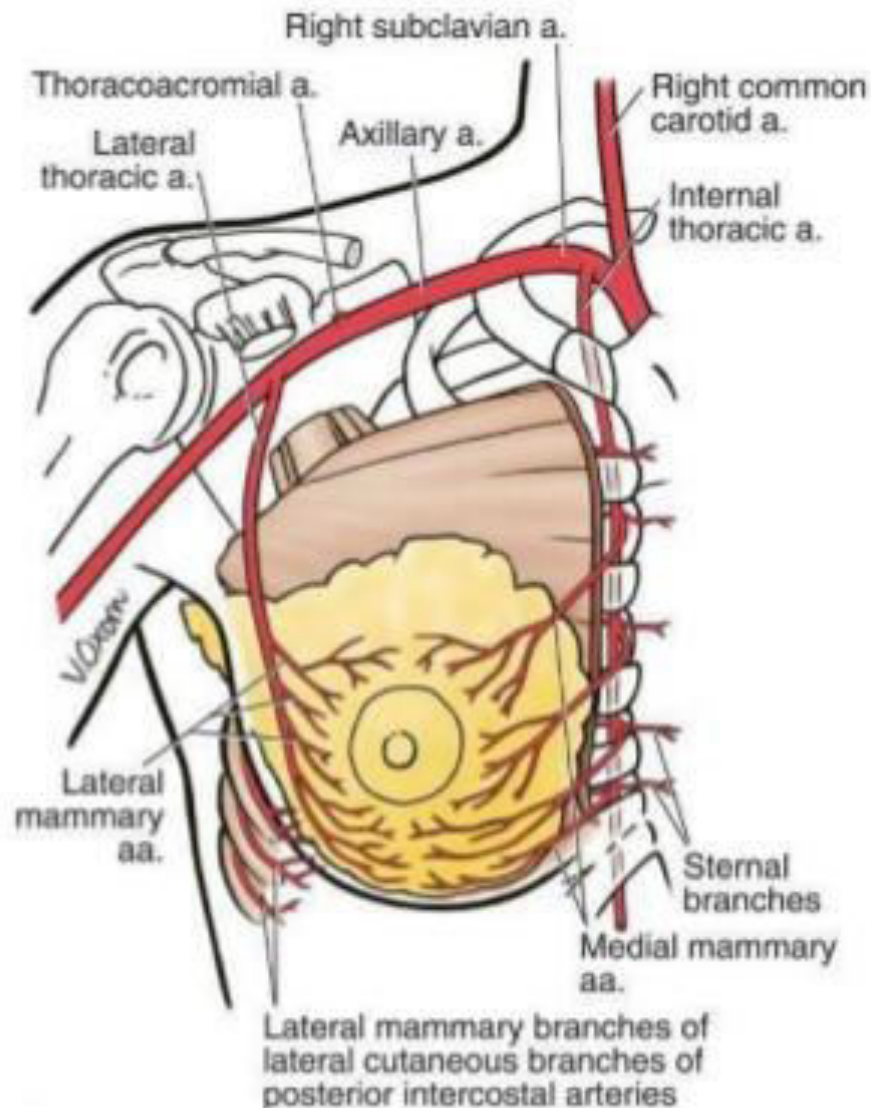


Arterial supply

- The thoracoacromial artery provides its major **blood supply**, while the intercostal perforators arising from the internal mammary artery provide a segmental **blood supply**. The medial and lateral anterior thoracic nerves provide innervation for the muscle, entering posteriorly and laterally.

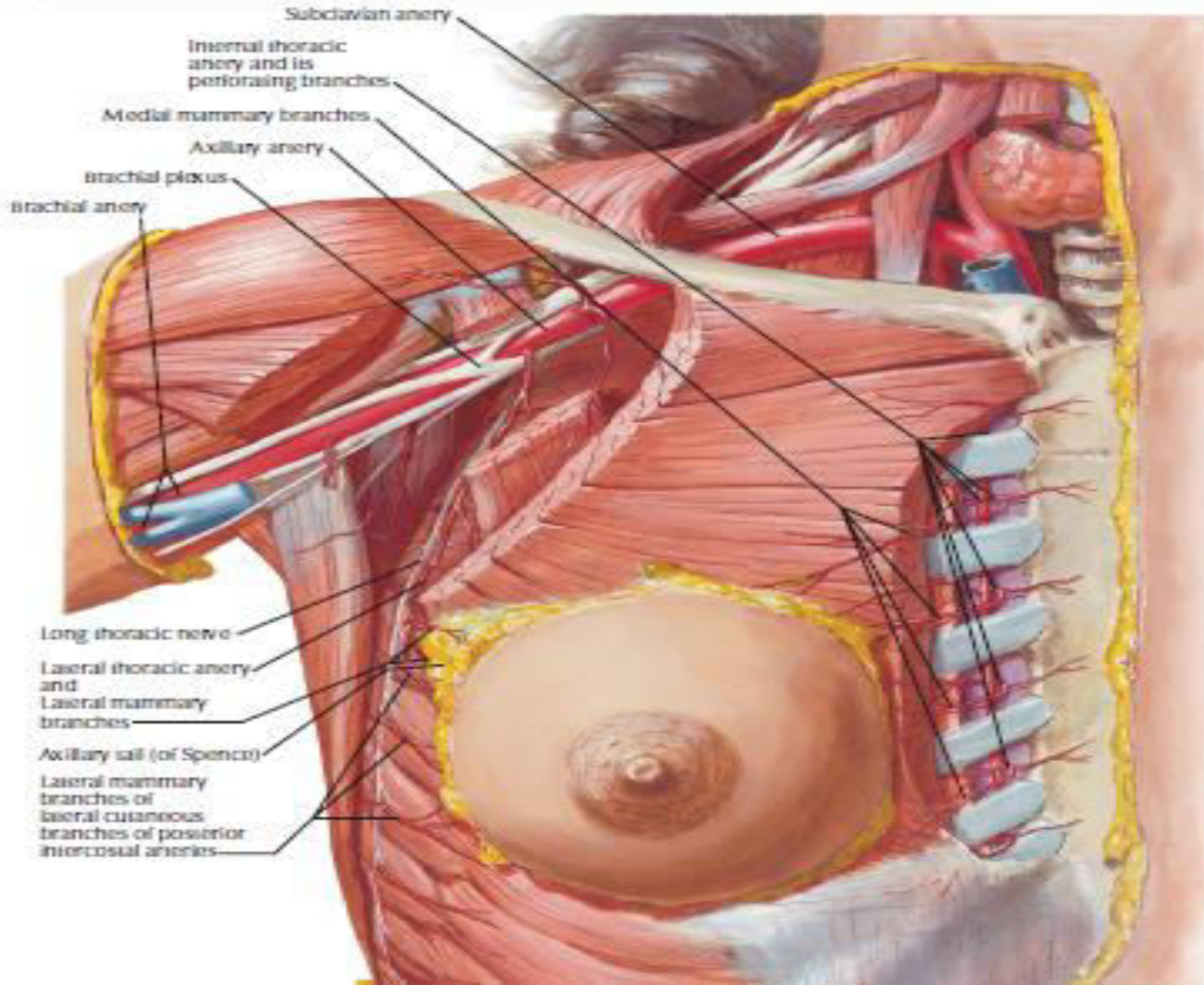
Blood Supply

- **Axillary artery**
 - Superior thoracic
 - Thoracoacromial artery
 - Lateral thoracic artery
 - Subscapular artery.
- **Internal thoracic:**
 - Perforating branches to the anteromedial breast.
- The second to fourth **anterior intercostal** arteries.
 - The second perforating artery is usually the largest; supplies the upper region of the breast, the nipple, areola and adjacent breast.



Posterior surface is relatively avascular.

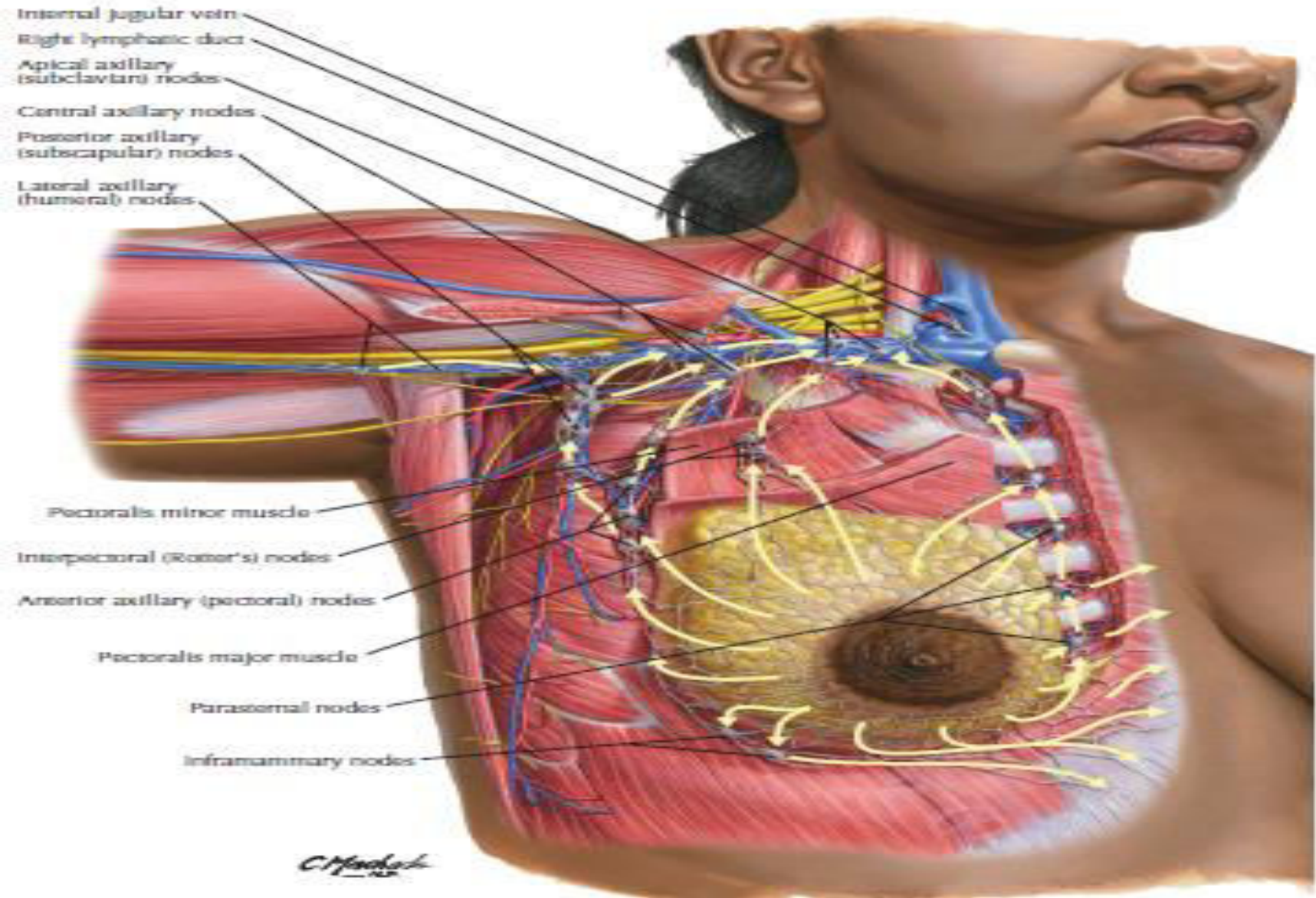
Arterial supply to breast



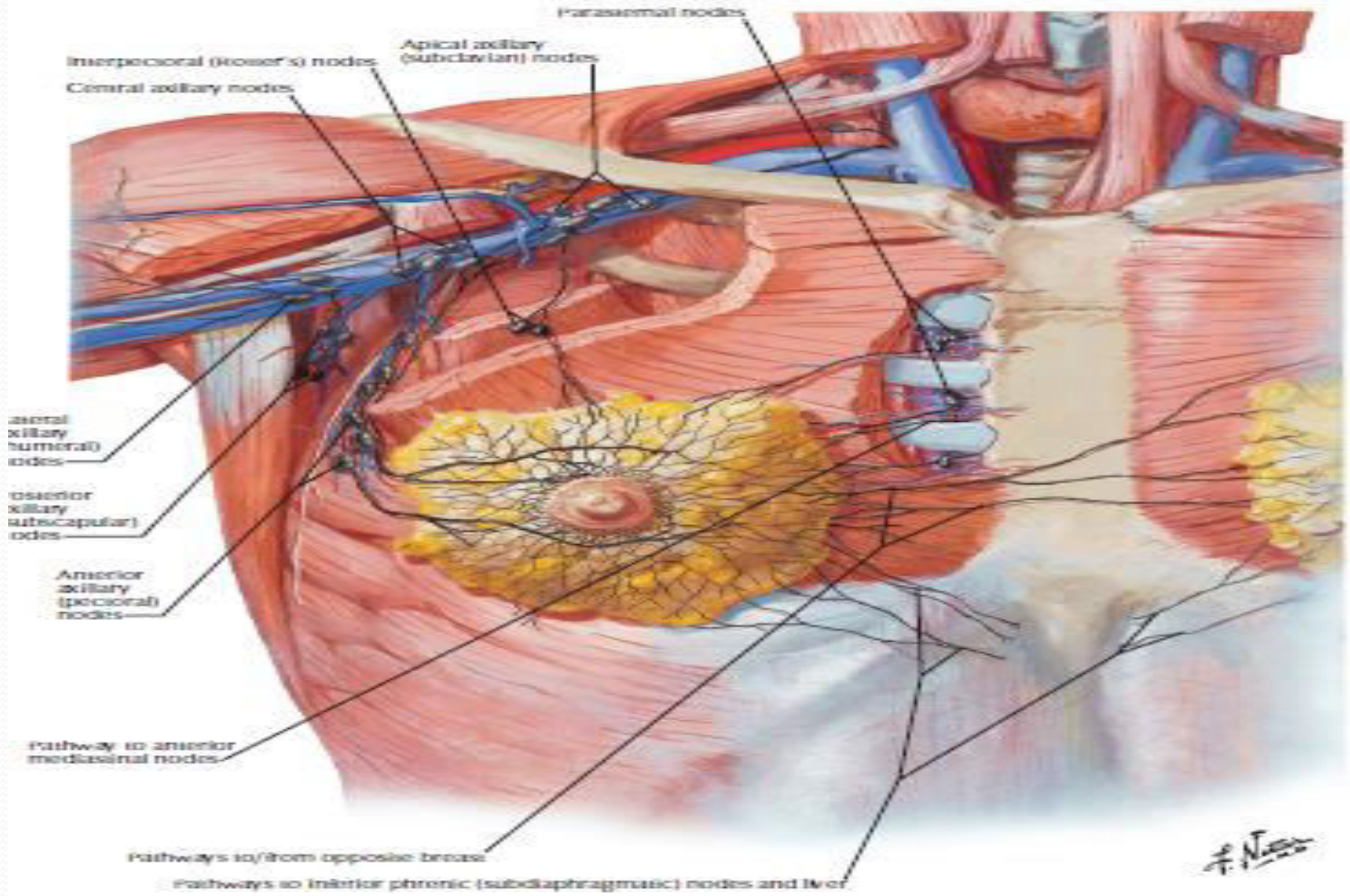
Lymphatic drainage

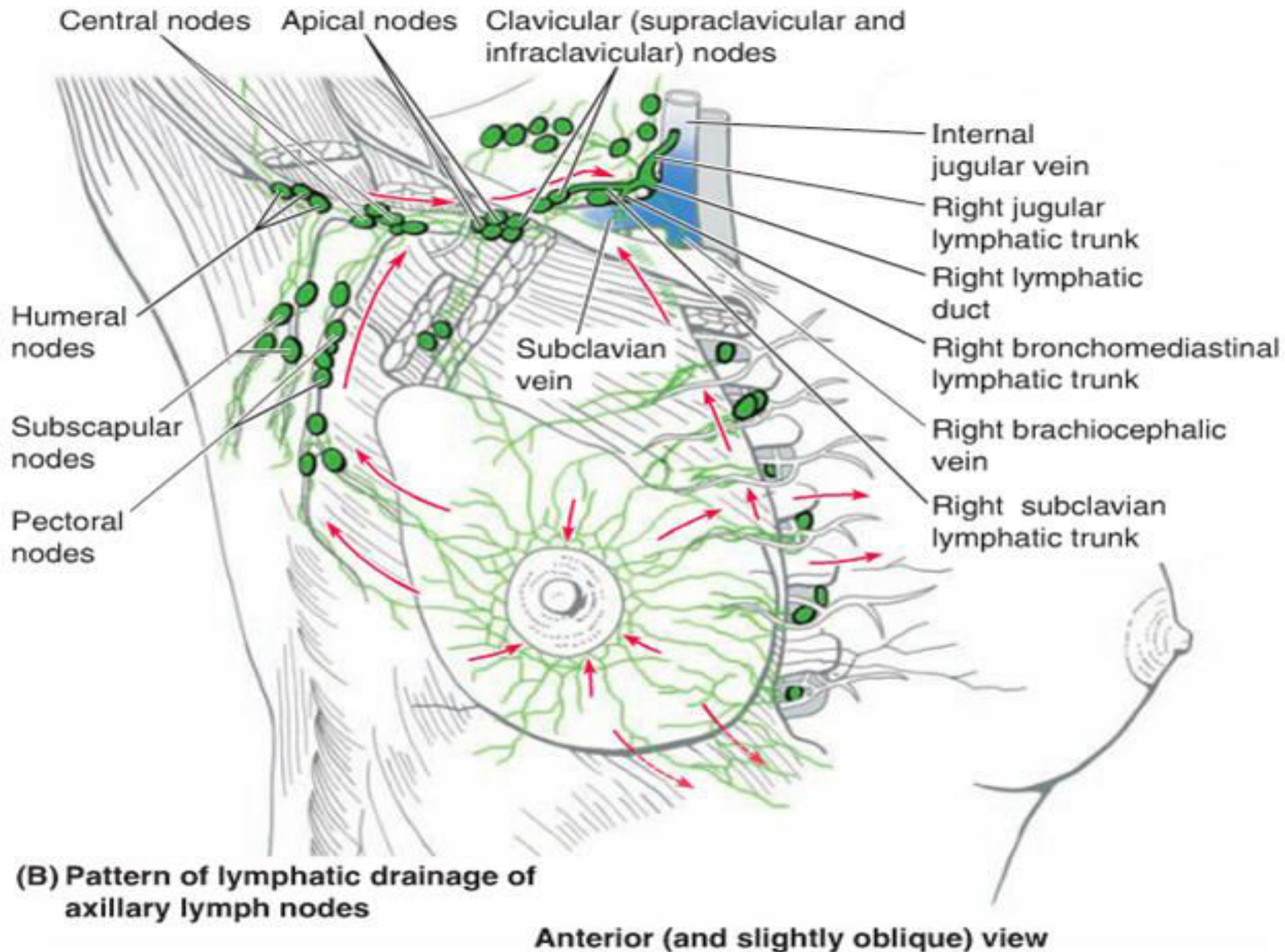
- Axillary lymph nodes - they receive 75-90% of the breasts' lymph, which passes through a sentinel lymph node situated at the lateral border of pectoralis major
- Internal mammary lymph nodes - they receive 10-25% of the breast's lymph
- Malignant cells traveling within the lymphatic system are a common mechanism of tumor metastasis, and examination of lymphatic tissue is essential for cancer prognosis and staging.

Venous drainage of breast



Lymphatic drainage of breast



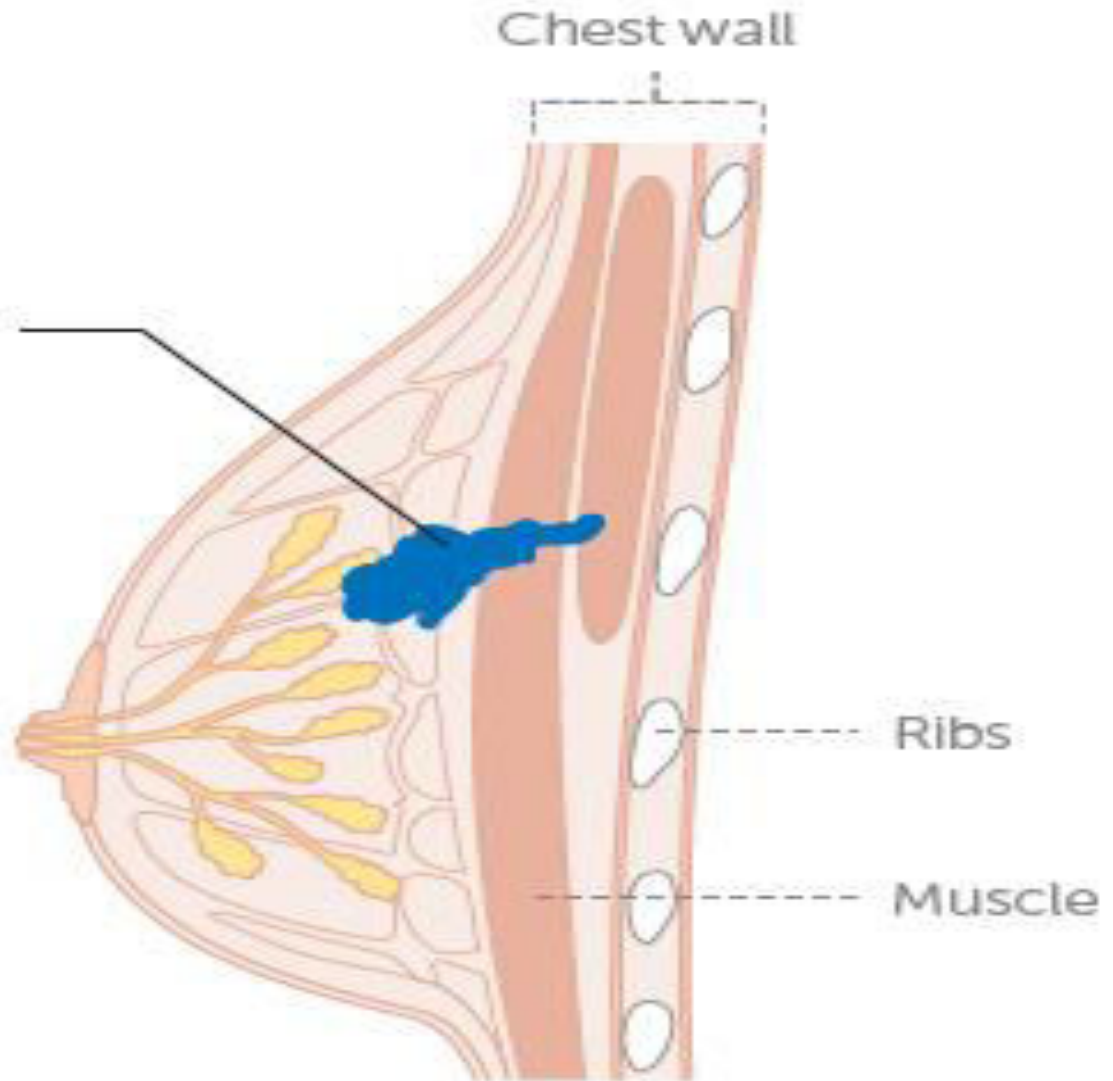


Direct spread

- Direct invasion happens when the tumor has spread to a nearby organ in the body. The cancer cells take root and begin to grow in this new area.

Direct spread

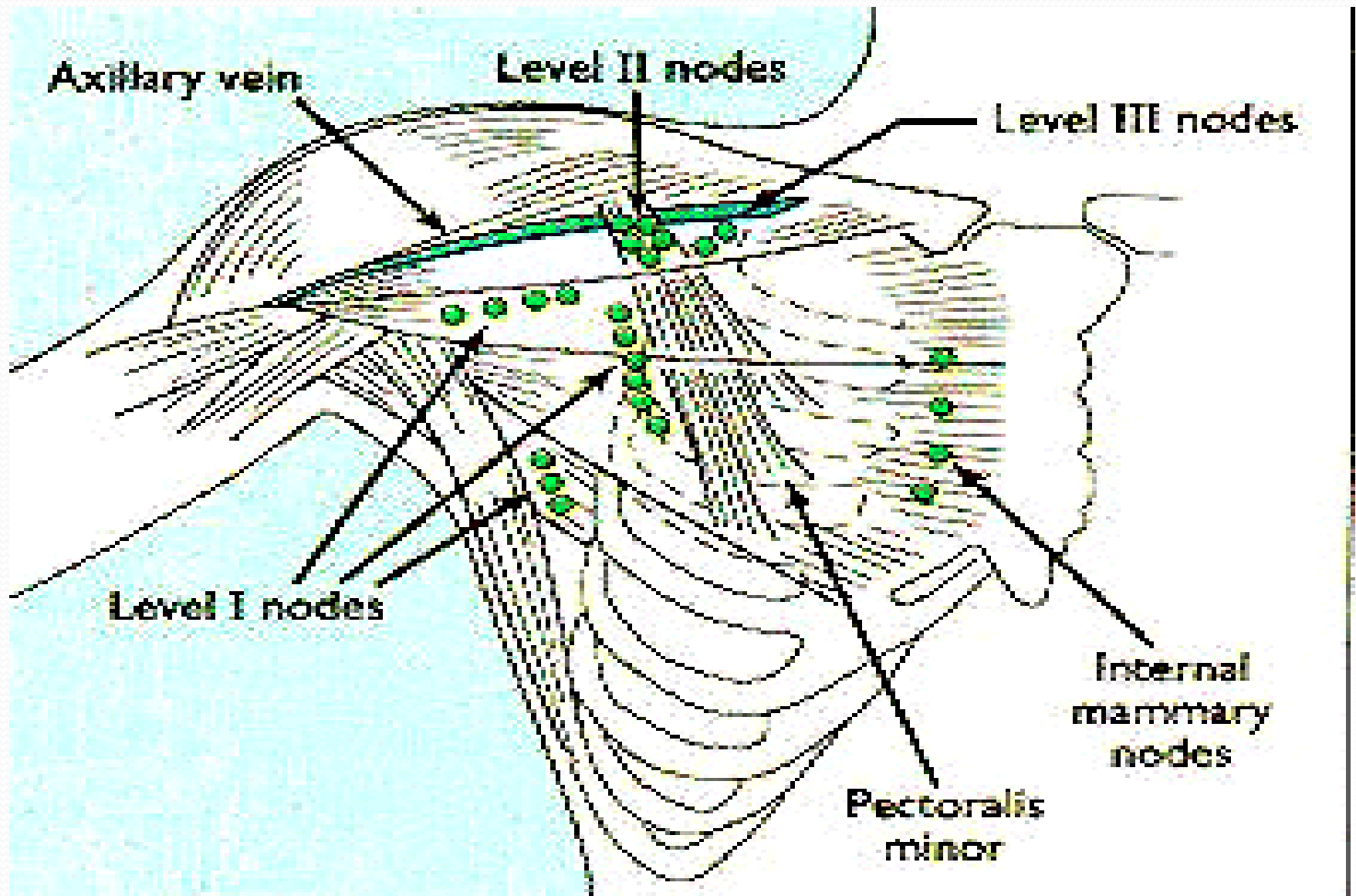
The cancer has spread to the chest wall



Lymphatic spread

- Lymphangitic spread occurs when cancer travels through the lymphatic system. Breast cancer often involves the nearby lymph nodes, so the cancer can enter the lymph circulatory system and take hold in different parts of the body

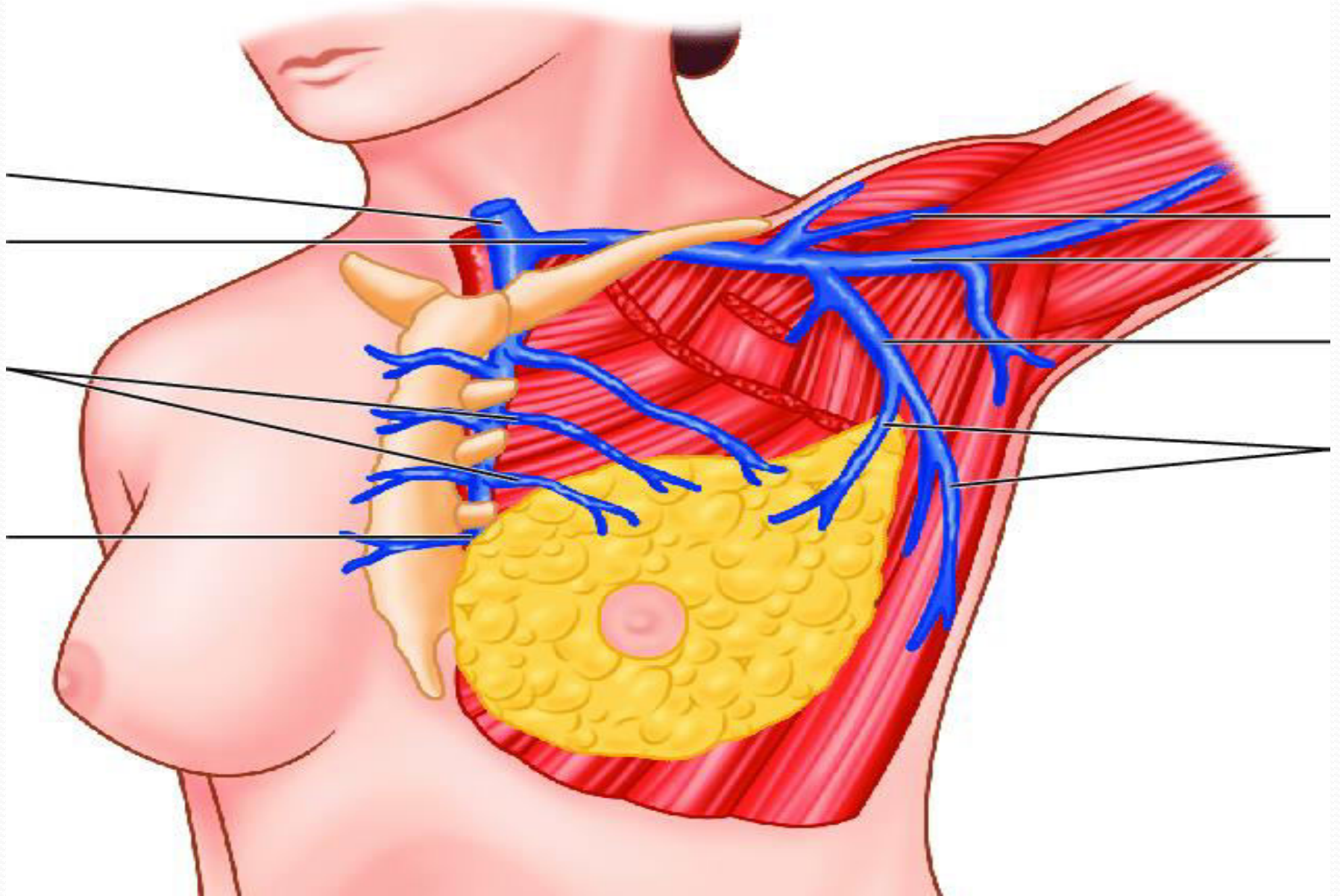
Lymphatic spread

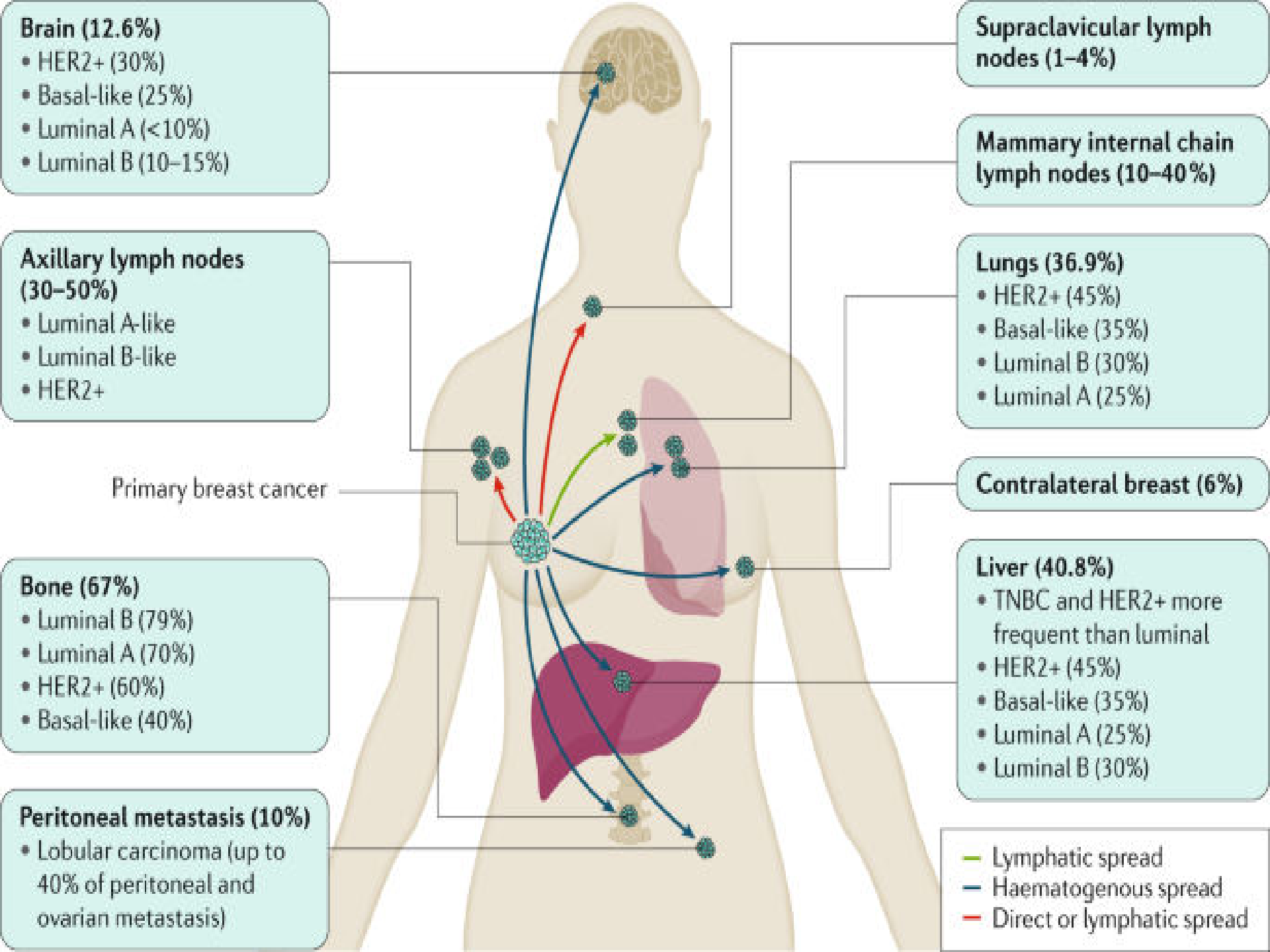


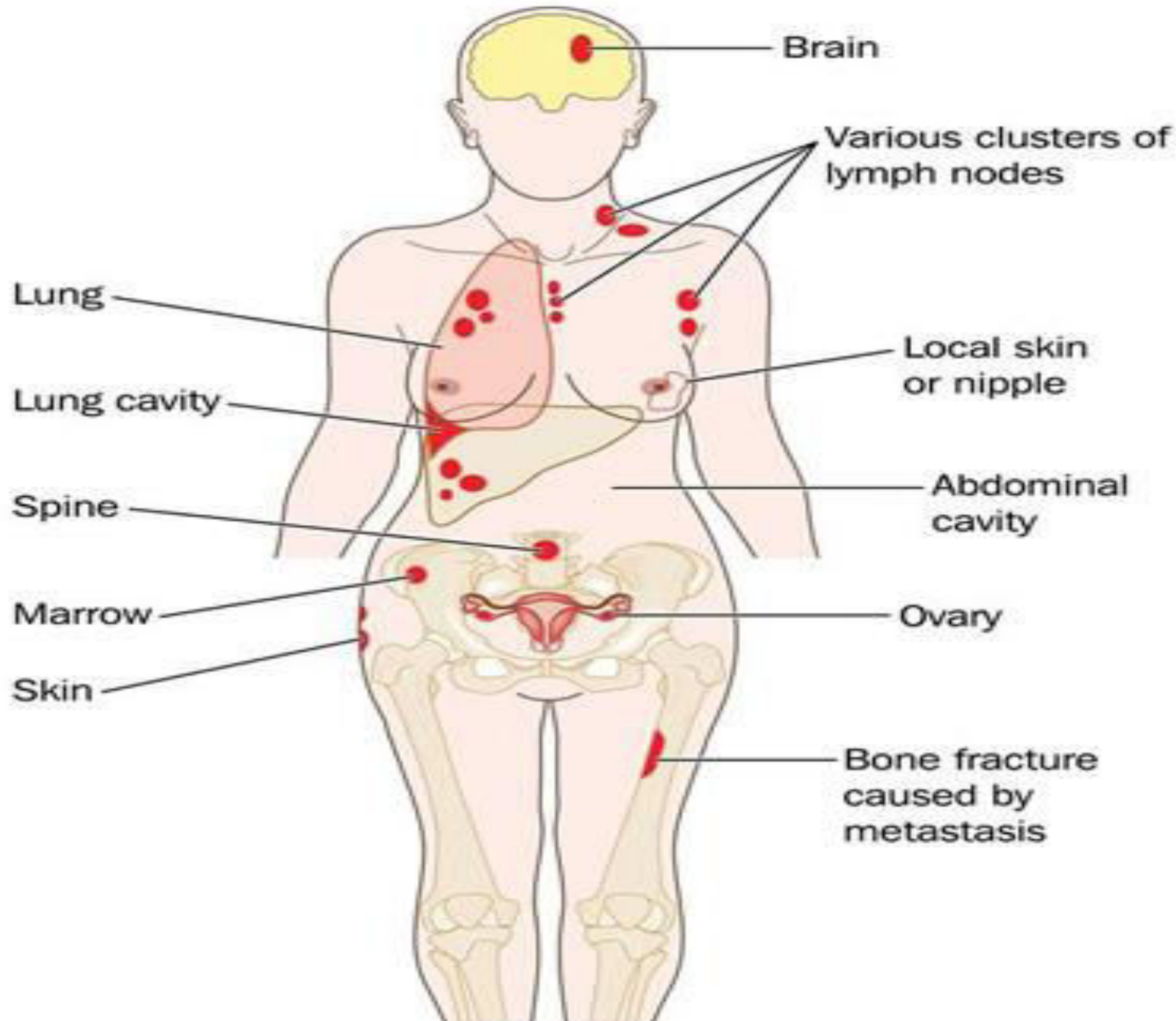
Hematogenous spread

- Hematogenous spread moves in much the same way as lymphangitic spread but through the blood vessels. The cancer cells travel through the body and take root in remote areas and organs.
- bones
- brain
- liver
- lungs

Venous spread







Thanks...