

# **MAMMARY GLAND**

# Objectives

For the **Gross anatomy** and **Histology** of the mammary gland.

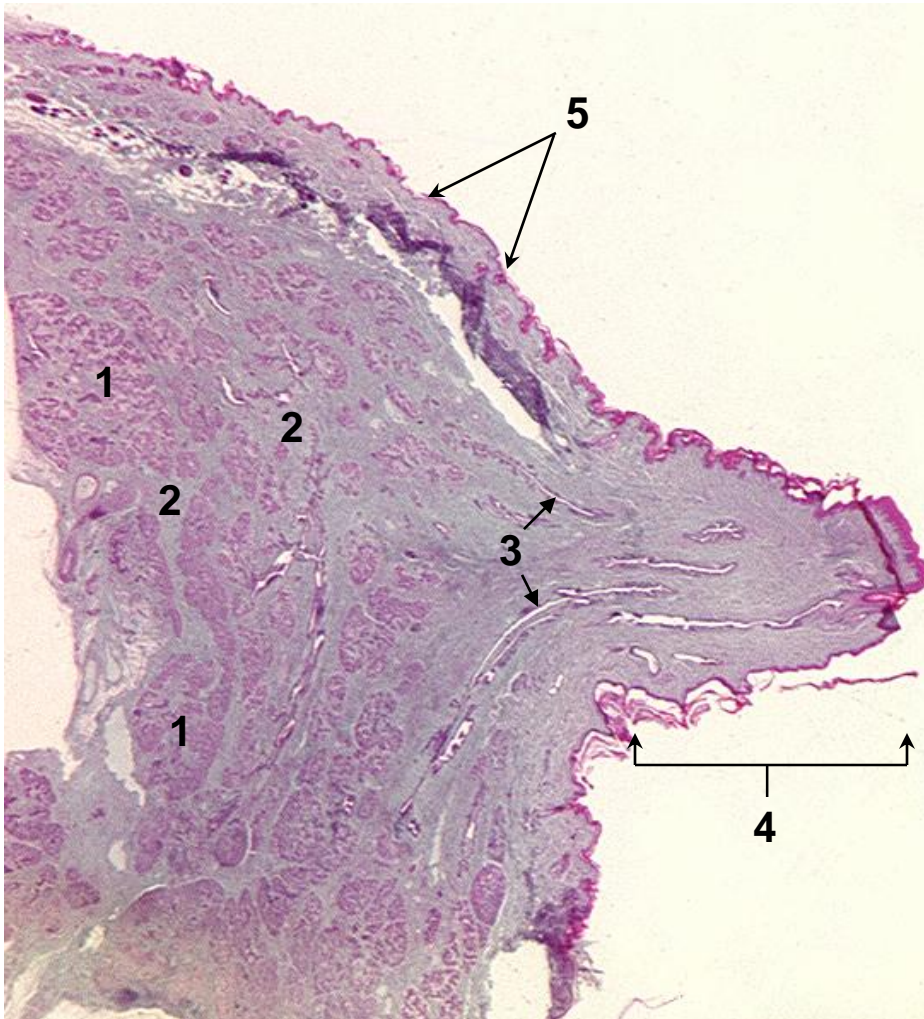
Students should be able to:

1. Appreciate the differences in duct numbers per teat.
2. Identify the mammary glands and their main features in all domestic species.
3. Identify their blood vessels, nerves and lymph ducts; appreciate internal structure features.
4. Identify the features of the microscopic structure of active and inactive mammary glands.

# Mammary gland - inactive

At low magnification identify :

1. area of tubules.
2. interlobular connective tissue.
3. lactiferous ducts.
4. teat.
5. surface of skin.



In this triple stained section  
connective tissue is stained blue/green

2.5 mm

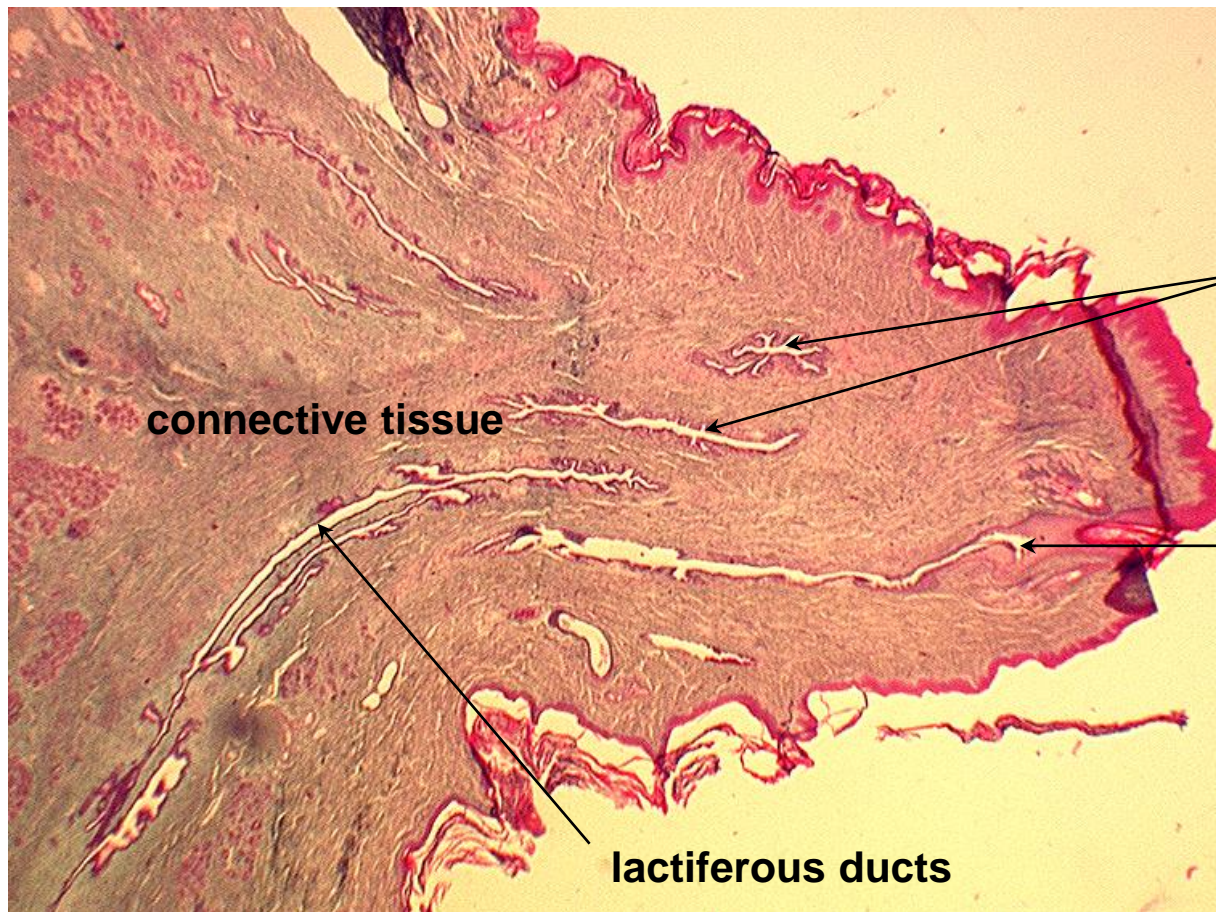
# Mammary gland - inactive

Area of teat identify :

**lactiferous ducts.**

**lactiferous sinuses.**

**teat sinus.**



**lactiferous sinus  
'star' shaped appearance**

**teat sinus**

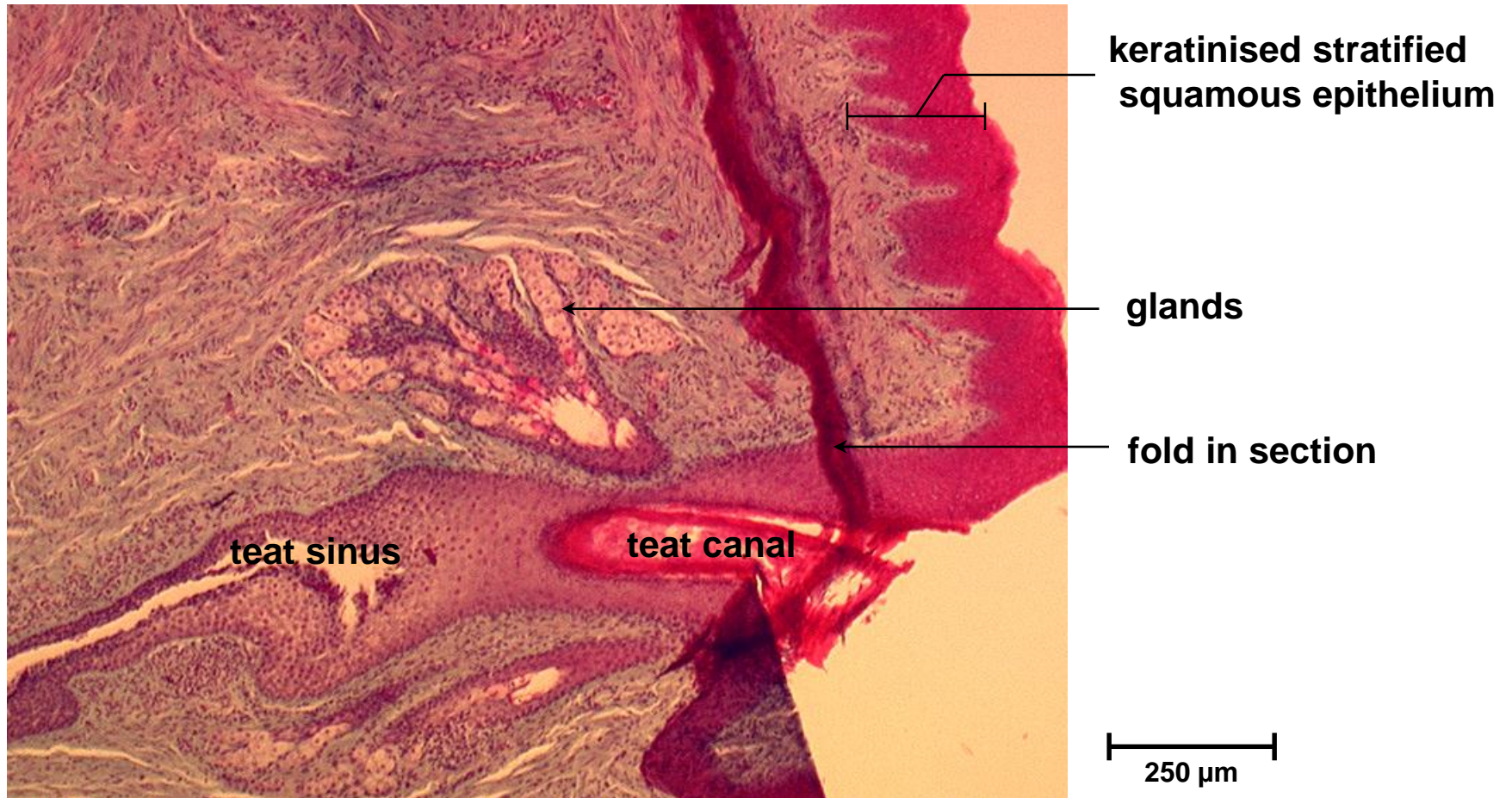
**connective tissue**

**lactiferous ducts**

**1.0 mm**

# Mammary gland - inactive

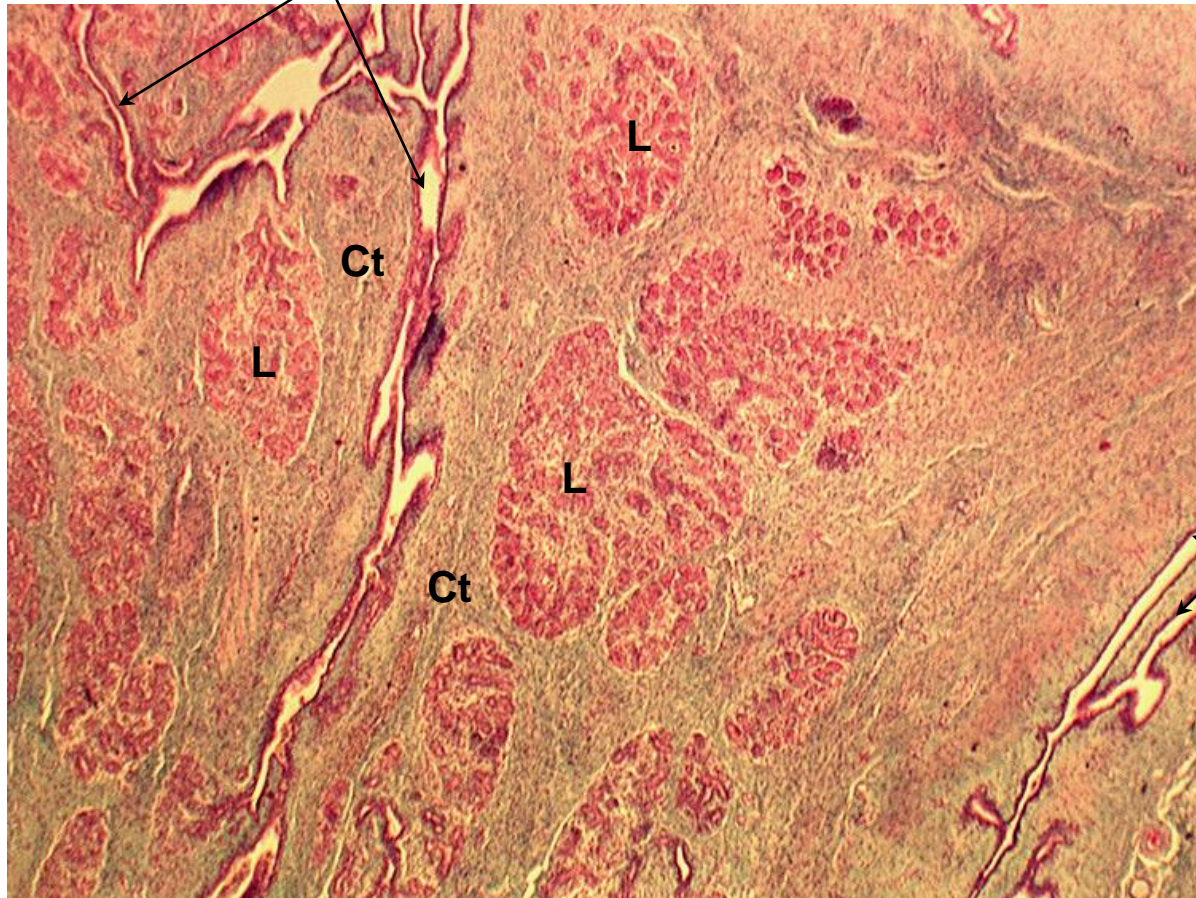
Opening of teat sinus, identify : teat sinus.  
glands opening into sinus.  
keratinised, stratified squamous epithelium.



# Mammary gland - inactive

Identify :        lobules  
                     interlobular duct system  
                     interlobular connective tissue

interlobular ducts opening to lactiferous ducts



Ct : interlobular  
              connective tissue

L : lobules

lactiferous duct

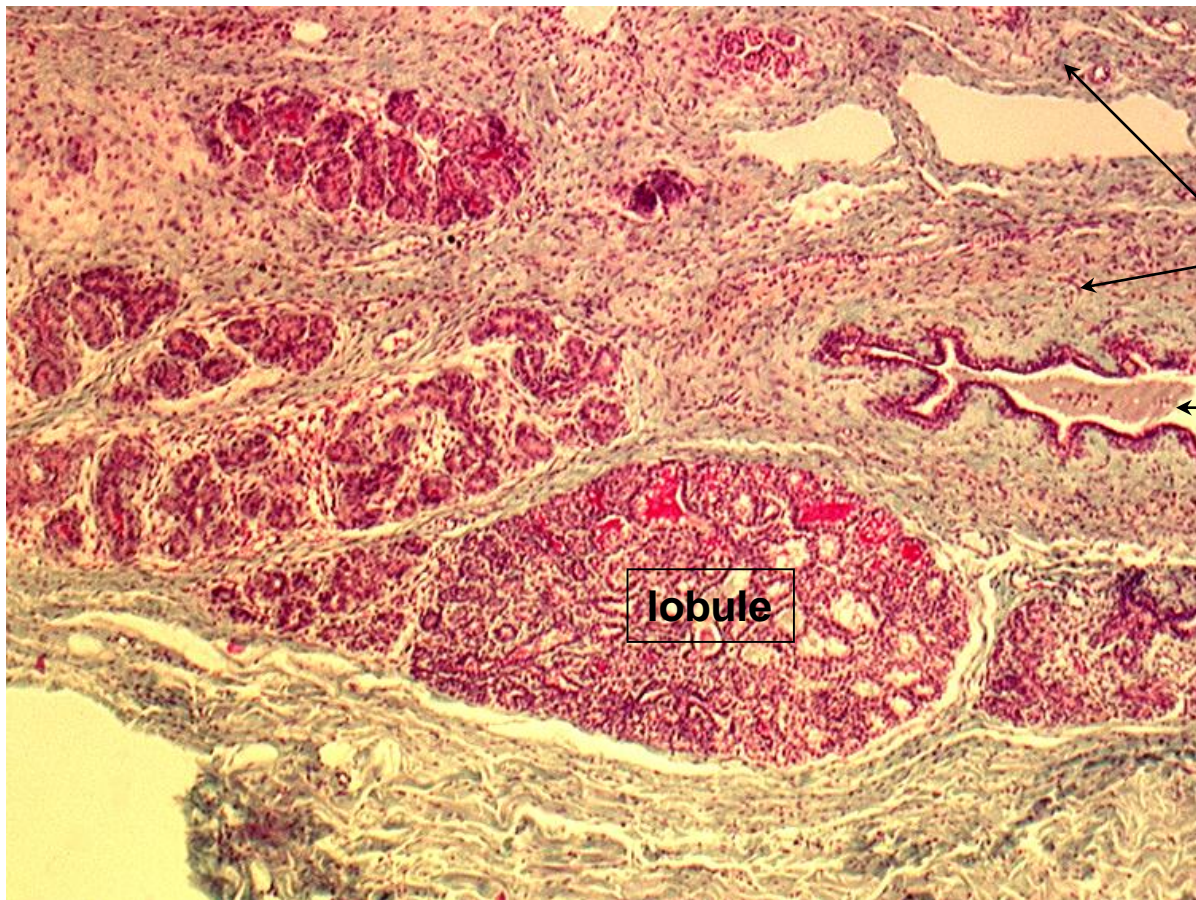
0.5 mm

# Mammary gland - inactive

At a slightly higher magnification the inactive tubules forming the lobules of the gland can be identified.

Large areas of interlobular connective tissue, stained blue/green extend between these lobules.

Within this connective tissue run the interlobular ducts.



connective tissue

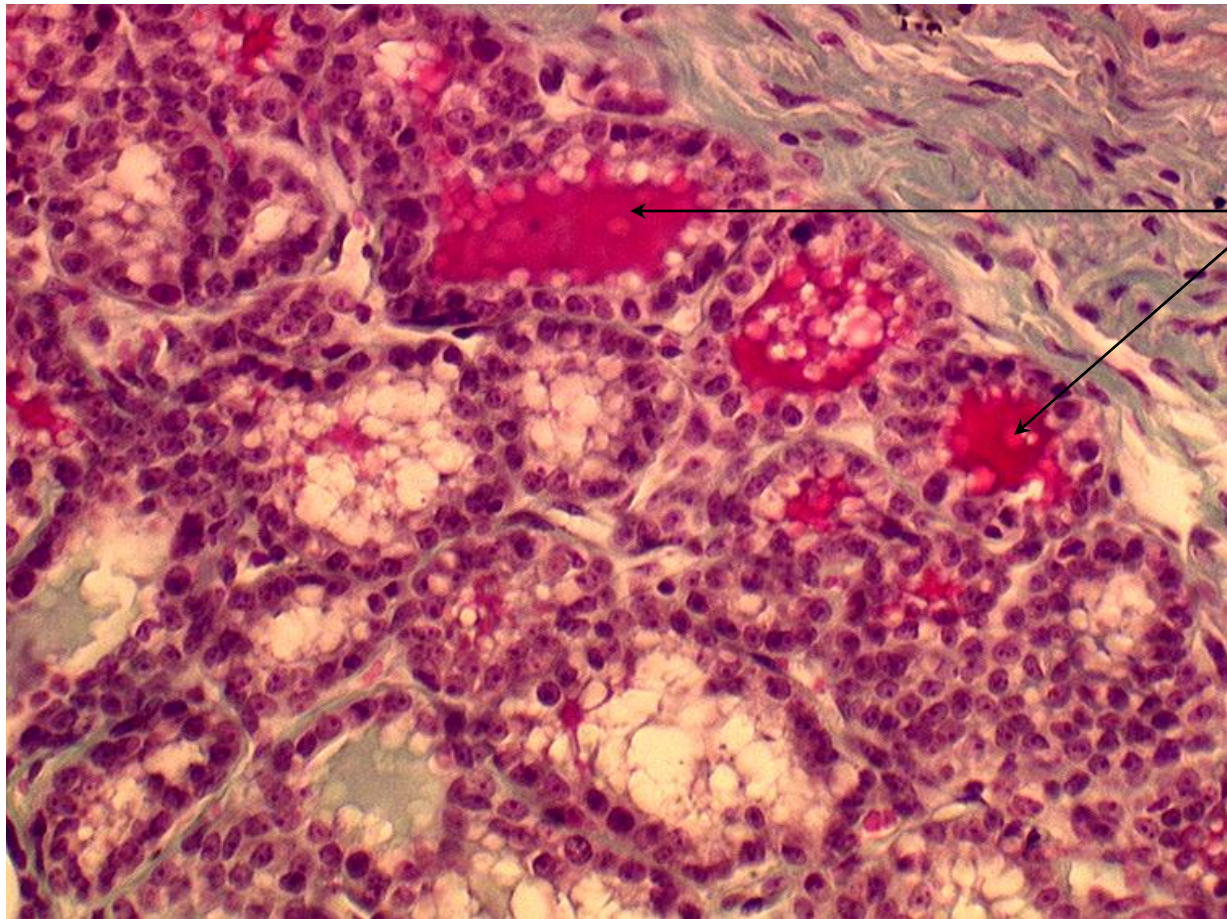
interlobular duct

lobule

250 μm

# Mammary gland - inactive

The low columnar cells lining the walls of the tubules are mildly secretory- note the eosinophilic content of some of the tubules.



secretions in tubules

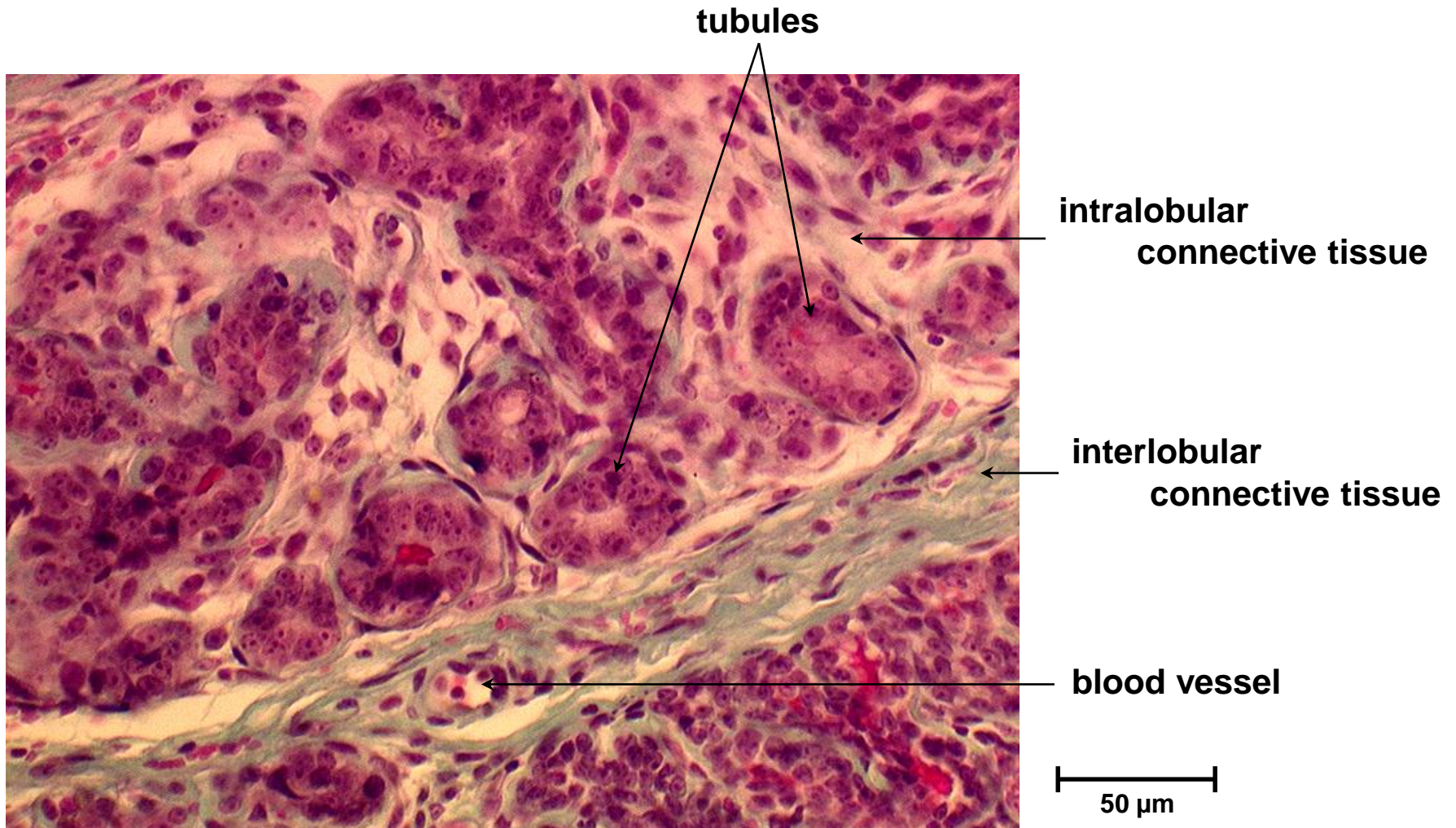
50  $\mu$ m



# Mammary gland - inactive

How is the inactive mammary gland classified?

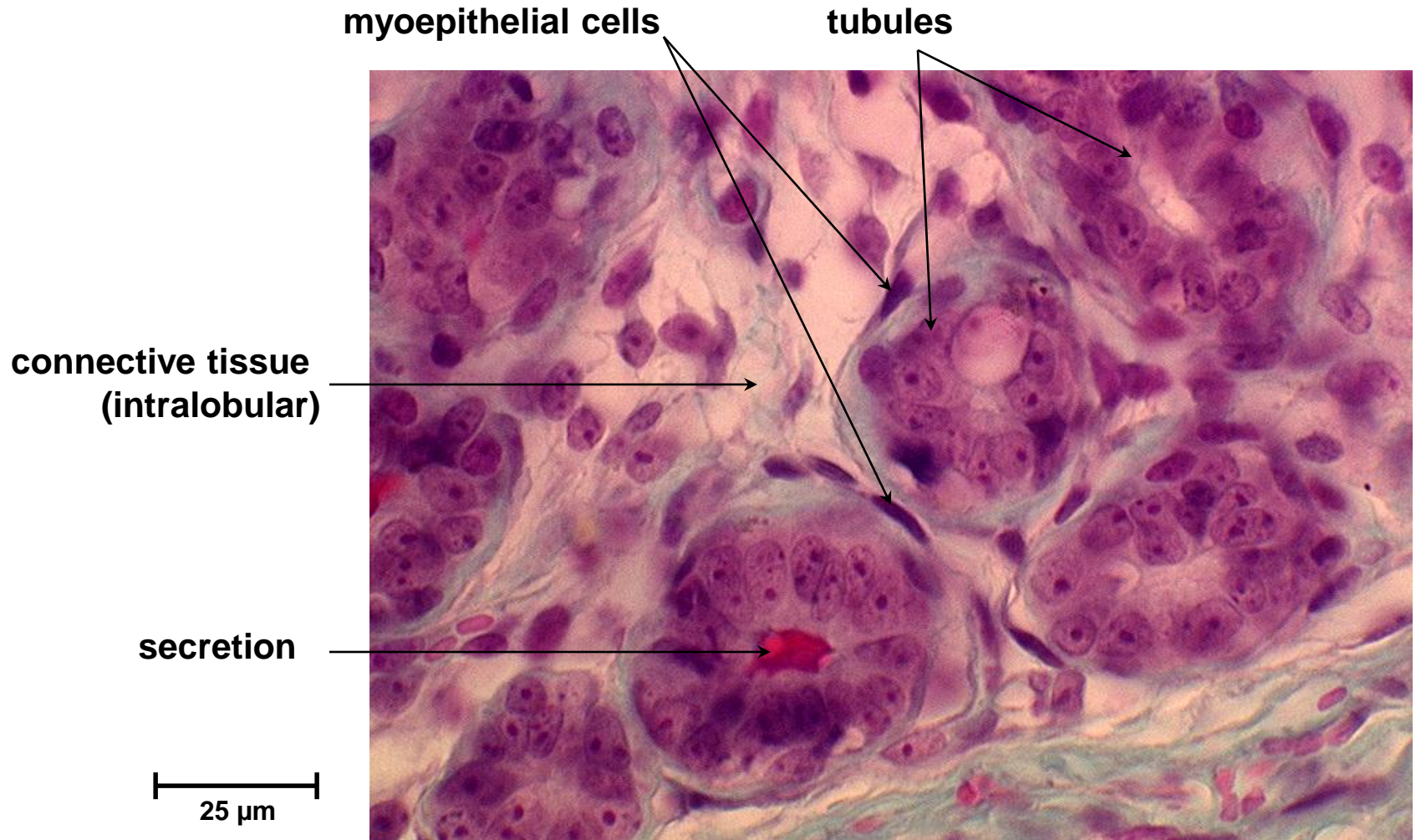
**Compound tubular gland.**



# Mammary gland - inactive

What are the elongated cells with nuclei lying at the base of the tubule epithelium?

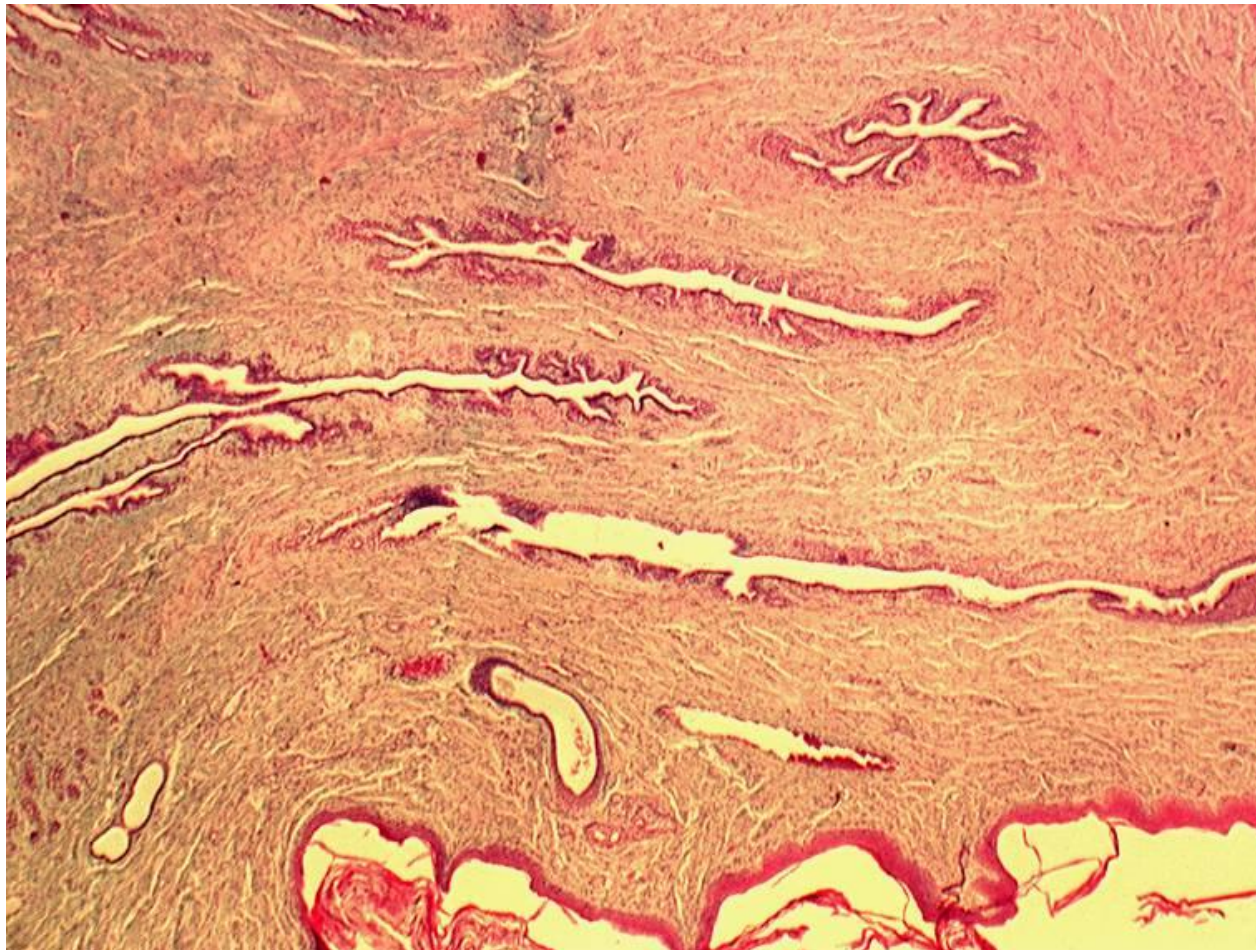
**Myoepithelial cells.**



# Mammary gland - inactive

Towards the teat the lactiferous ducts open into the lactiferous sinuses to teat sinus to teat canal.

The double epithelial layers become progressively taller, from cuboidal to columnar.



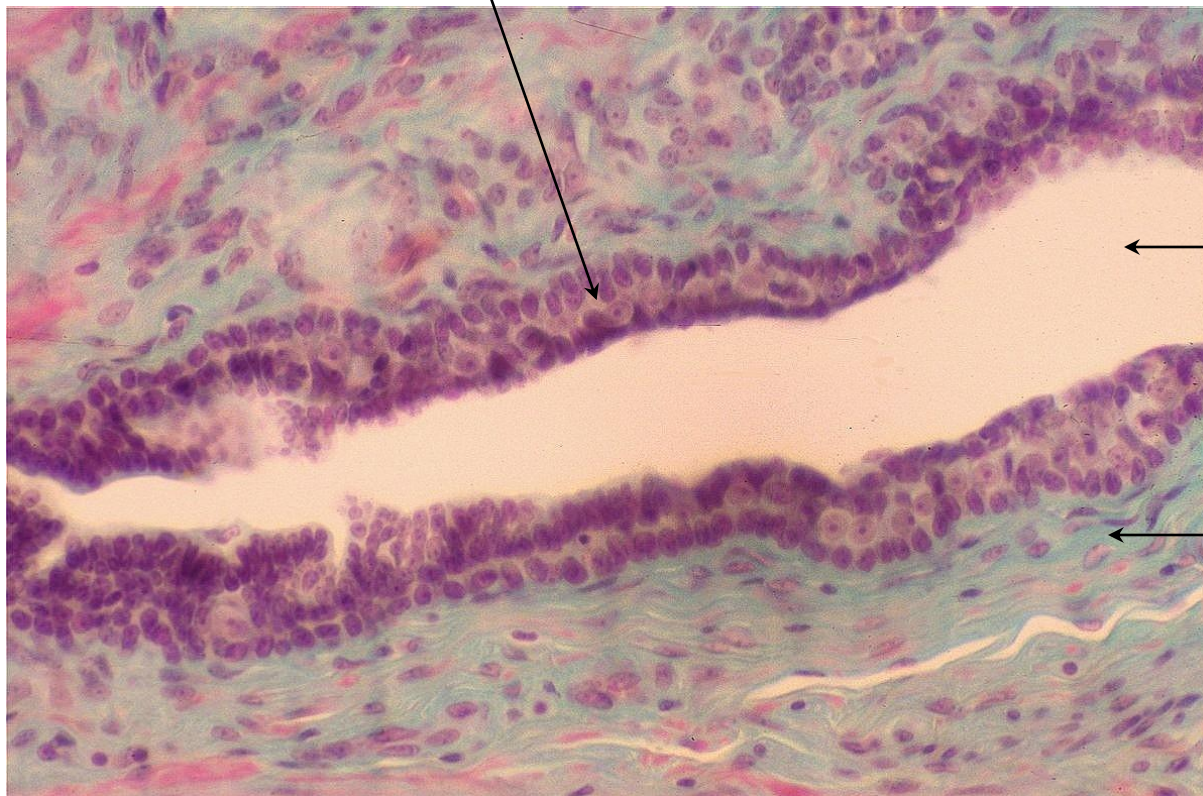
0.5 mm

# Mammary gland - inactive

What is a distinguishing feature of the lactiferous ducts?

**Double layered cuboidal to columnar epithelium.**

double layered epithelium



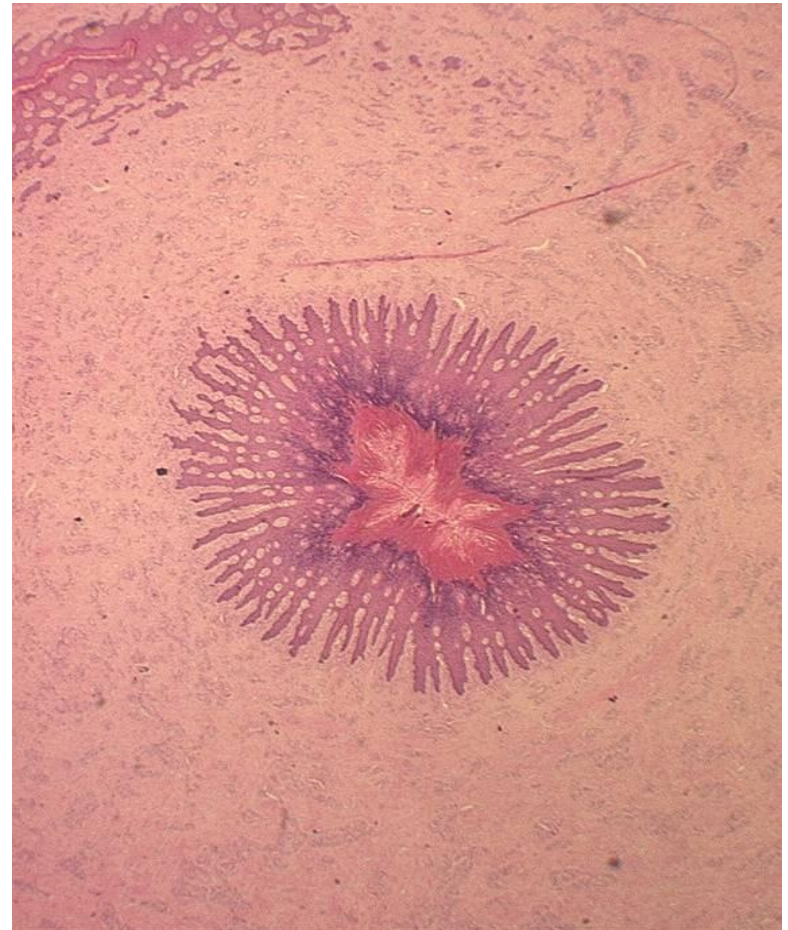
← lumen of duct

← connective tissue

50  $\mu$ m

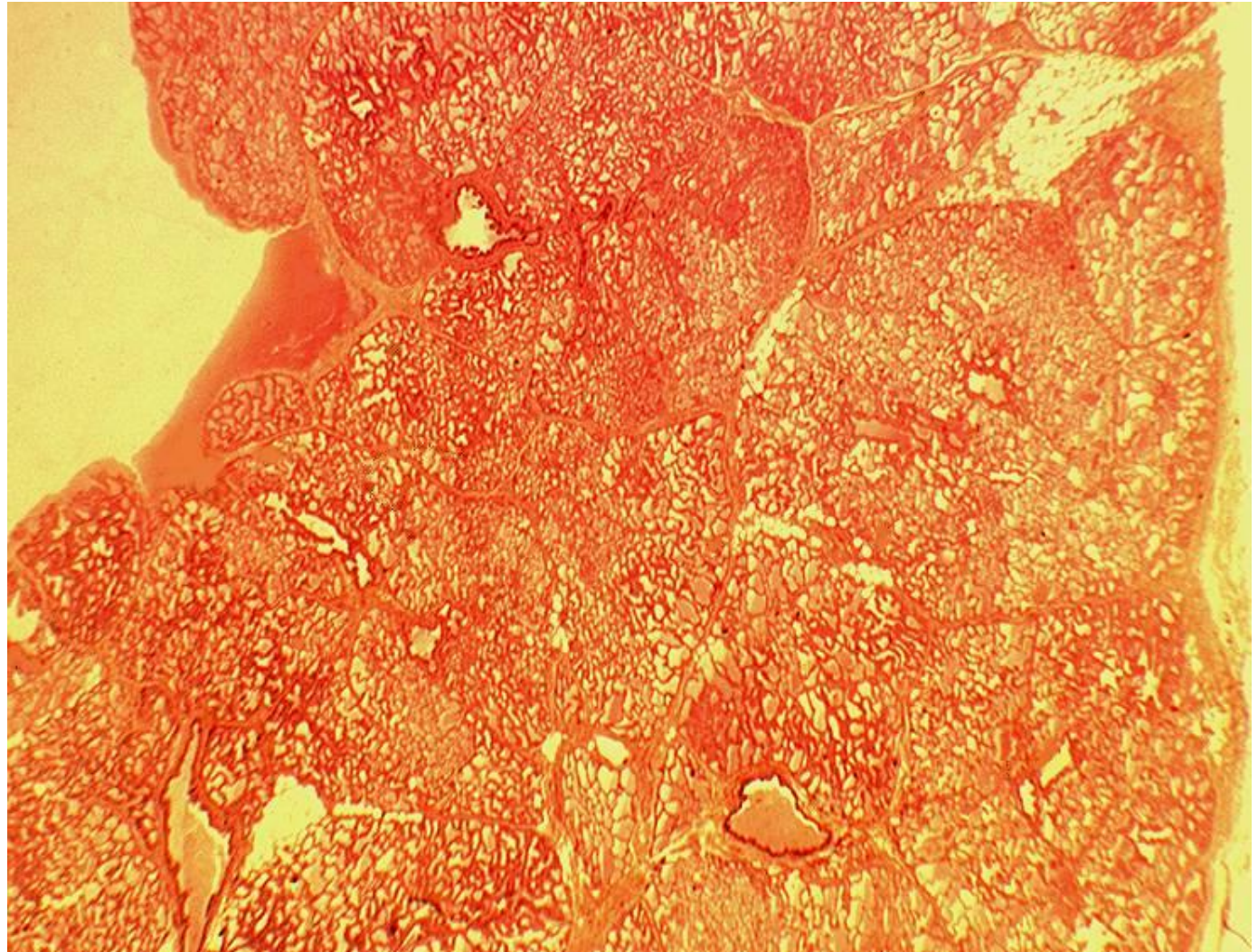
# Demonstration slide Mammary gland

Transverse section through teat canal.



# Mammary gland - active

start by examining the red/pink stained section.

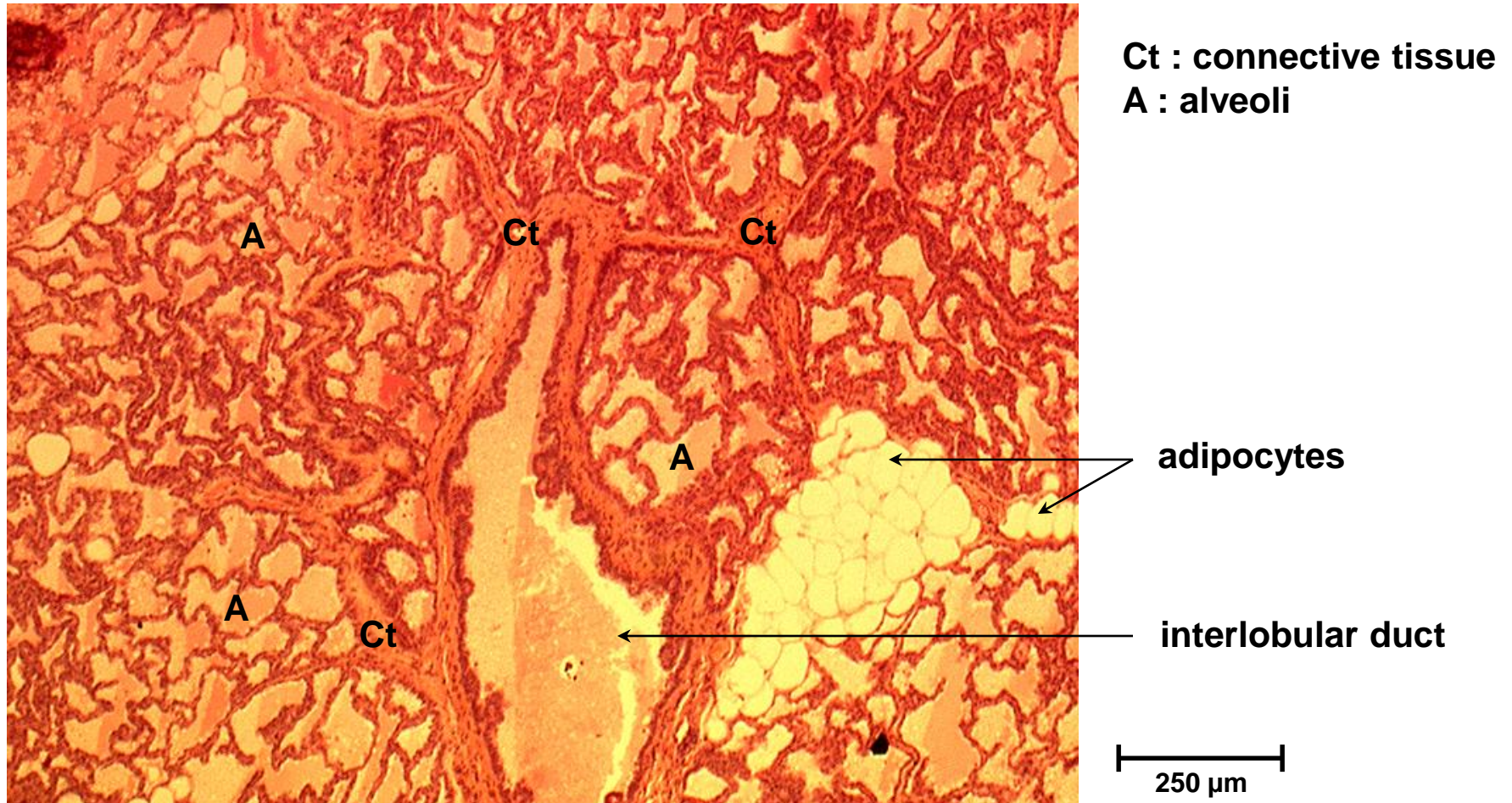


0.5 mm

# Mammary gland - active

Note each lobule is greatly expanded; consisting mostly of alveoli.

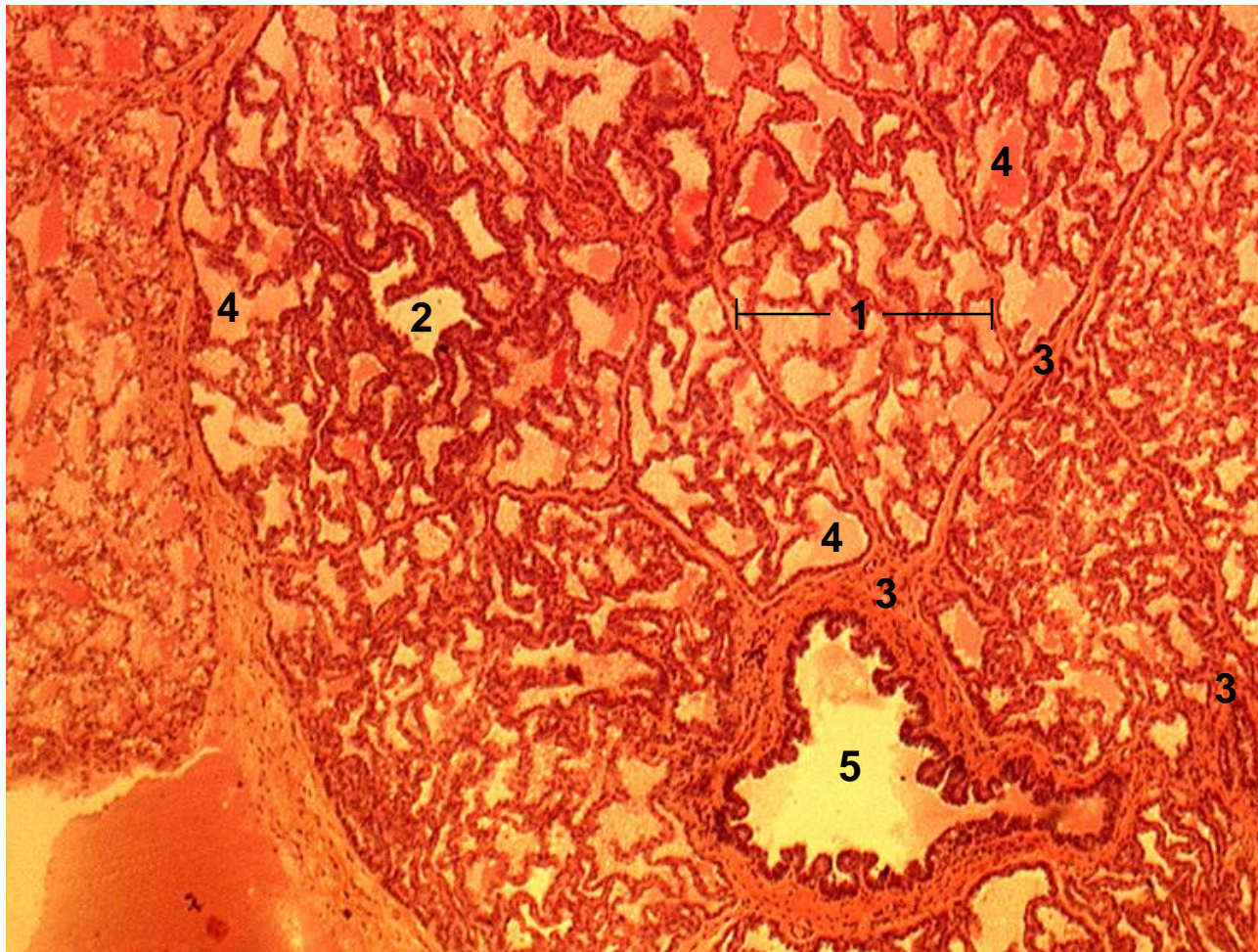
The interlobular connective tissue is compressed to fibrous tracts or seams.



# Mammary gland - active

Identify :

1. lobule.
2. intralobular ducts.
3. interlobular connective tissue.
4. alveoli.
5. interlobular ducts.



250  $\mu$ m

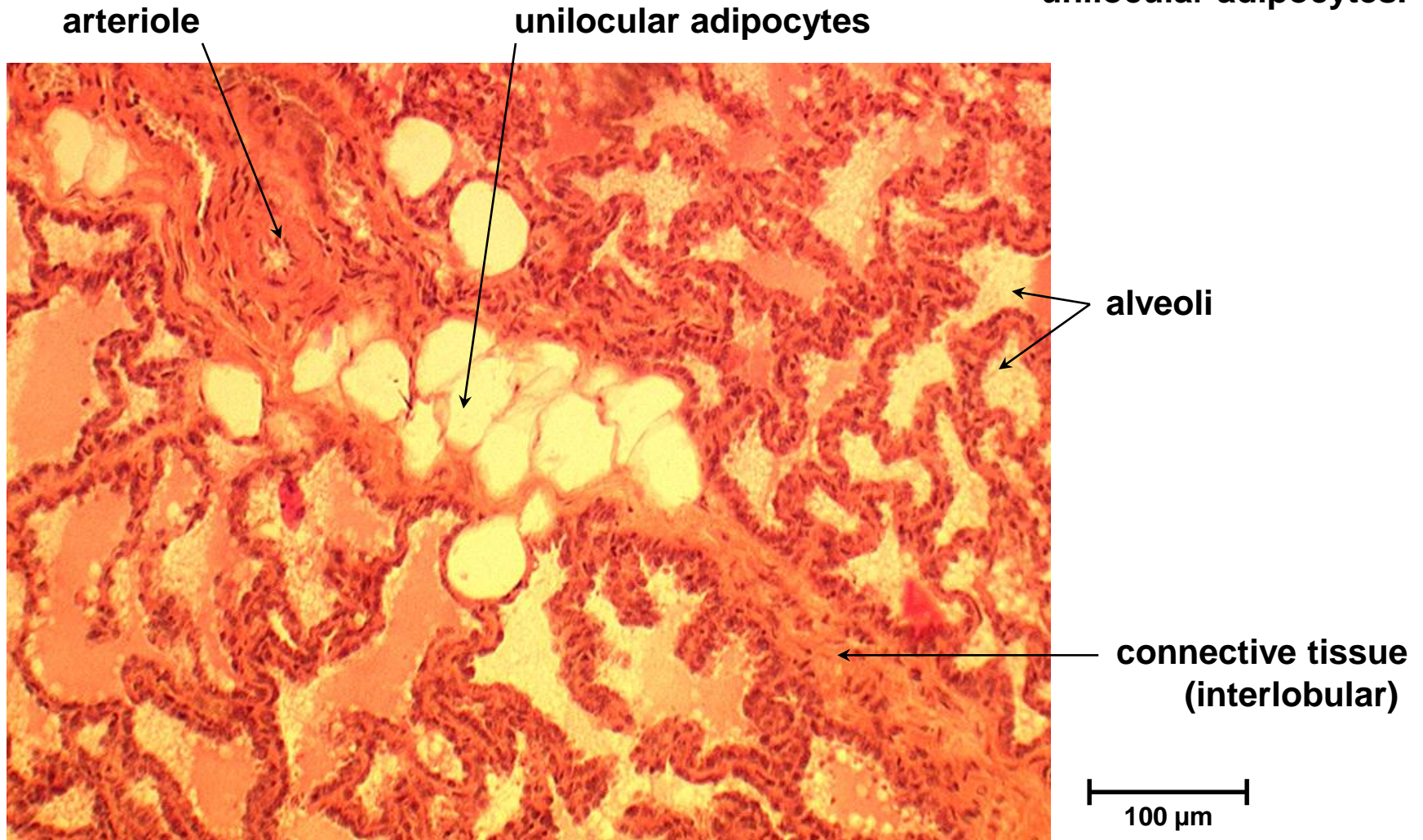


# Mammary gland - active

In the compressed seams of interlobular connective tissue,

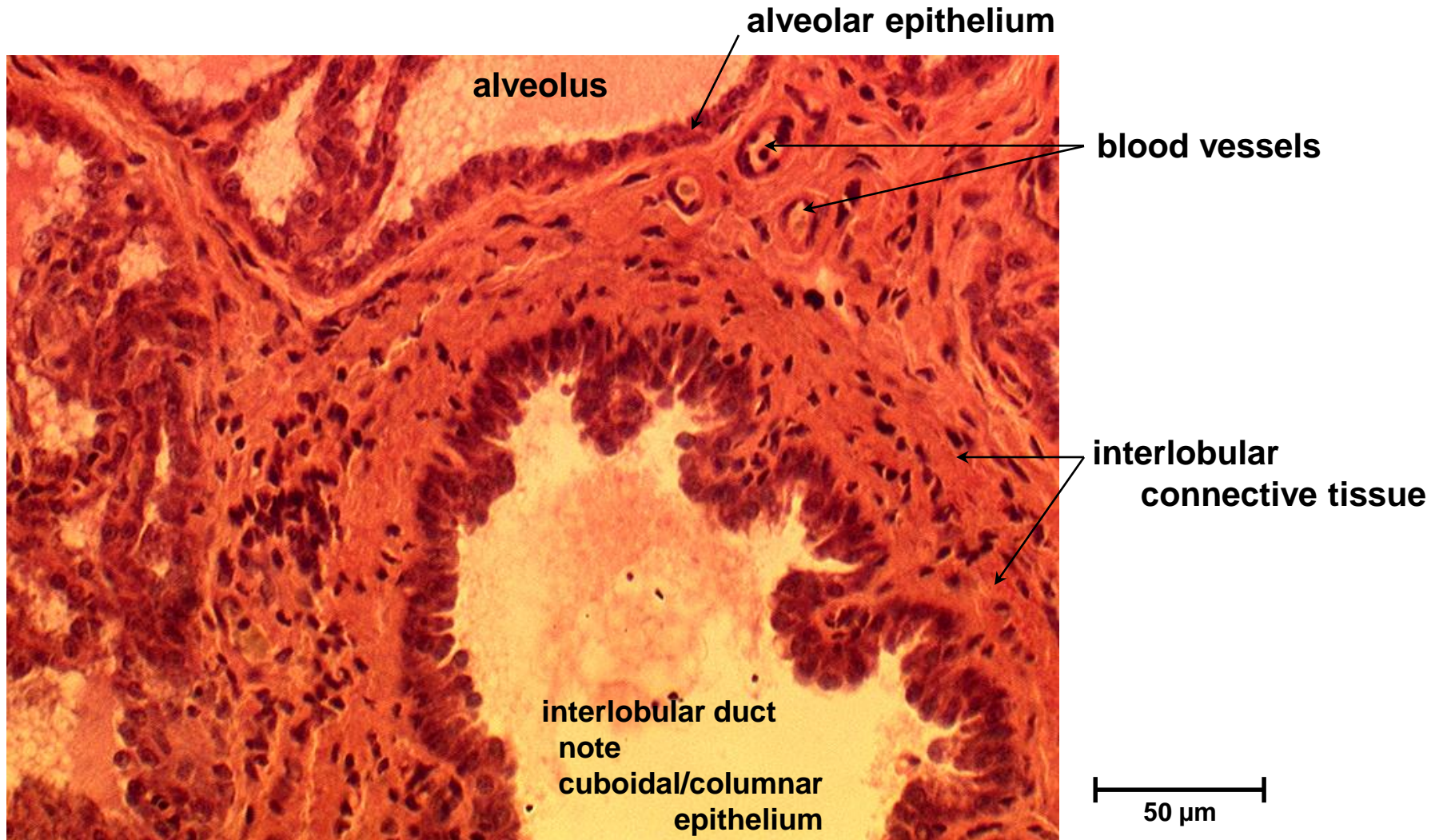
Identify : blood vessels.

unilocular adipocytes.



# Mammary gland - active

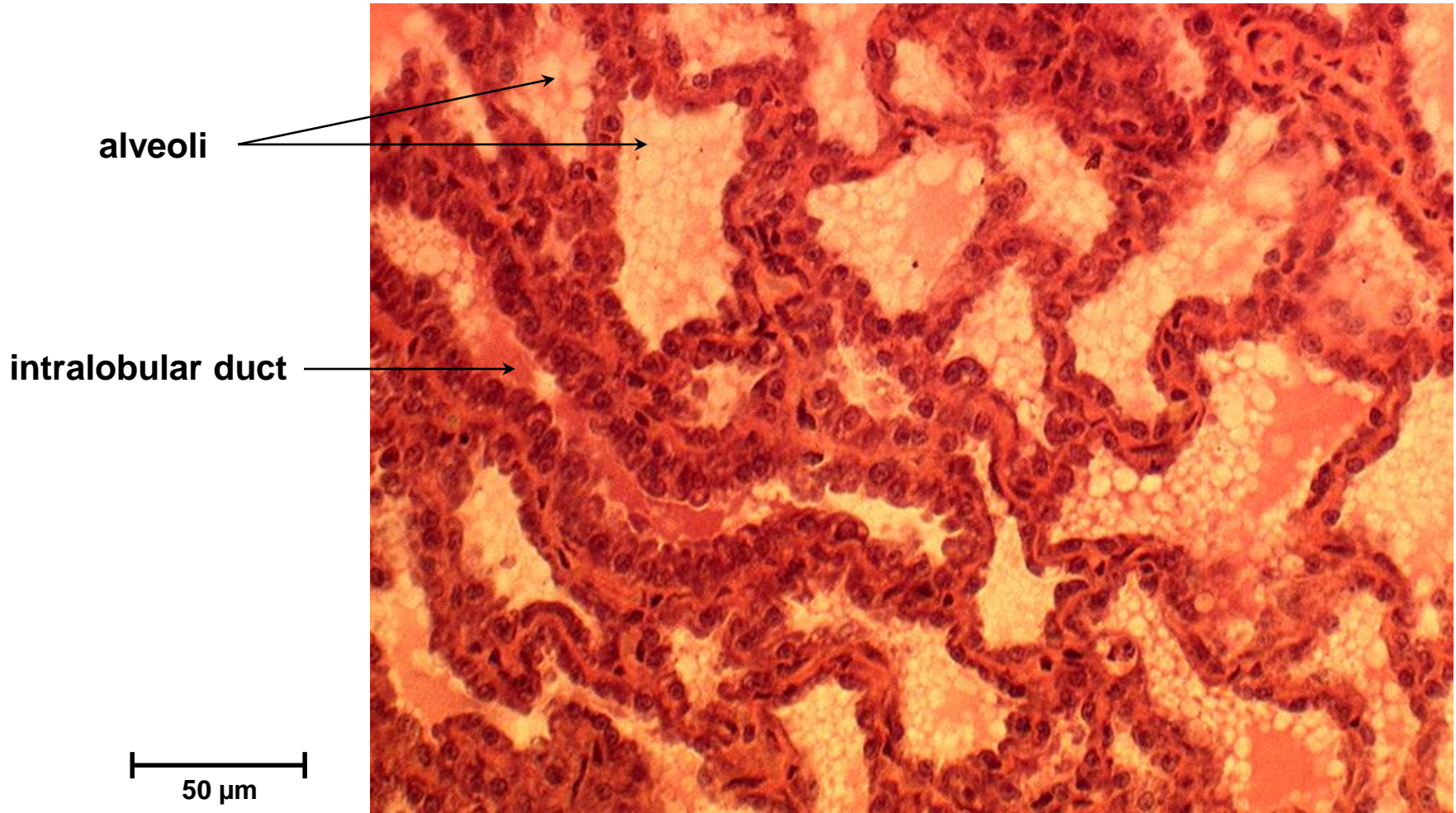
Most prominent in the interlobular connective tissue are the large interlobular and lactiferous ducts.



# Mammary gland - active

Within the lobules identify intralobular ducts.

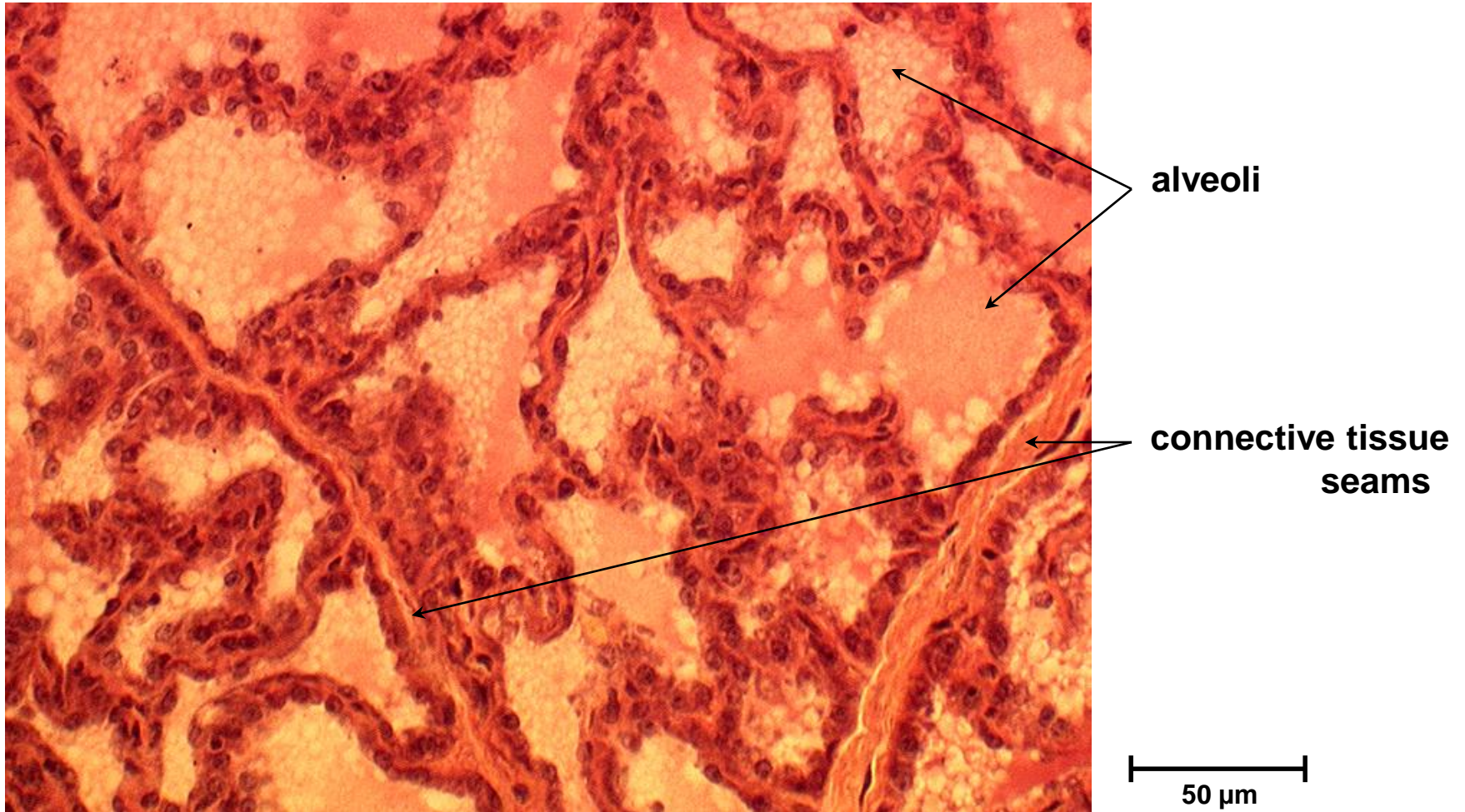
Note the more regular epithelium of the duct.



# Mammary gland - active

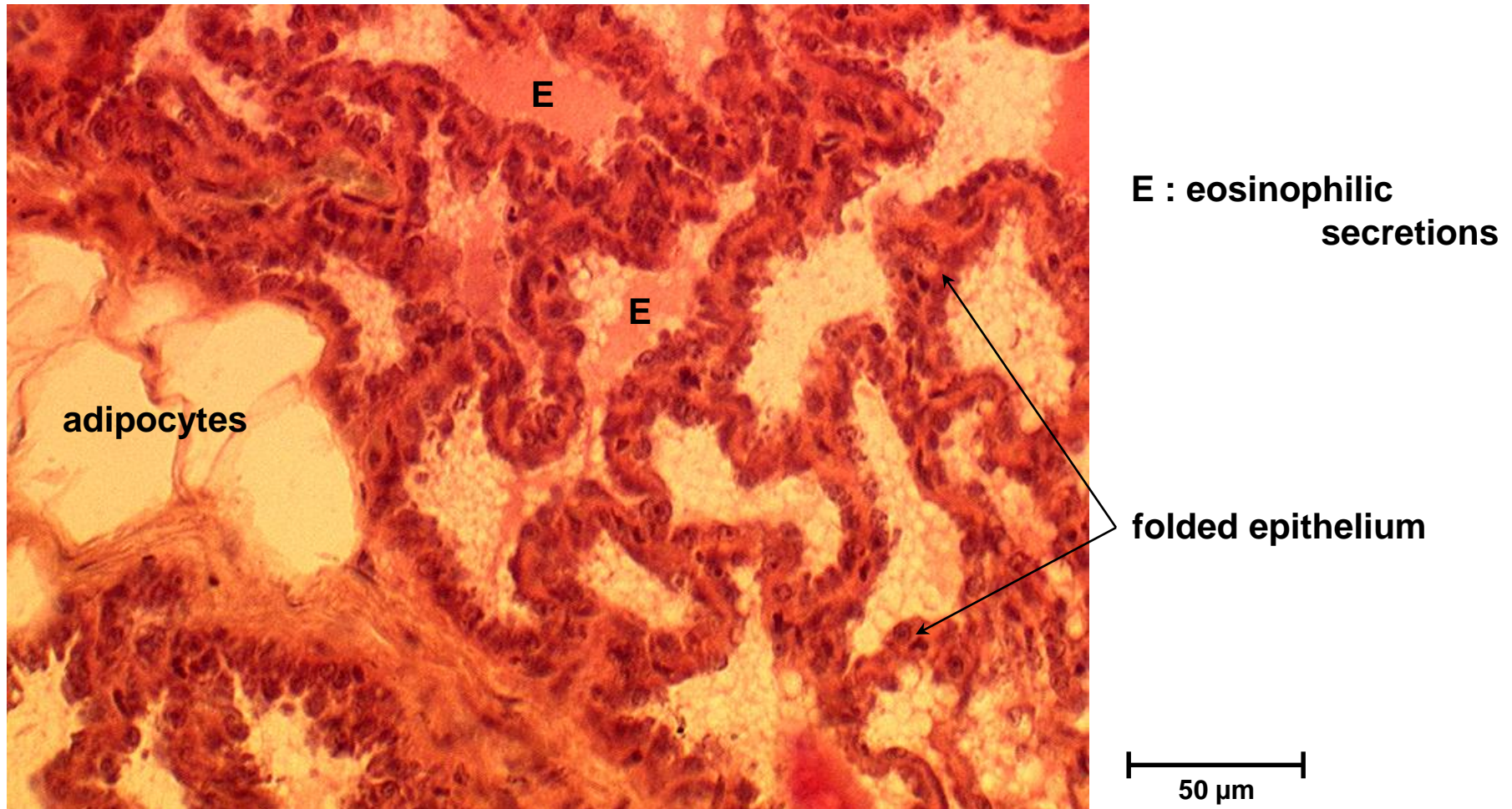
How is the active mammary gland classified?

**Compound tubulo-alveolar gland.**



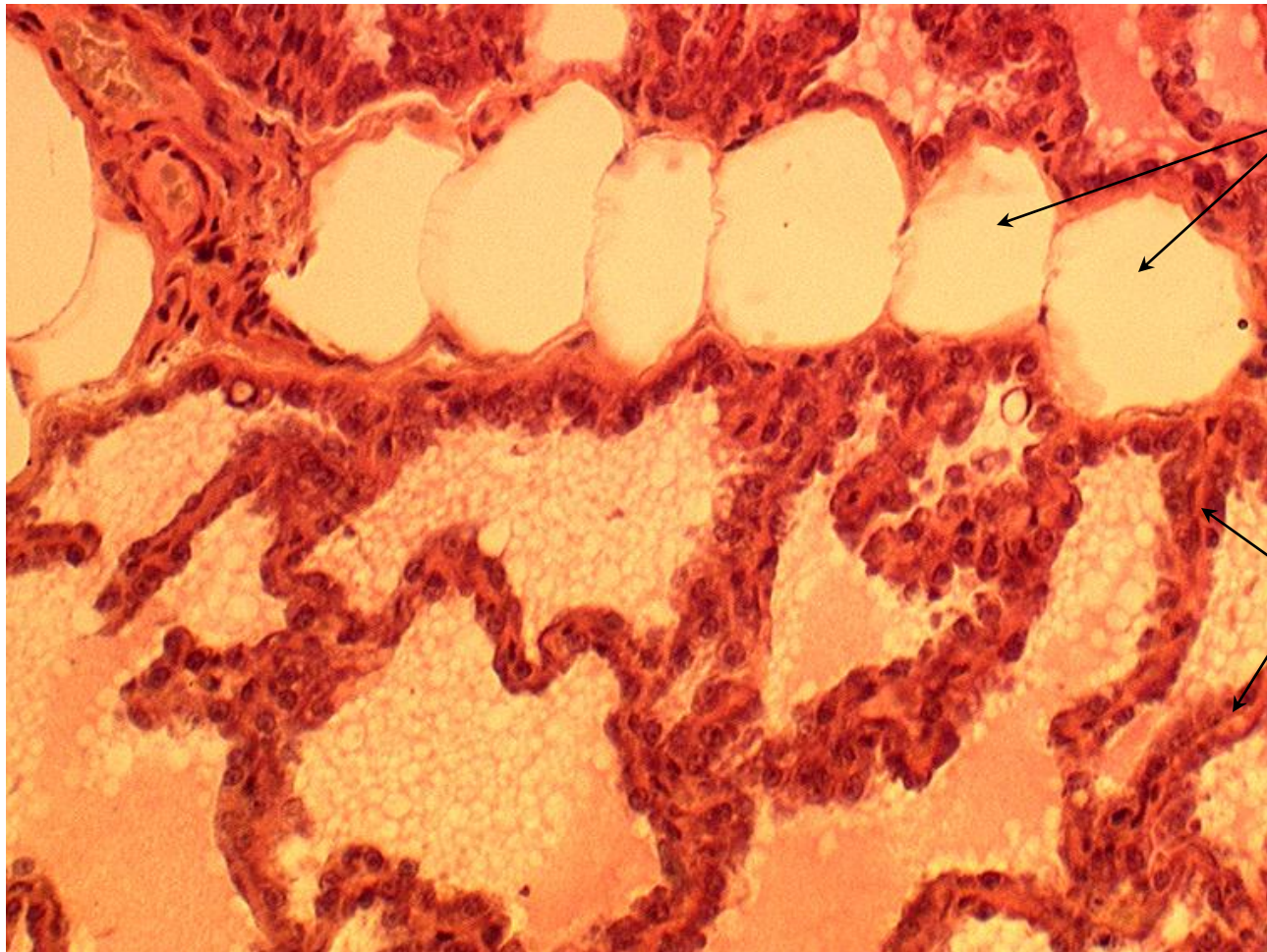
# Mammary gland - active

Note the appearance of the alveoli : folded somewhat 'ragged' epithelium.  
content of fat droplets.  
eosinophilic protein containing secretions.



# Mammary gland - active

Compare the staining of the large unilocular adipocytes in this section with their appearance in the lipid stained section which follows.



unilocular adipocytes  
in seam of interlobular  
connective tissue

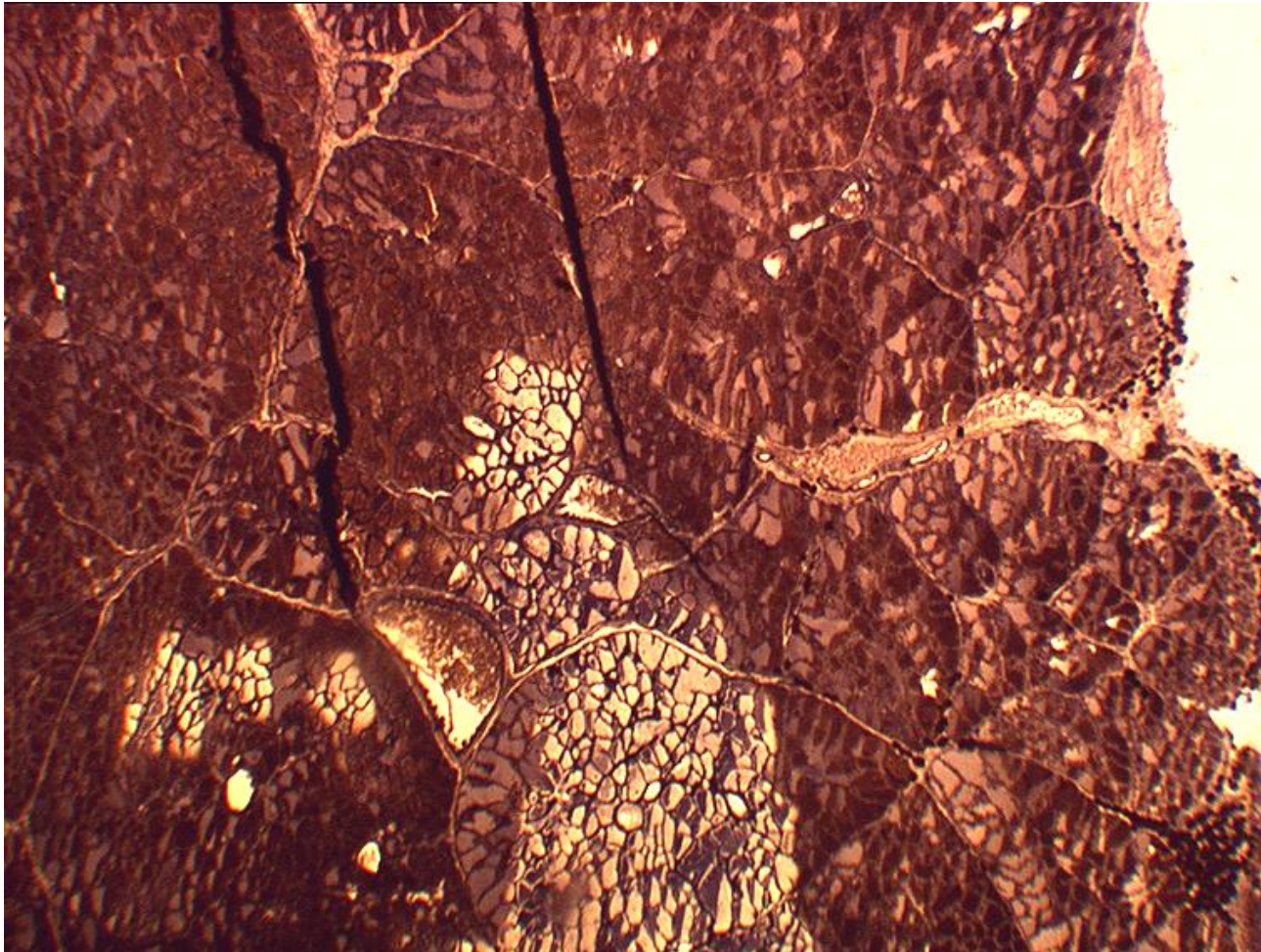
alveolar epithelium

50  $\mu$ m

# Mammary gland – active      stained for lipid

As seen before in histological sections; the presence of lipid can be demonstrated by the use of osmium containing solutions.

In sections stained with H&E the unfixed lipid is lost during sample processing.



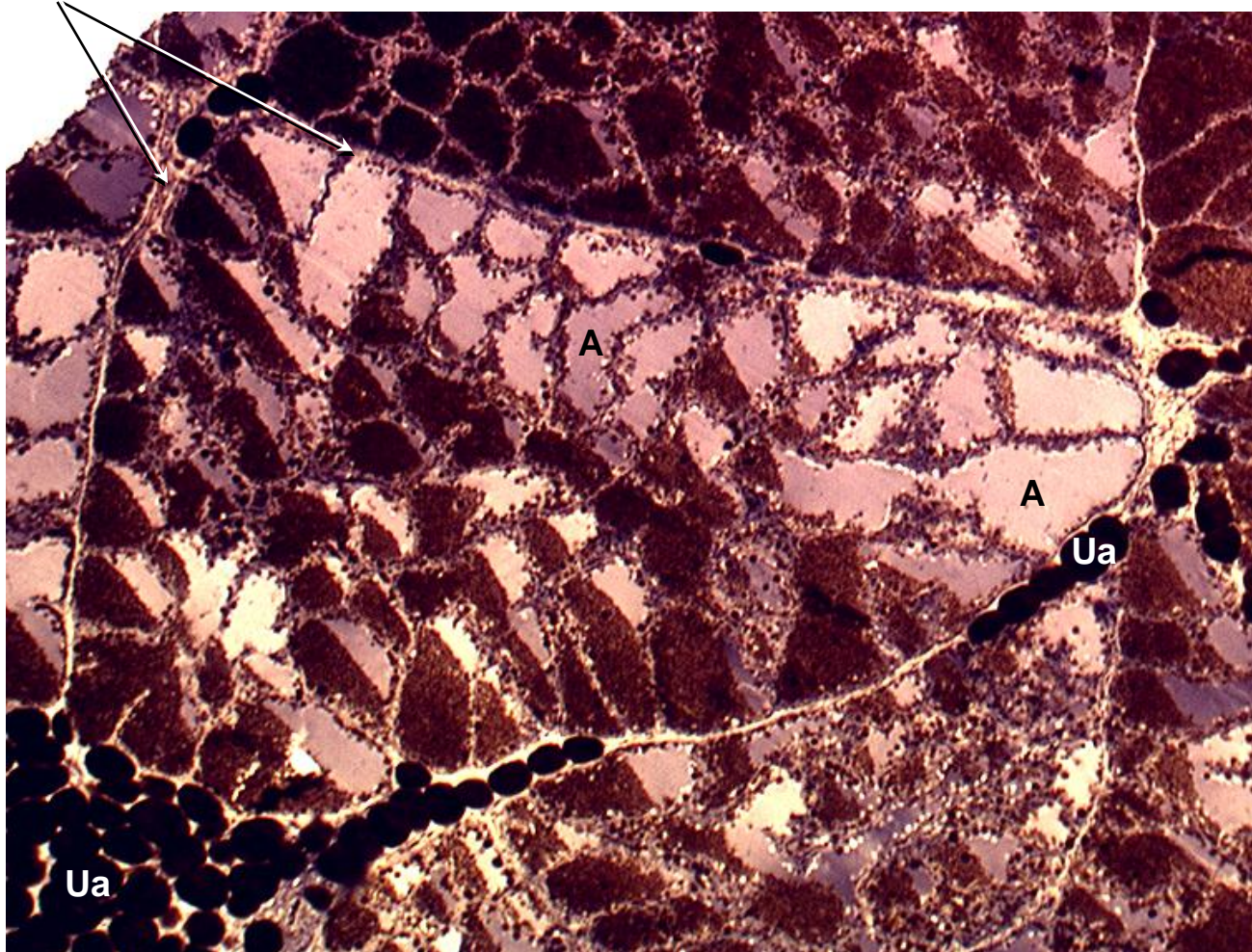
All handling and use of osmium containing solutions must be carried out in a fume hood.

1.0 mm

# Mammary gland – active      stained for lipid

Compare the small globules of fat in the alveoli with the larger, darker globules of the adipose cells in the interlobular connective tissue.

interlobular connective tissue



A : alveolae

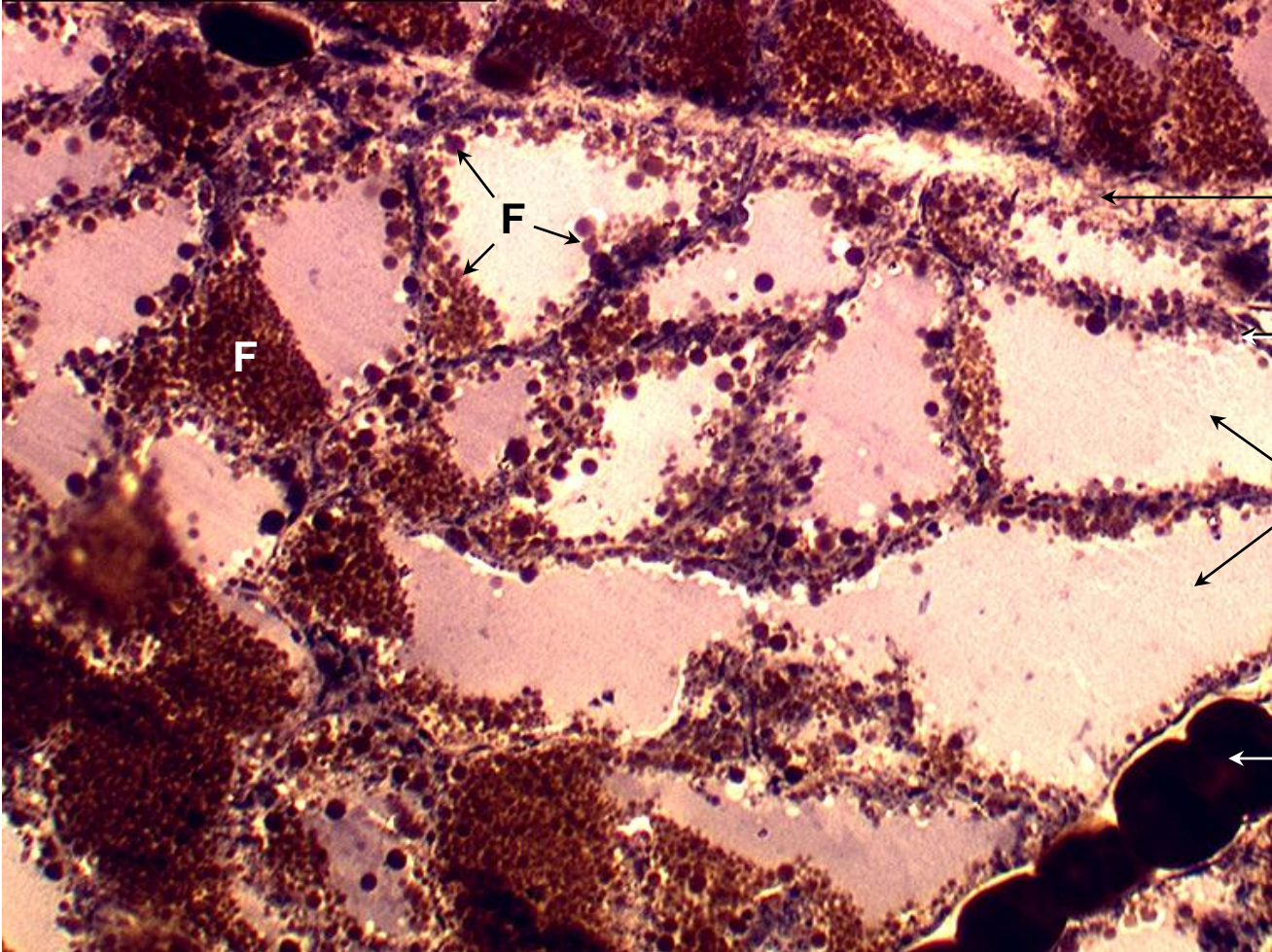
Ua : unilocular  
adipocytes

250 μm



# Mammary gland – active      stained for lipid

When viewing this section examine under higher magnification, look at a brown/black area rather than intensely black over-stained areas.



F : fat globules

interlobular  
connective tissue

epithelium

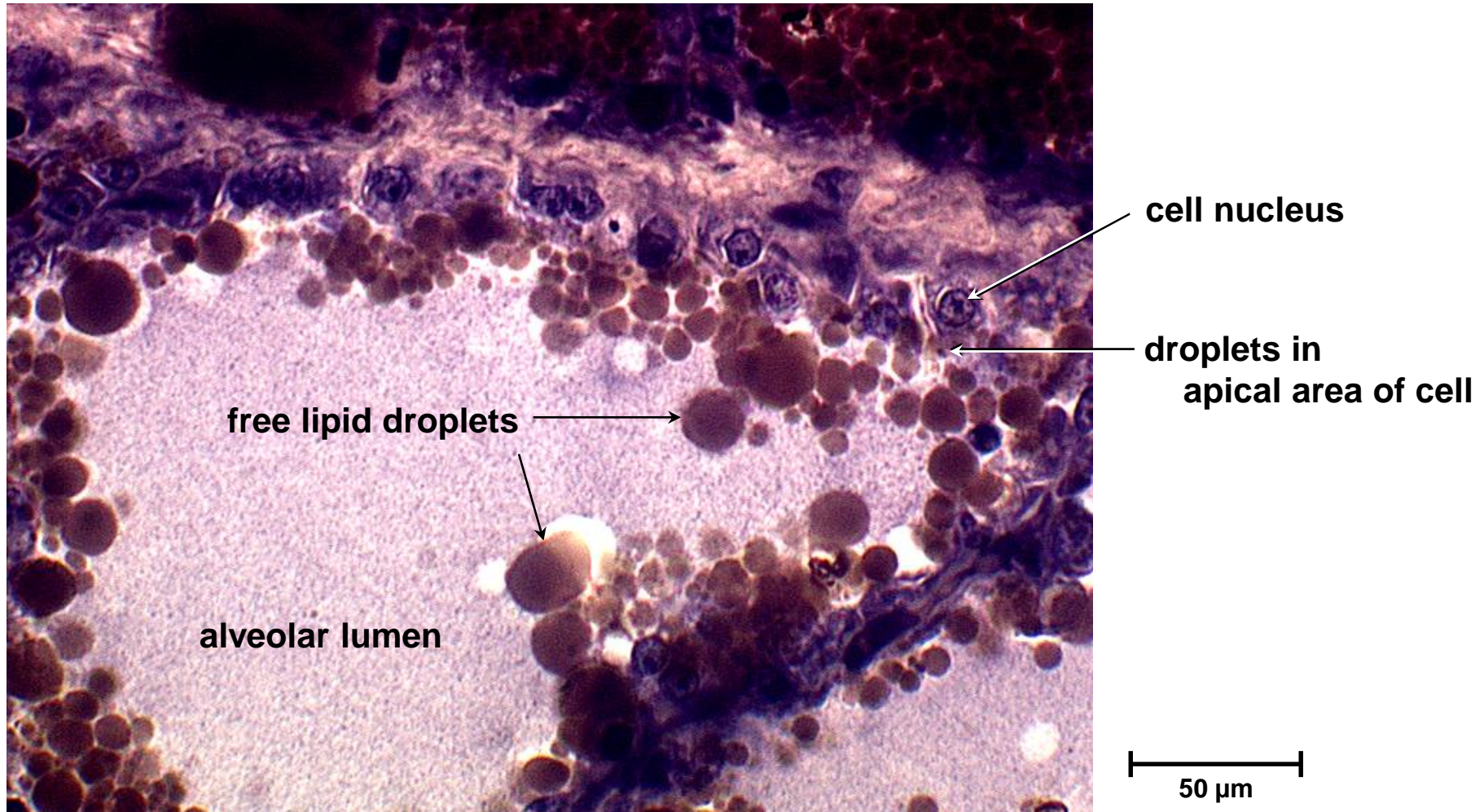
alveoli

adipocytes

100 μm

# Mammary gland – active      stained for lipid

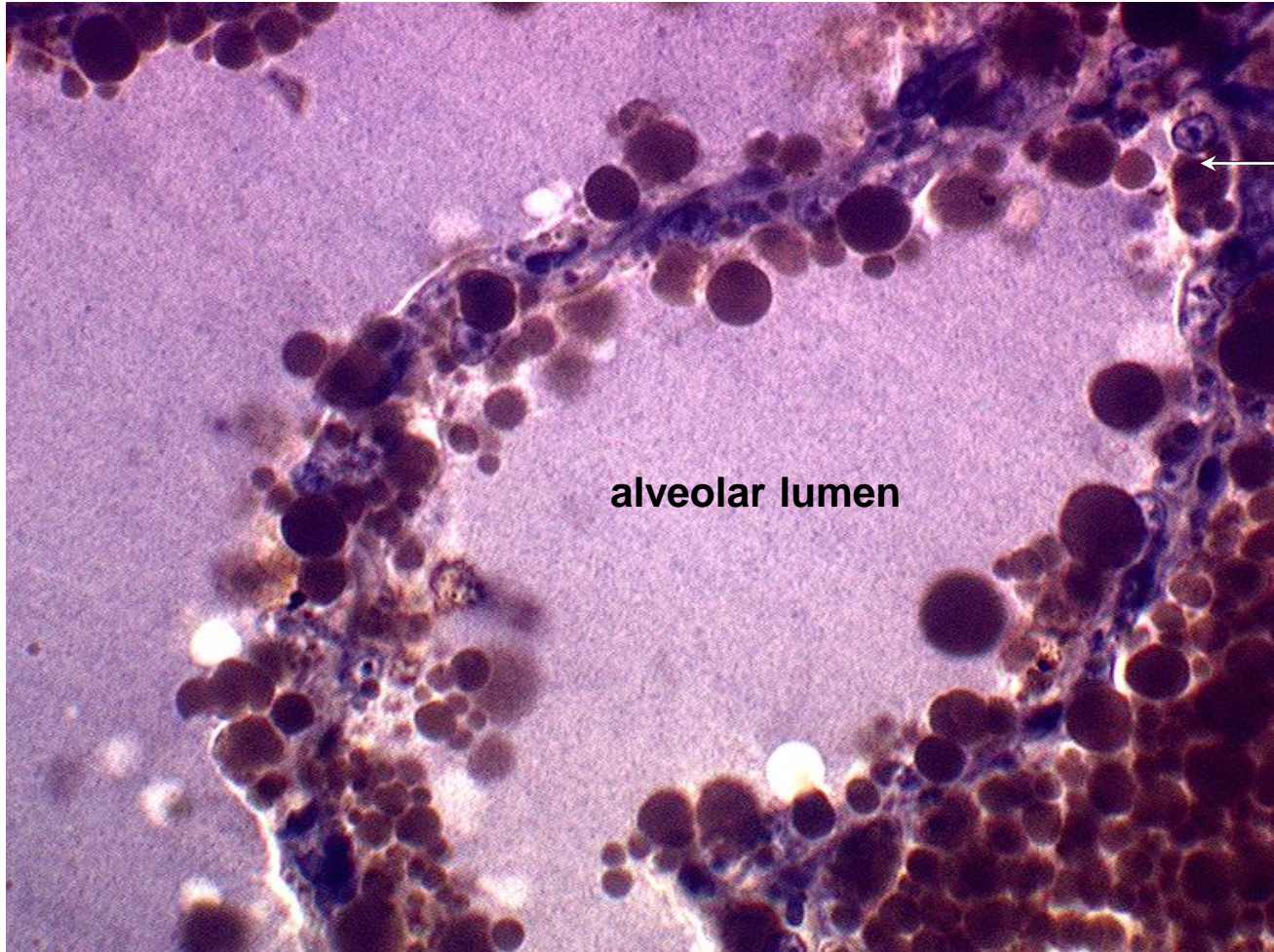
Then at still higher magnification look for fat globules in the alveoli and small globules actually in the apical parts of the alveolar epithelial cells.



# Mammary gland – active      stained for lipid

Why would a stain dissolved in water stain fat sections.

The stain is more readily soluble in the fat than in water.



lipid droplets in cell

alveolar lumen

50 μm