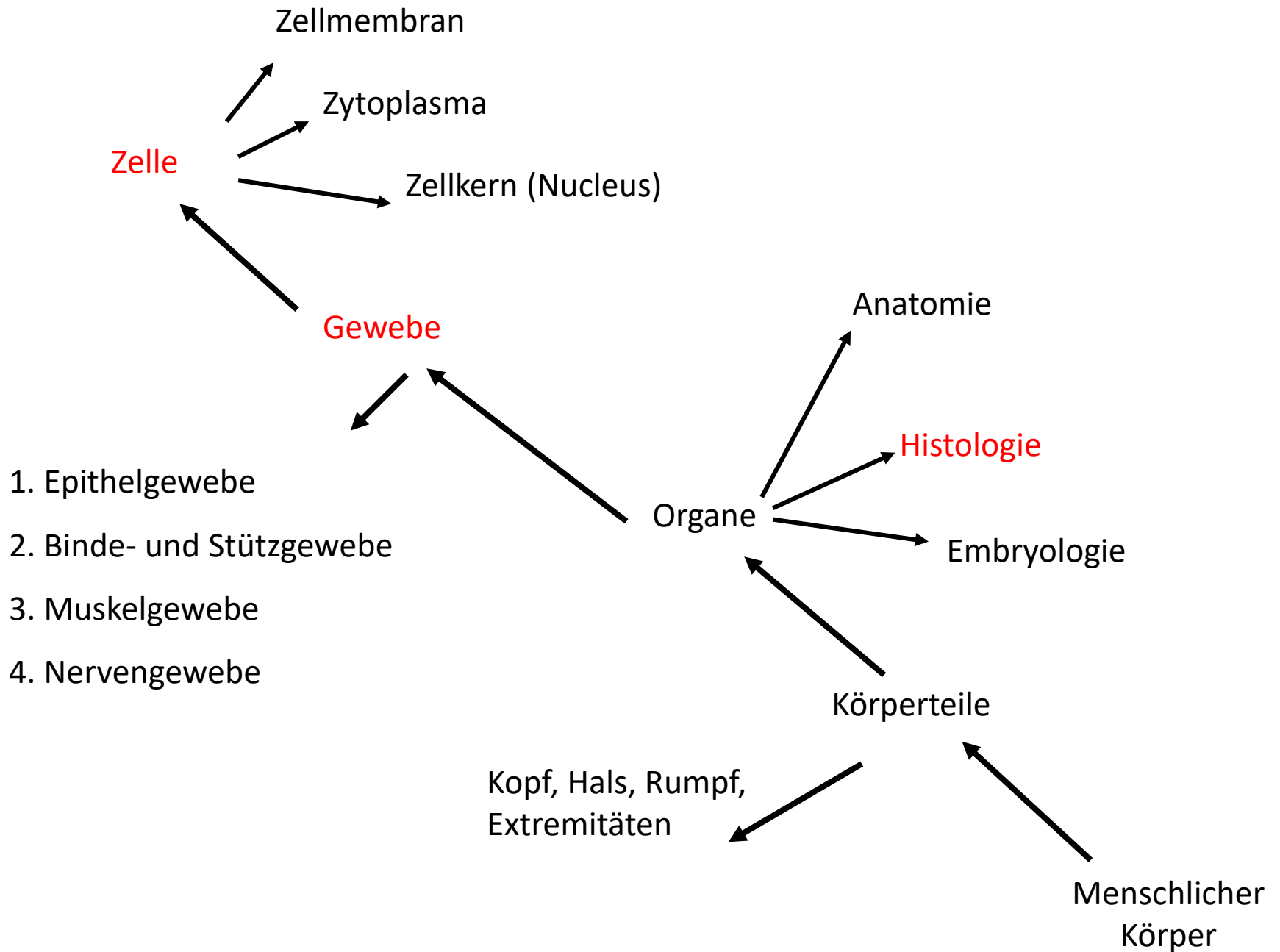


# Bindegewebe Zellen und Fasern

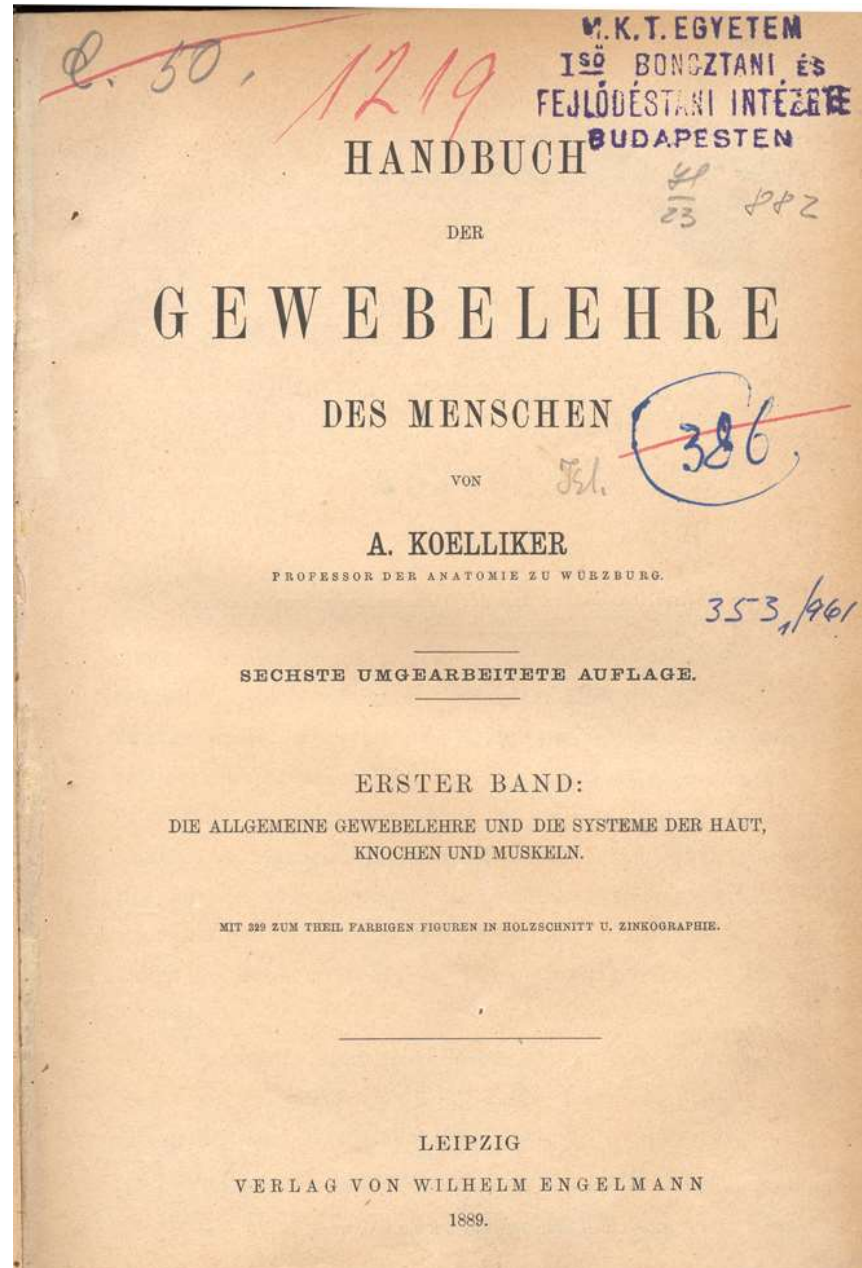
Dr. Miklós Réthelyi





1. ábra. Schwann Tivadar, az állati sejt feltalálója. Schwann 1810-ben született Neuss-ban (Poroszország), életének legnagyobb részét Liège-ben (Belgium) töltötte, hol az élettan tanára volt. Meghalt 1882-ben. Az állati sejtekről szóló korszakalkotó dolgozatát 1839-ben Berlinben, Johannes Müller intézetében készíttette.

1839



Erste Auflage: 1852

34. 11. 125V. 1

# ÁLTALÁNOS B O N C Z T A N .

ÍRTA

## MIHALKOVICS GÉZA

ORVOS-SEGÉDSZÜNETI, KÜLÉSE- ÉS SZERENGEZÉSEK,

A BUDAPESTI KIRÁLYI MAGYAR TUDOMÁNY-EGYESÜLEM A BONGCZAN ÉS FEJLŐDÉSTAN NY. B. TANÁRA  
A MÁBODIK BONGCZANI INTÉZET IGAZGATÓJA, A M. AKADEMIA MEGVÁLASZTOTT TAGJA,  
A MAGYAR ORVOSI KÖNYVKIADÓ-TÁRSULAT ELNÖKE, A TERMÉSZETTUDOMÁNYI TÁRSULAT VÁLASZTHÁNYI  
ÉS A BUDAPESTI K. ORVOSEGYLET RENDES TAGJA.

KIADTA TAGJAI SZÁMÁRA

A MAGYAR ORVOSI KÖNYVKIADÓ-TÁRSULAT.

ÖTSZÁZNEGYVENNEGY FOLTSZÁMTEL.

BUDAPEST.

FRANKLIN-TÁRSULAT KÖNYVNYOMDÁJA.

1881.

1881



1844-1899

Katalog kommt!



## Epithelzellen

Geometrische Formen

Zellen liegen neben Zellen

Bequeme Zellen

Klassische Färbung: H-E

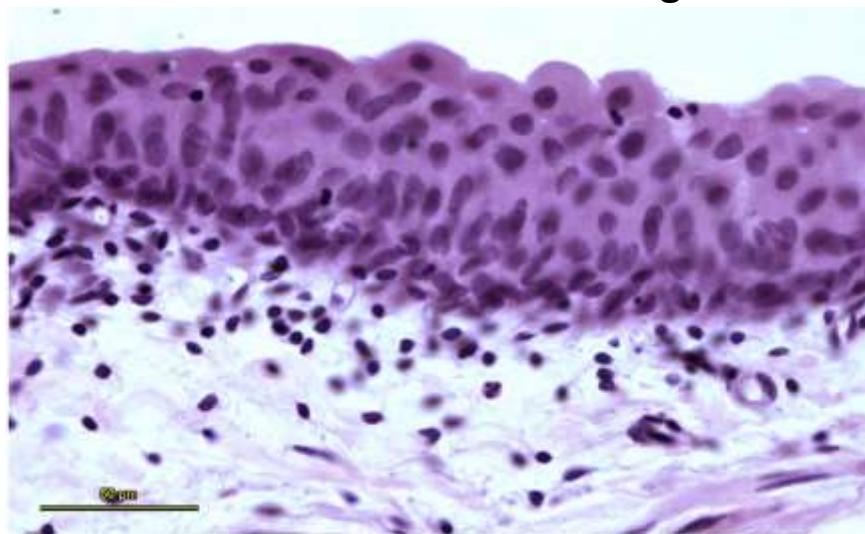
## Bindegewebezellen

Unterschiedliche Formen, oft mit Ausläufern

Zellen sind von Matrix umkreist

Viele bewegliche Zellen

Klassische Färbung: H-E + spezifische Färbungen



## Spezielle Färbungen

Färbung	Farbstoff	Ergebniss
Allgemein	hematoxylin - eosin	nucleus (blau) cytoplasma, Bindegewebe Fasern (rosarot)
Elastische Fasern	orcein resorcinfuchsin	elastische Fasern (lila) elastische Fasern (blau)
Versilberung	Silbernitrat ( $\text{AgNO}_3$ )	Retikulinfasern (schwarz)
Fett	Sudanrot	Fettzellen (orange)
Van Gieson Färbung	Fuchsinsäure Pikrinsäure	Kollagenfasern (rot) elastische Fasern (gelb)
Azan Färbung	Azokarmin Anilinblau	Epithelgewebe (rot) Bindegewebe (blau)

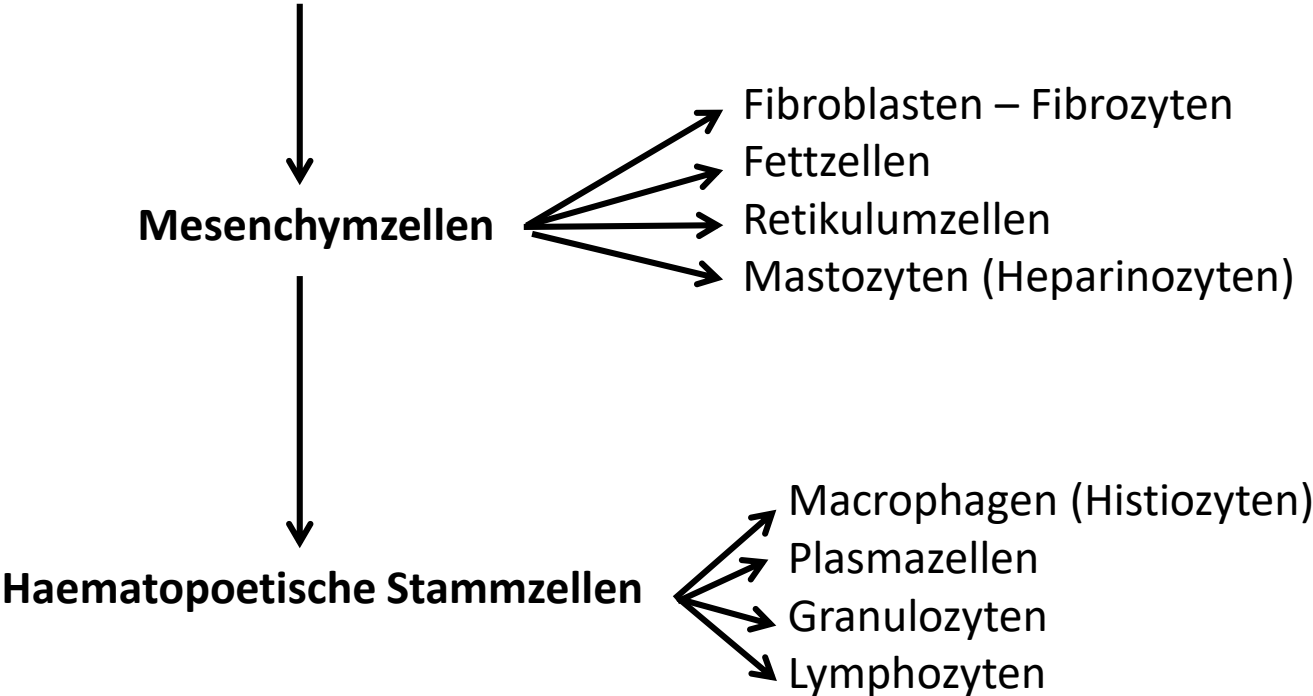


# Herkunft der Bindegewebezellen

**Ectoderm**

Das mittlere Keimblatt: **Mesoderm**

**Endoderm**



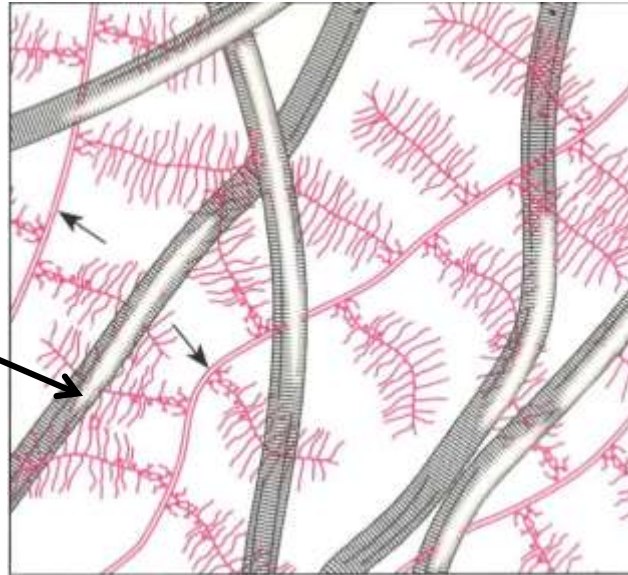
# Bindegewebematrix

## Bindegewebefasern

Kollagenfasern

Elastische Fasern

Retikuläre Fasern

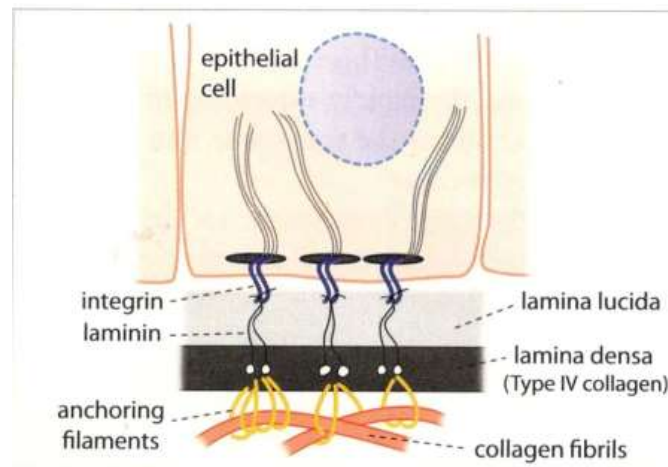


## Grundsubstanz

Flüssigkeit

Große Moleküle

Proteoglykane

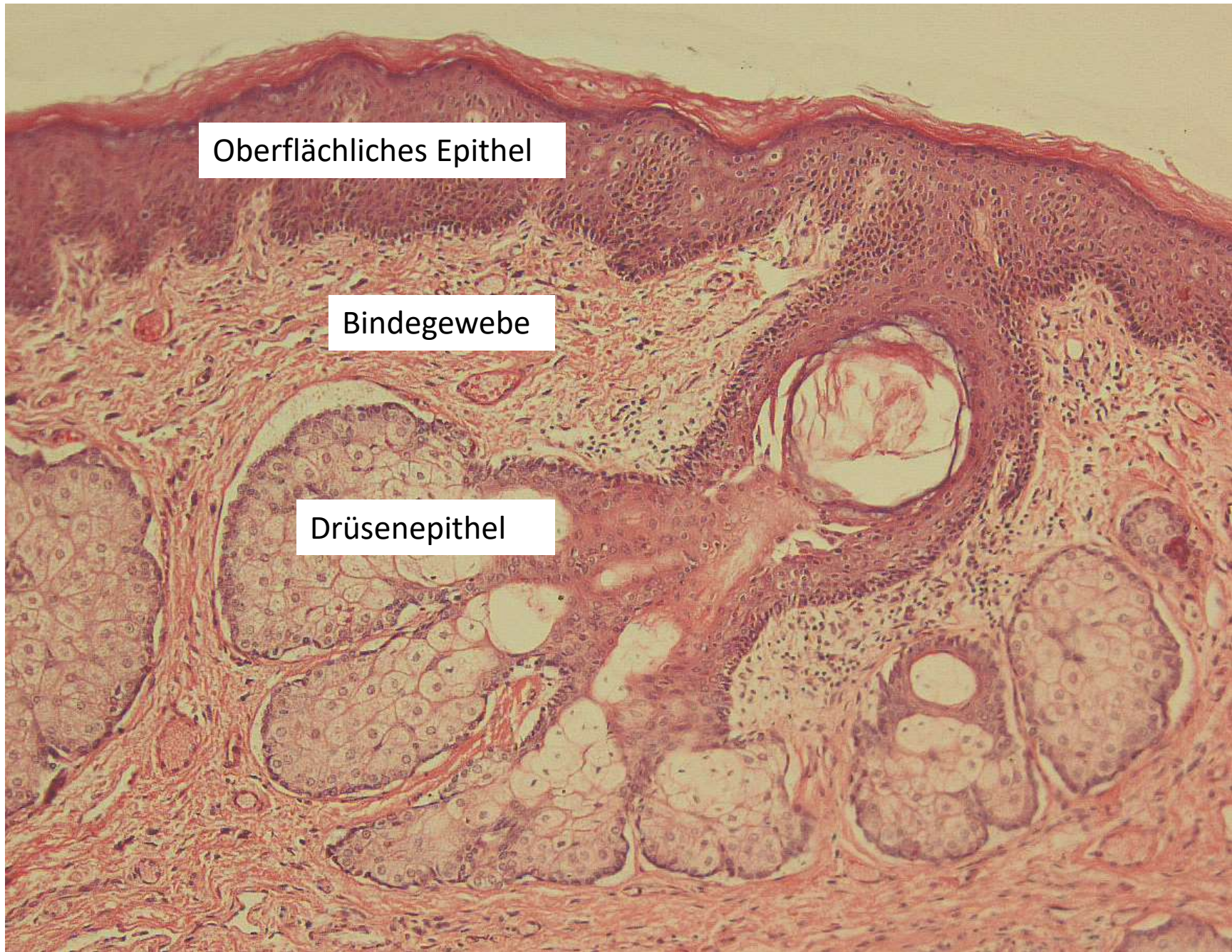


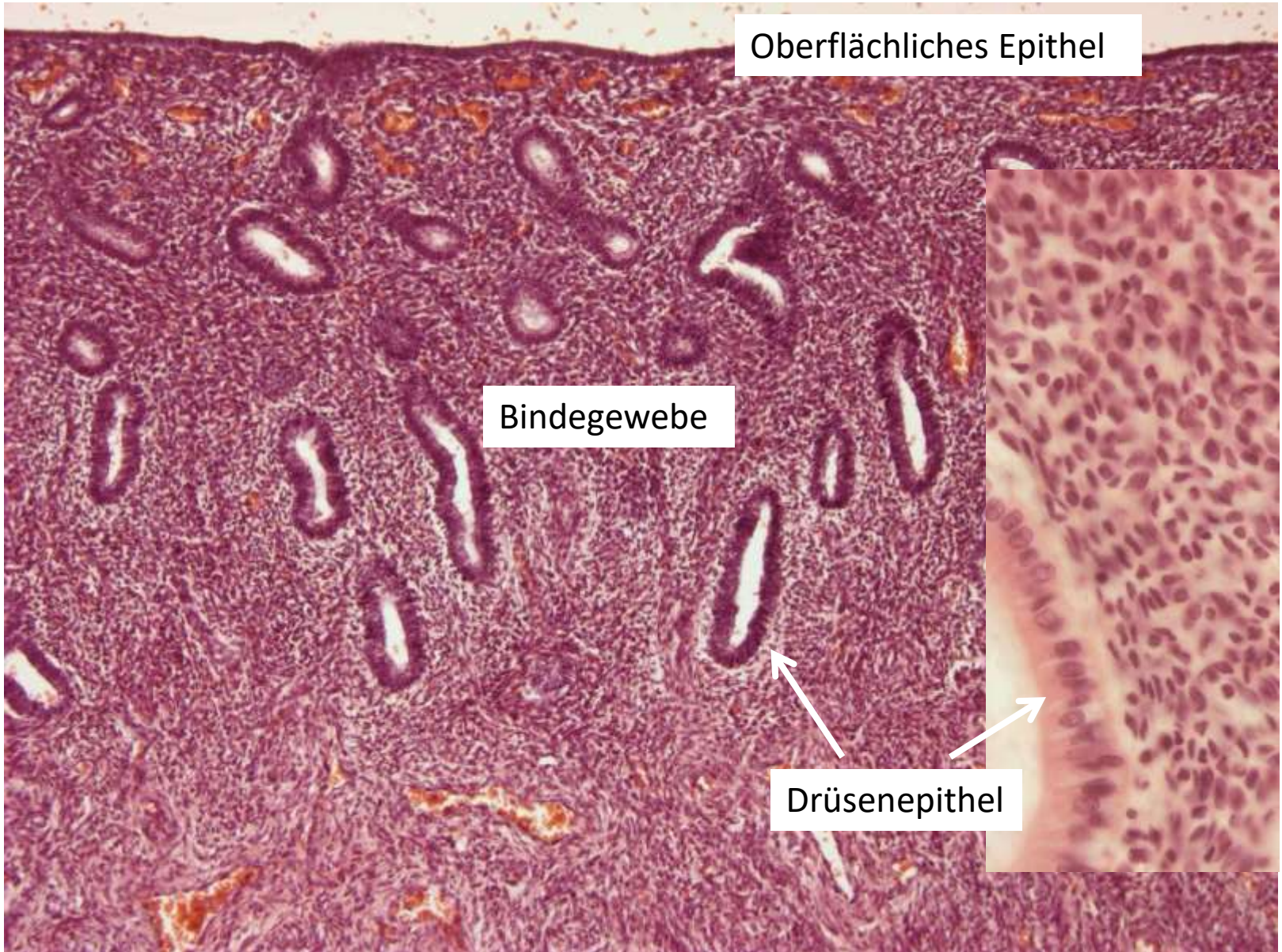
Glykoproteine  
(Laminin, Nektin)

Oberflächliches Epithel

Bindegewebe

Drüsenepithel





Oberflächliches Epithel

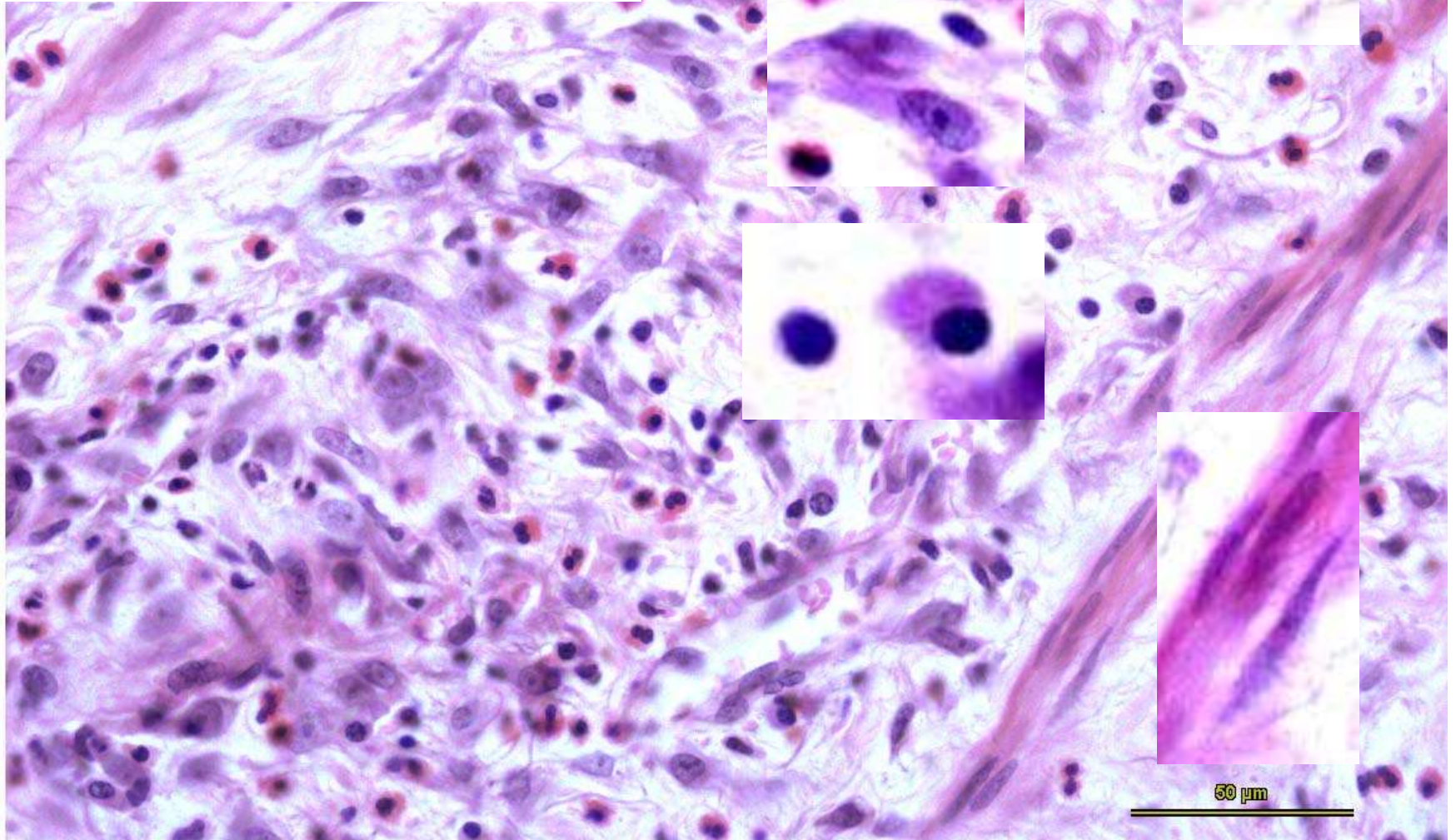
Bindegewebe

Drüsenepithel

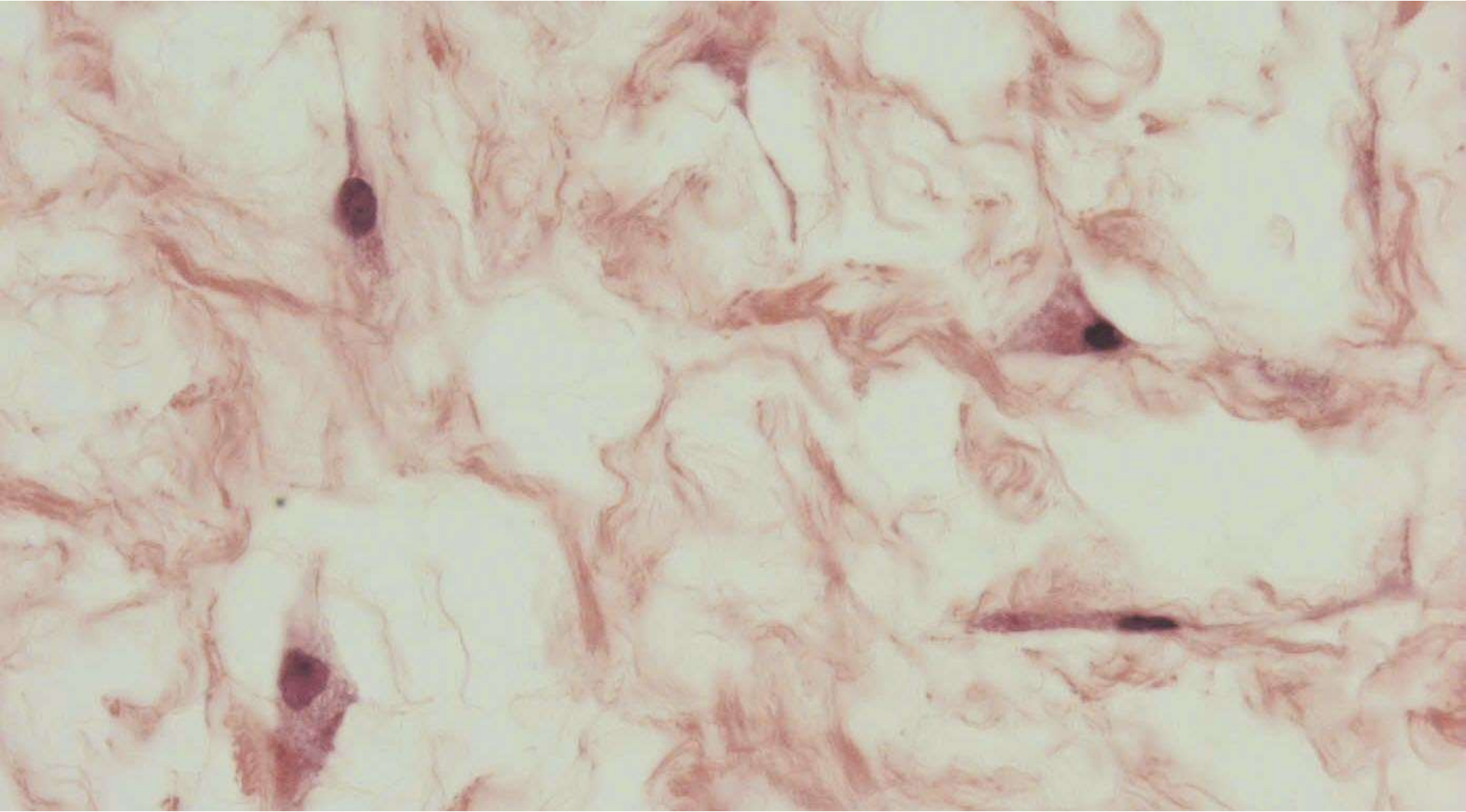
Zellen

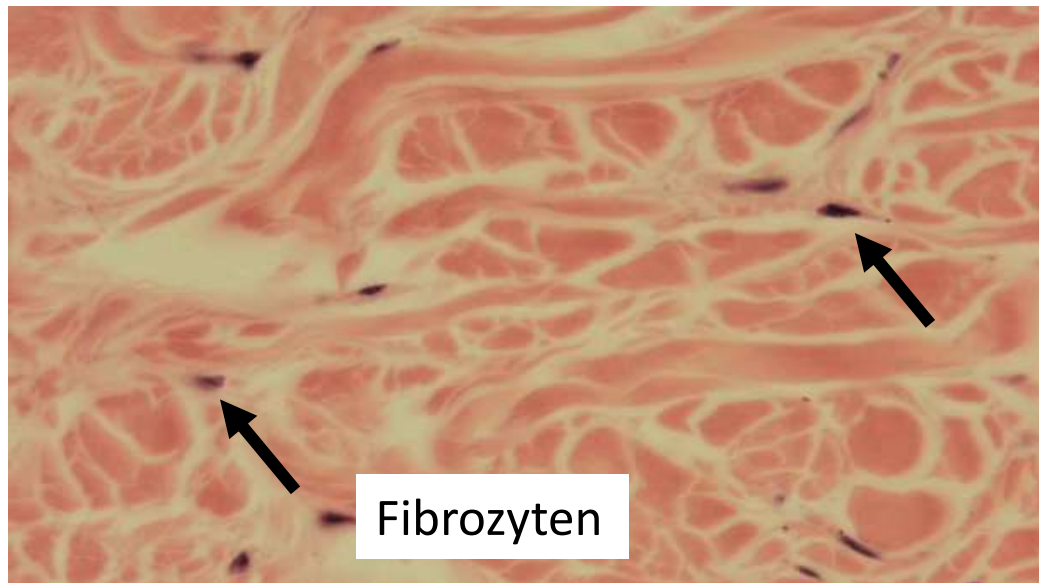
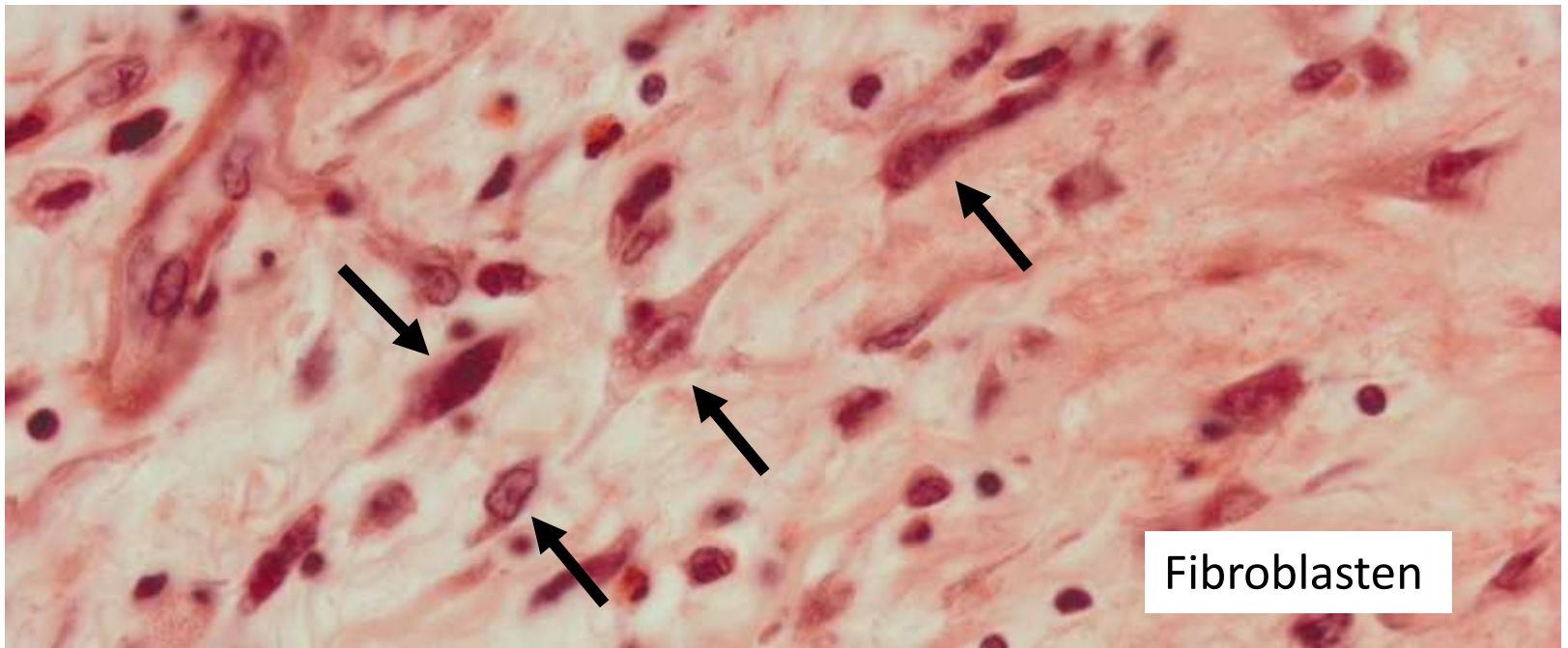
## Beschreibung der Zellen

- Größe und Form der Zellen
- Form und Lage des Zellkerns
- Die Färbung des Zellkerns, Nucleolus
- Die Färbung des Zytoplasma



Undifferenzierte Mesenchymzellen

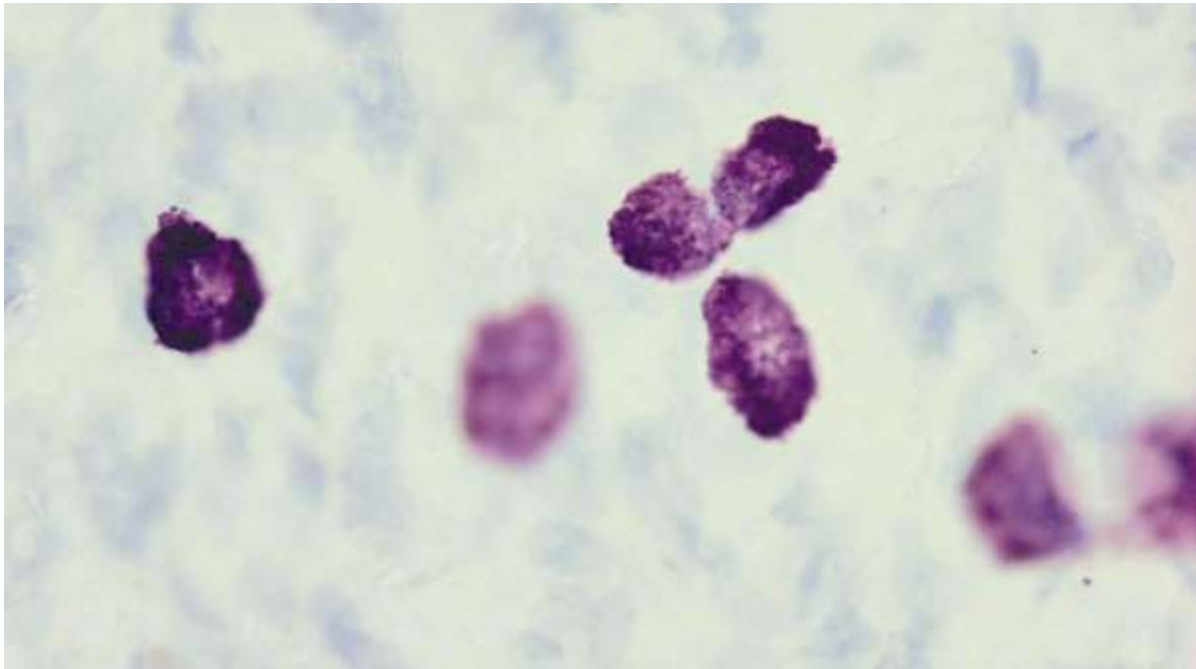




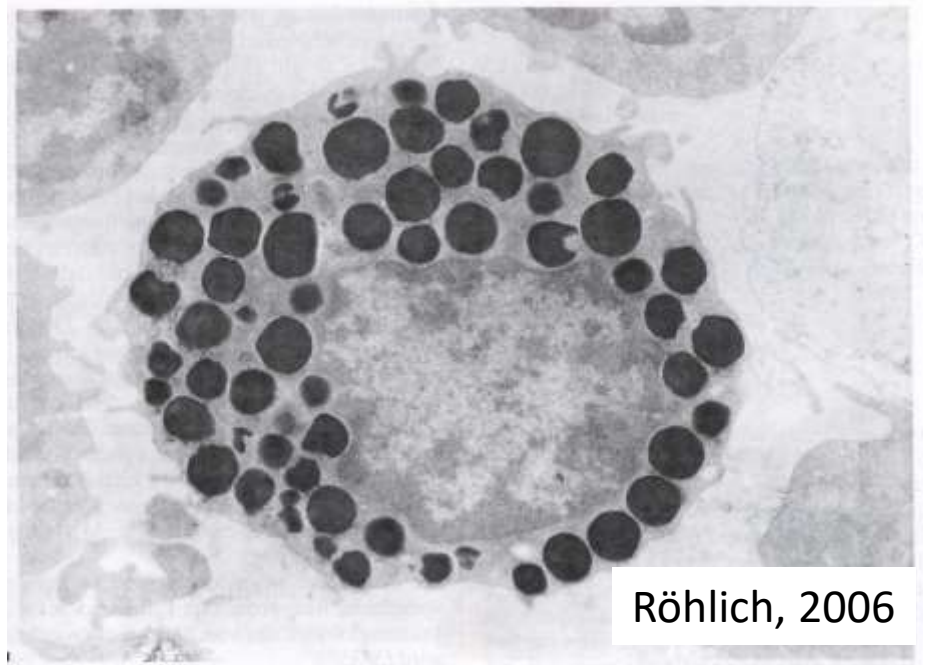


# Retikulumzellen



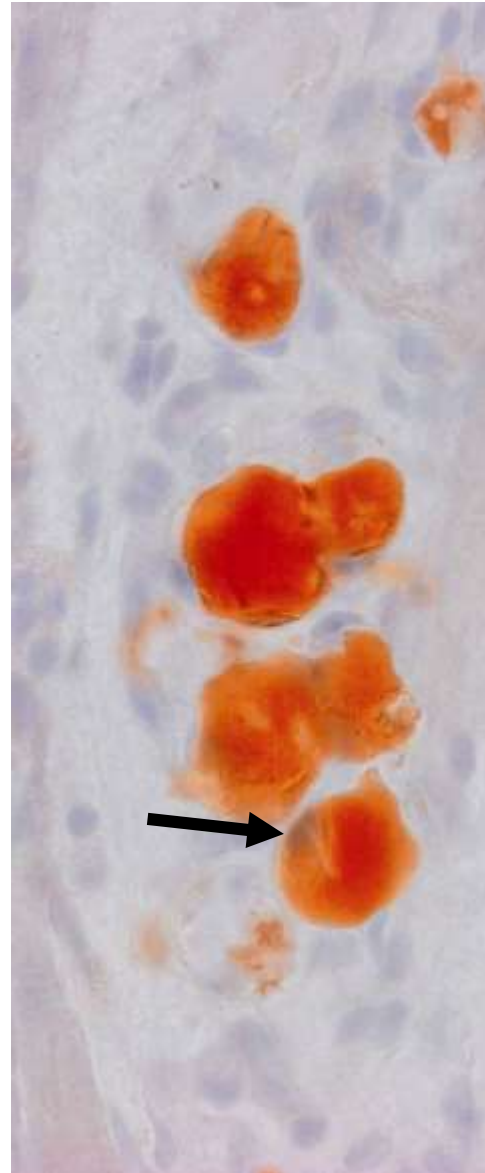
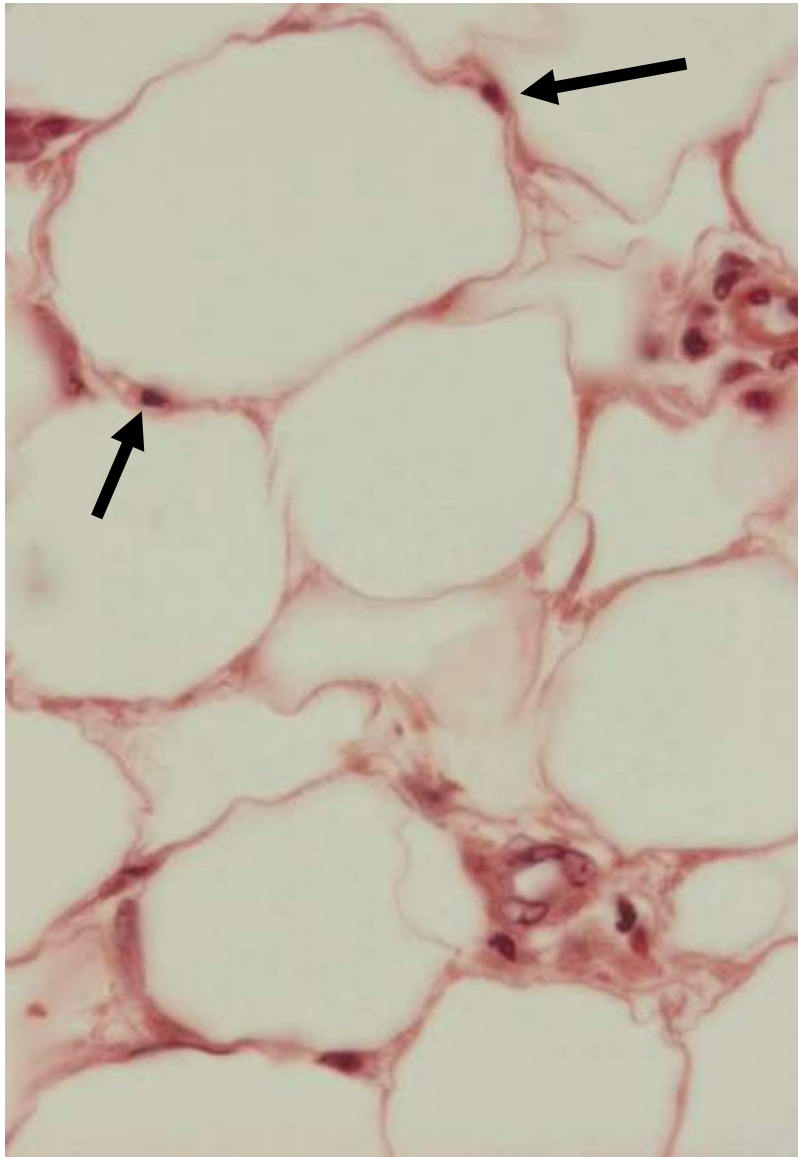


**Mastozyten**

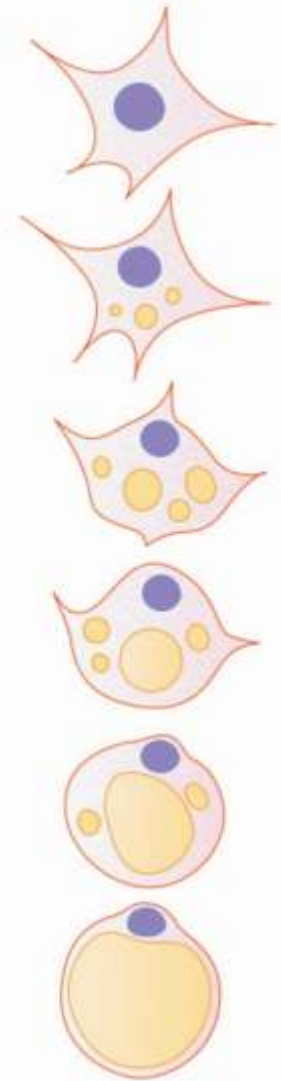


Röhlich, 2006

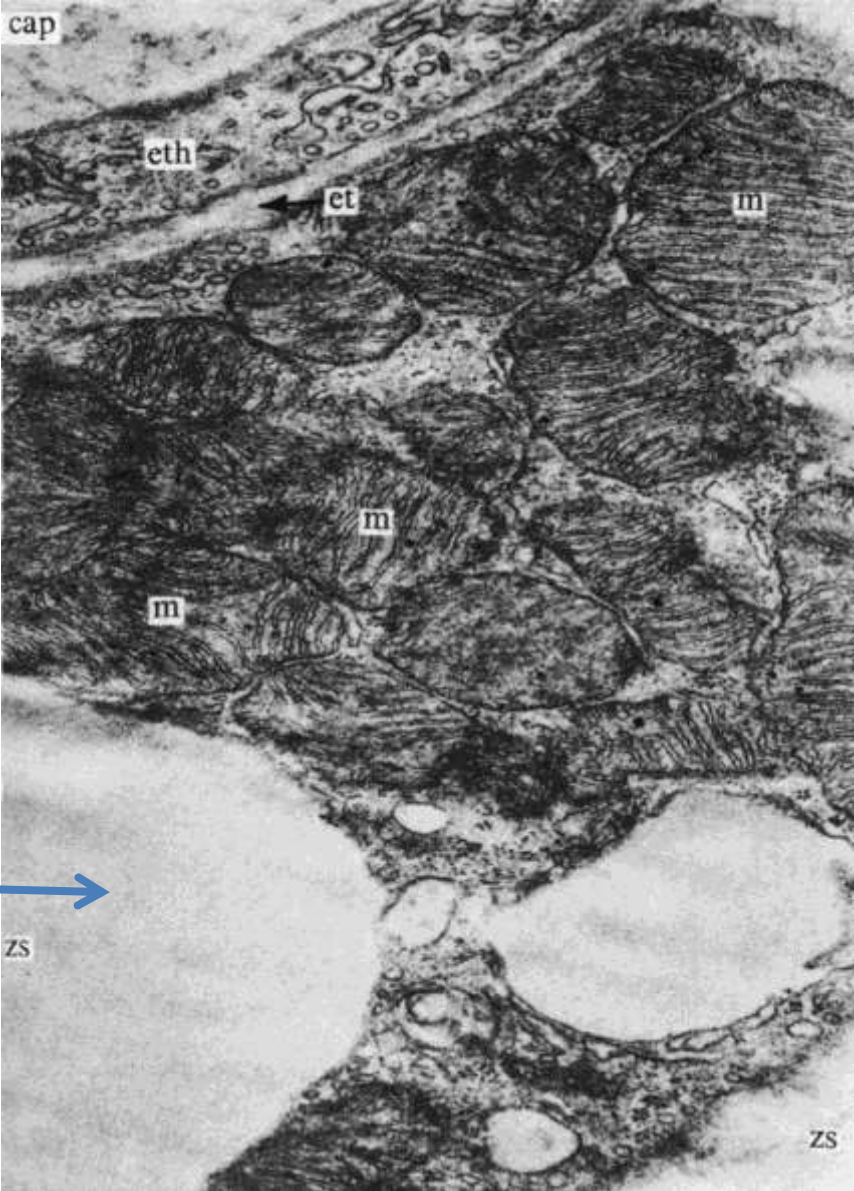
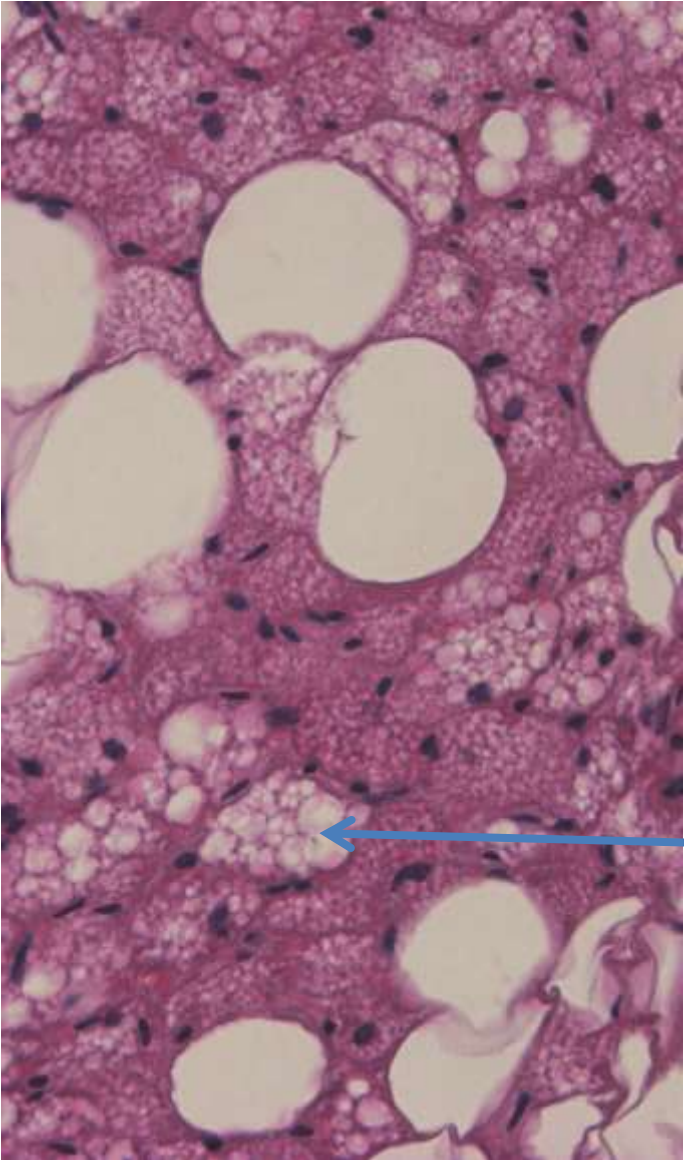
Adipozyten (Fettzellen)

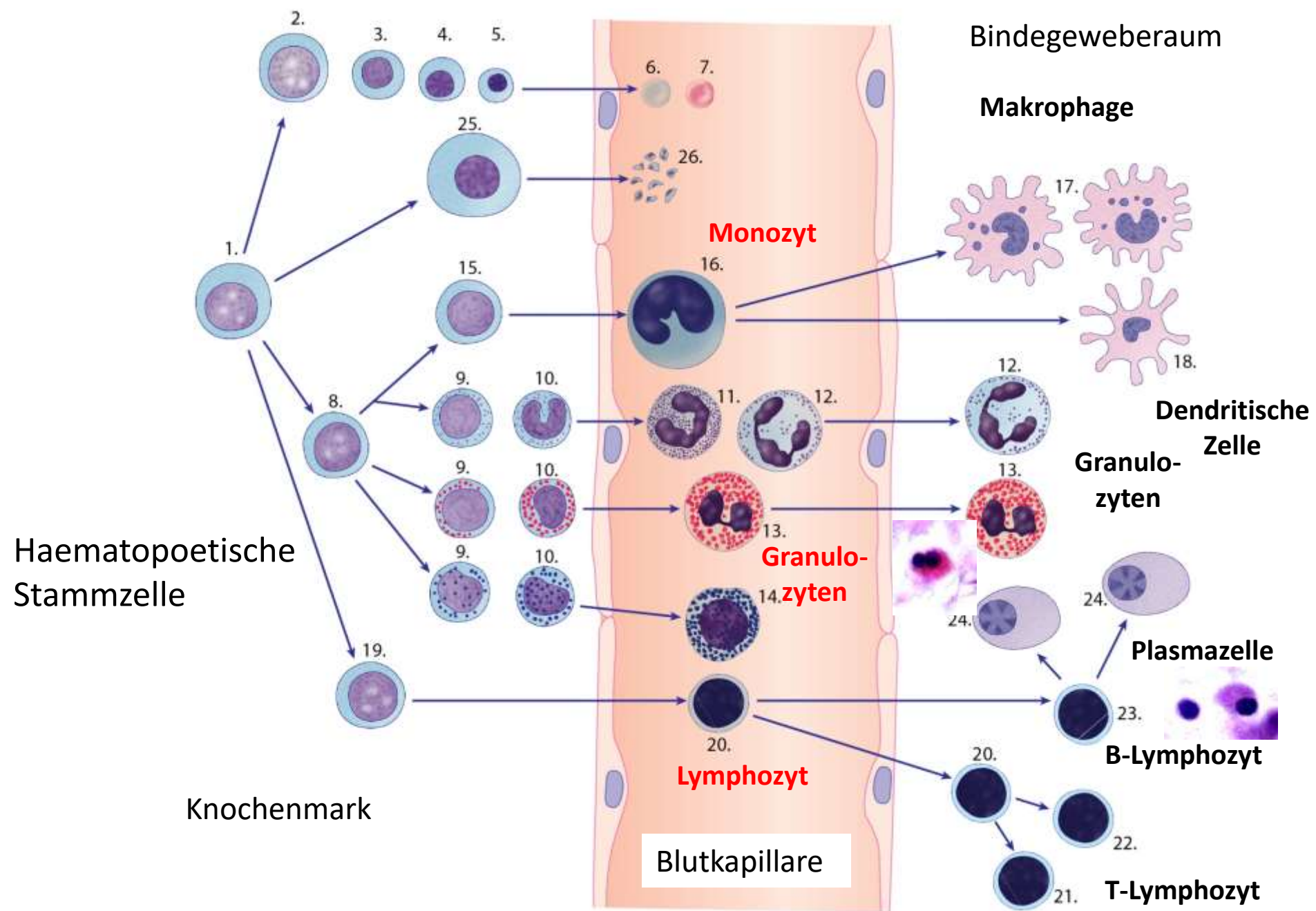


Mesenchymzelle

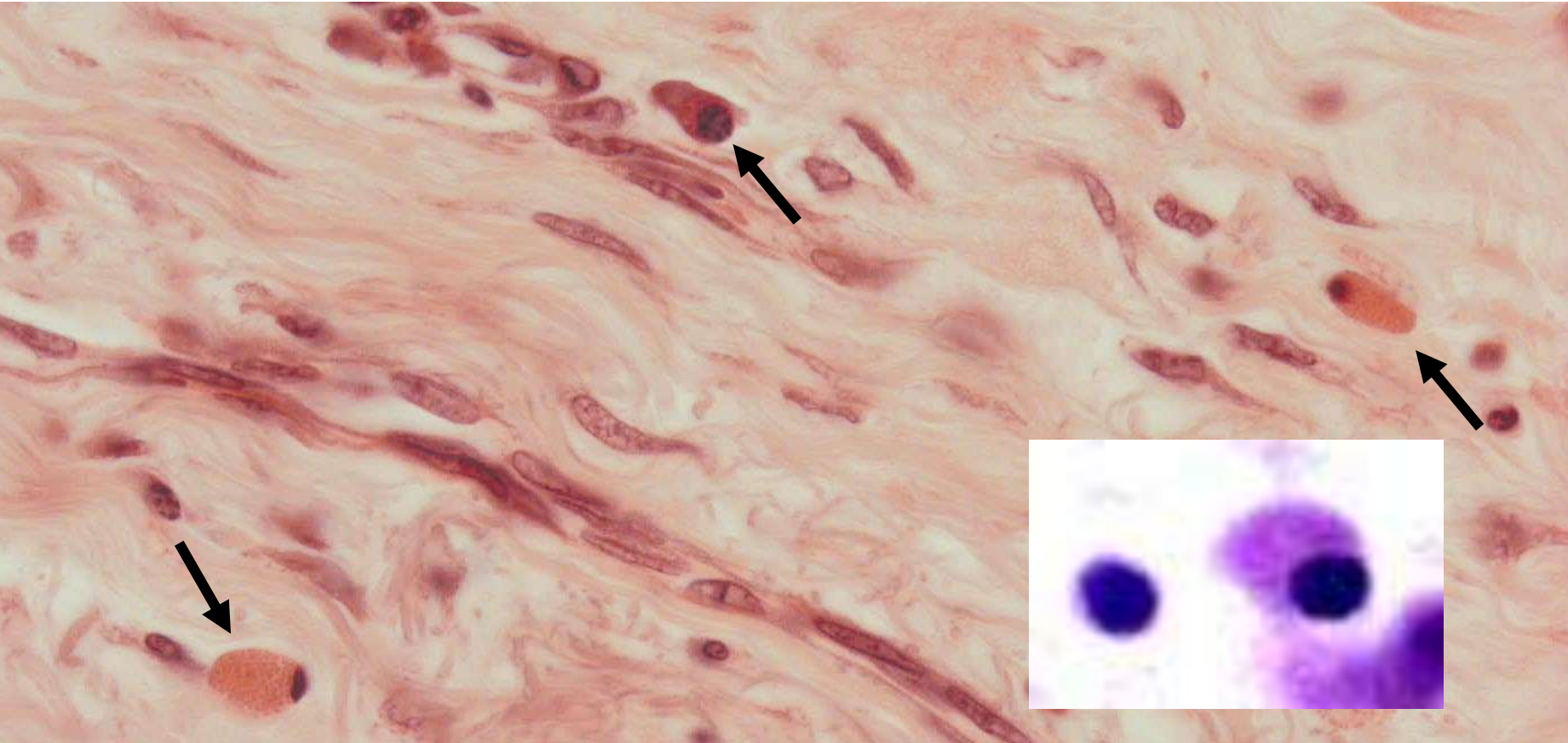


# Braune Fettzellen

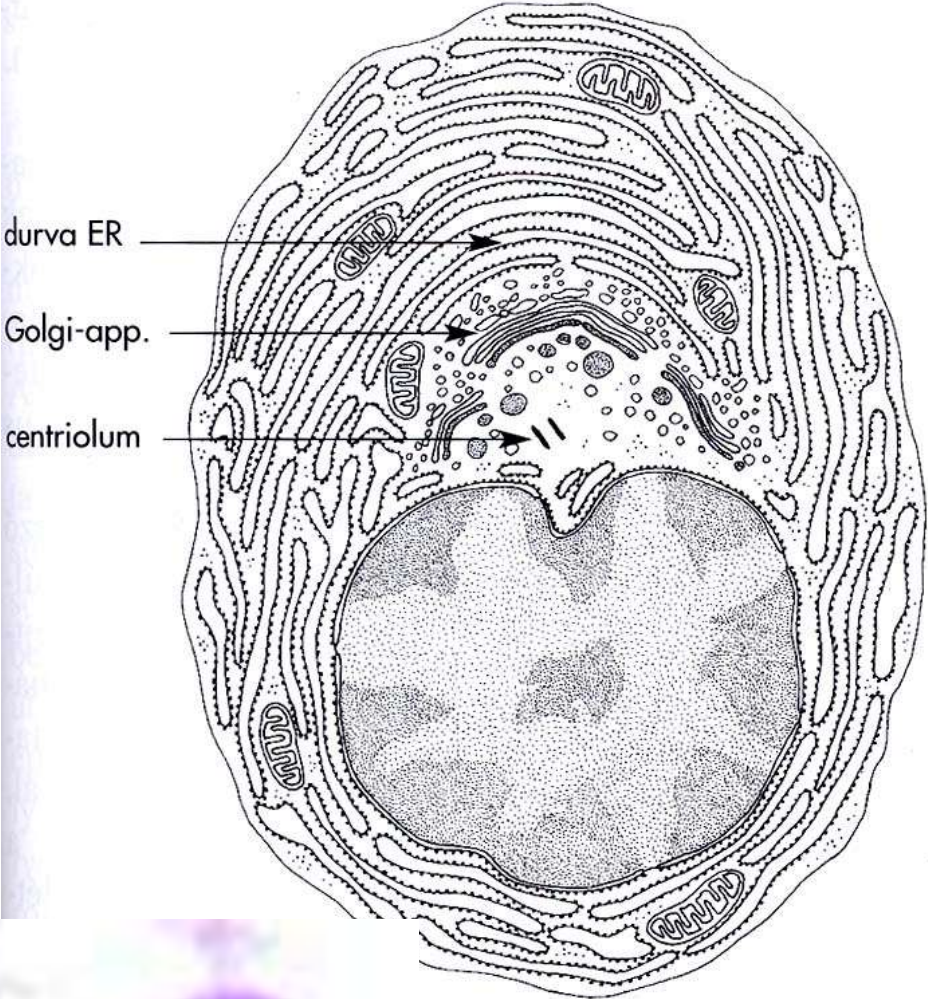
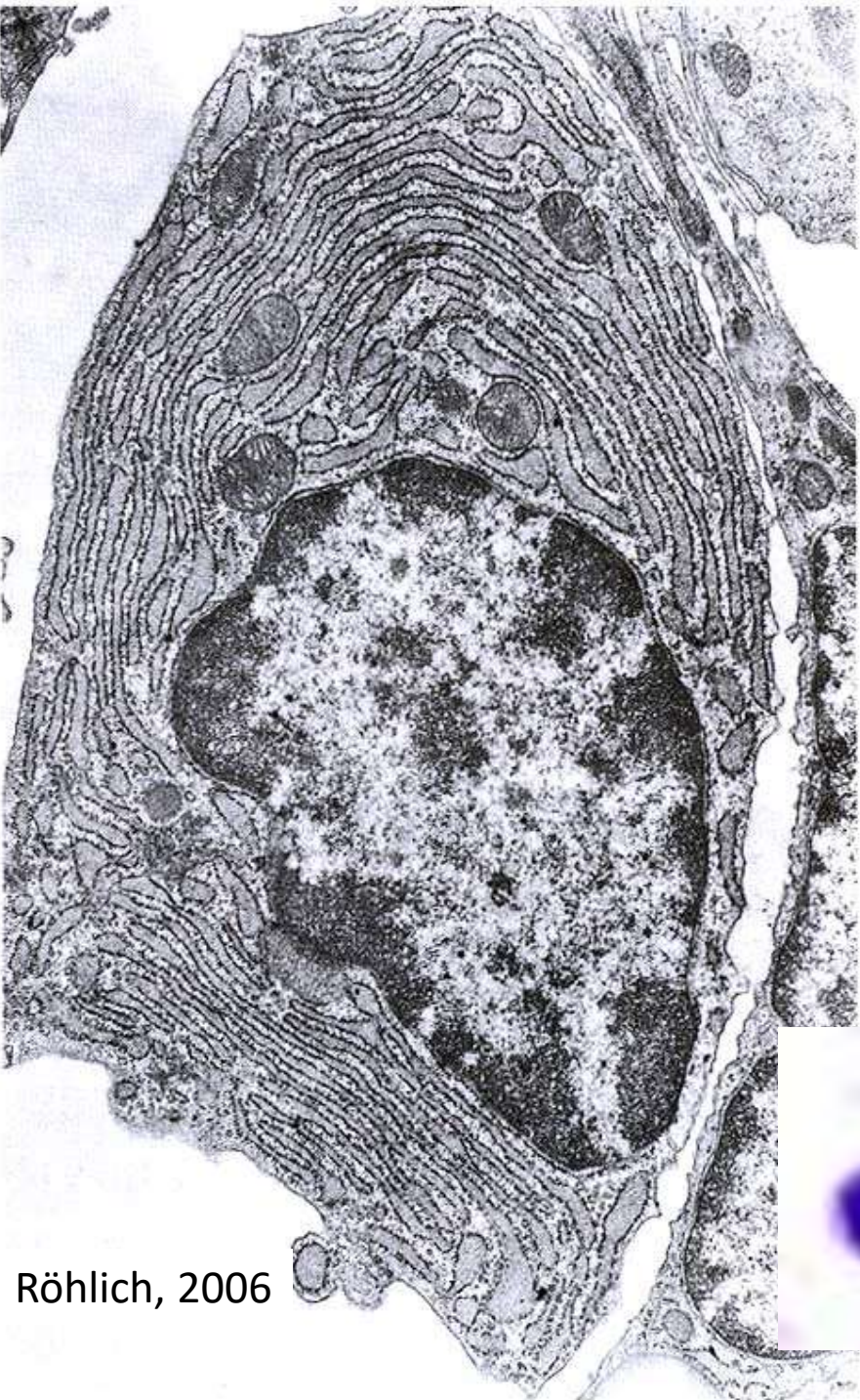




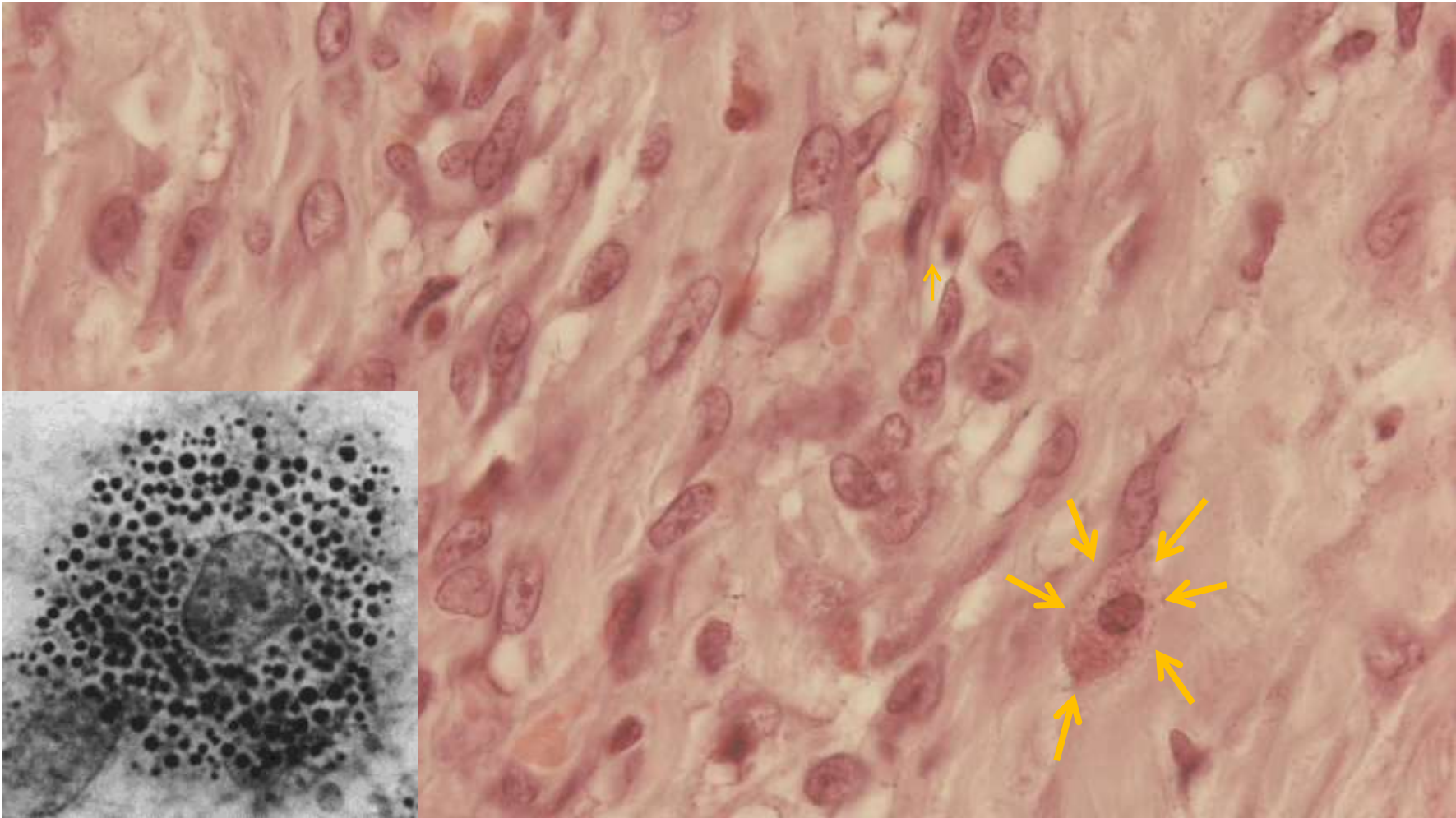
Plasmazellen



# Plasmazellen



# Histiozyt (Makrophage)





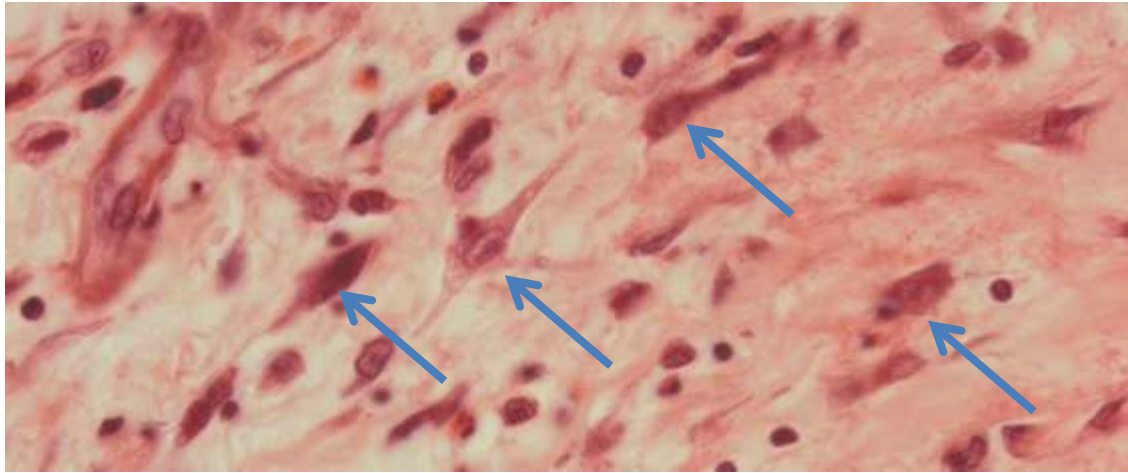
**Macrophage (Histiozyt)**



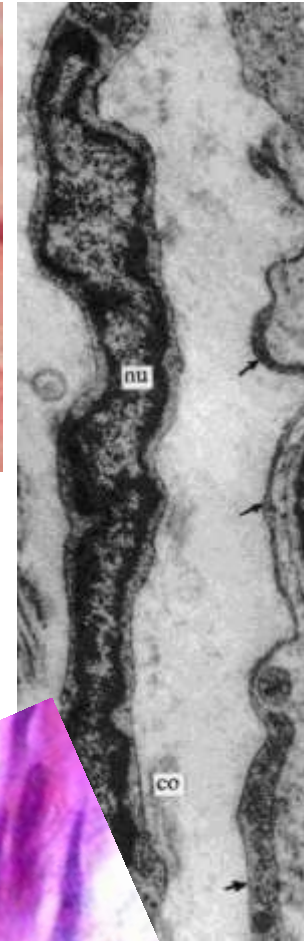
Röhlich, 2006

Fasern

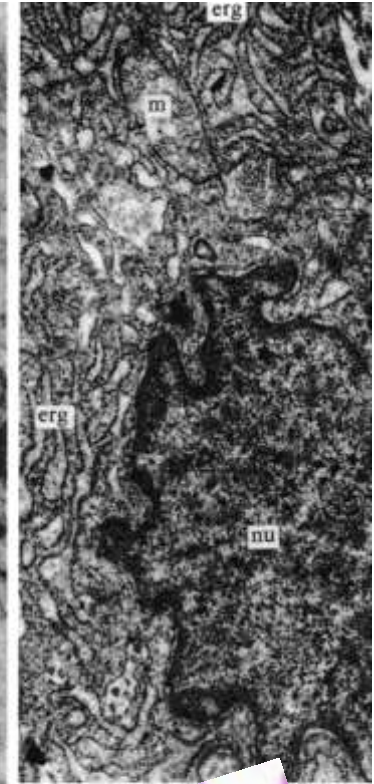
Fibroblast



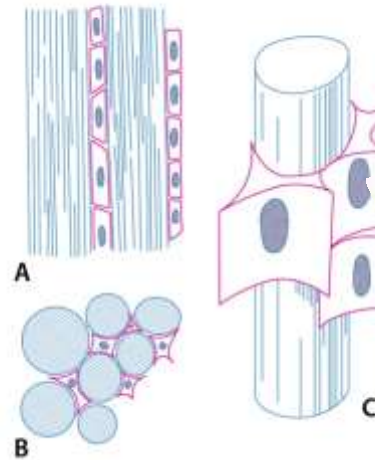
Fibrozyt



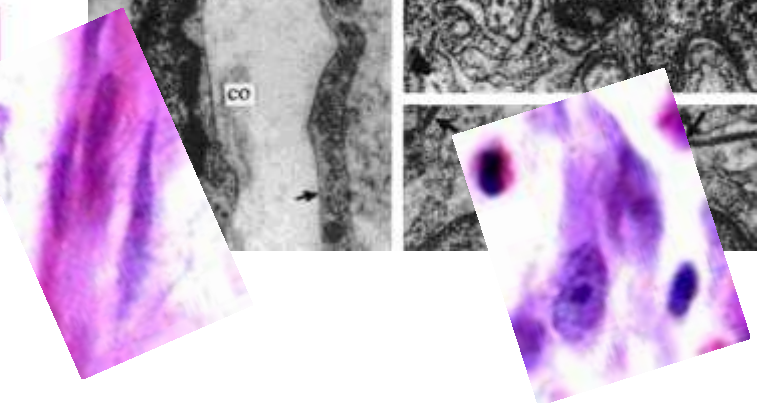
Fibroblast



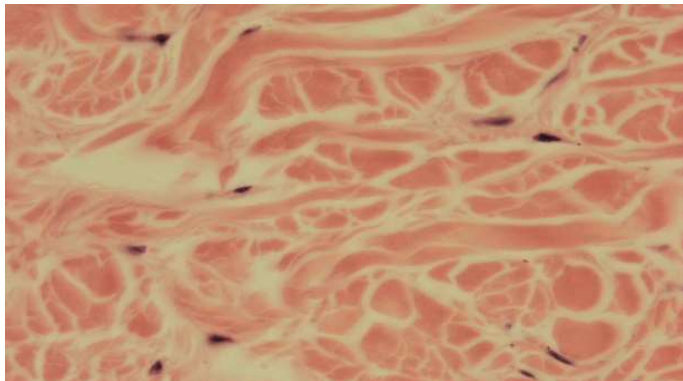
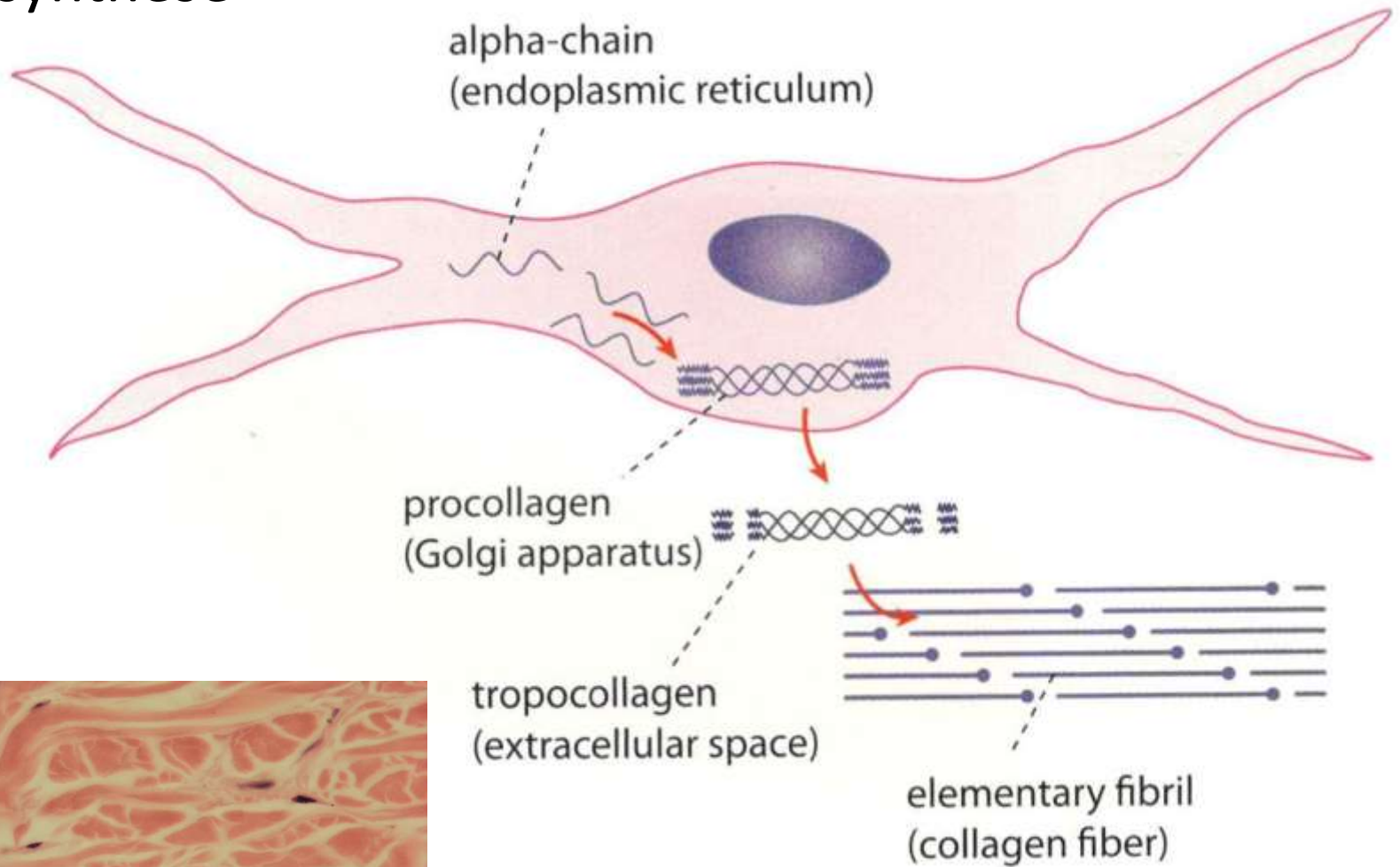
Kollagenfasern, Fibrozyten



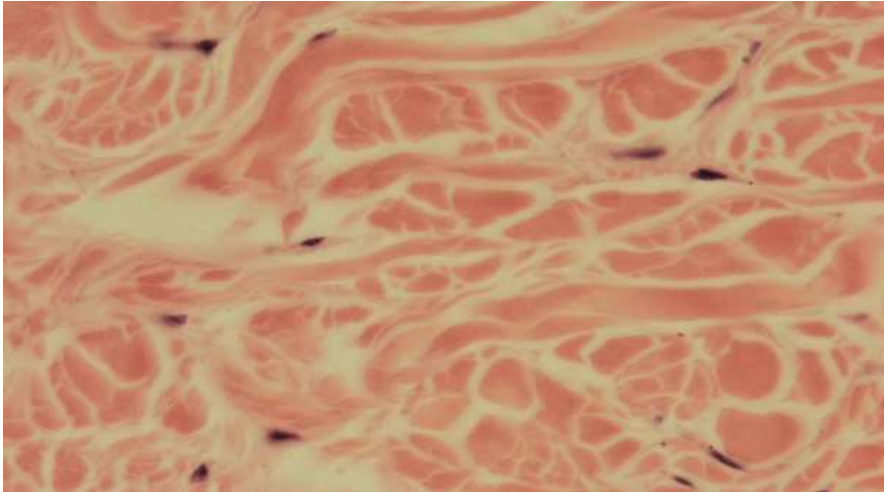
Flügelzellen



# Fasersynthese



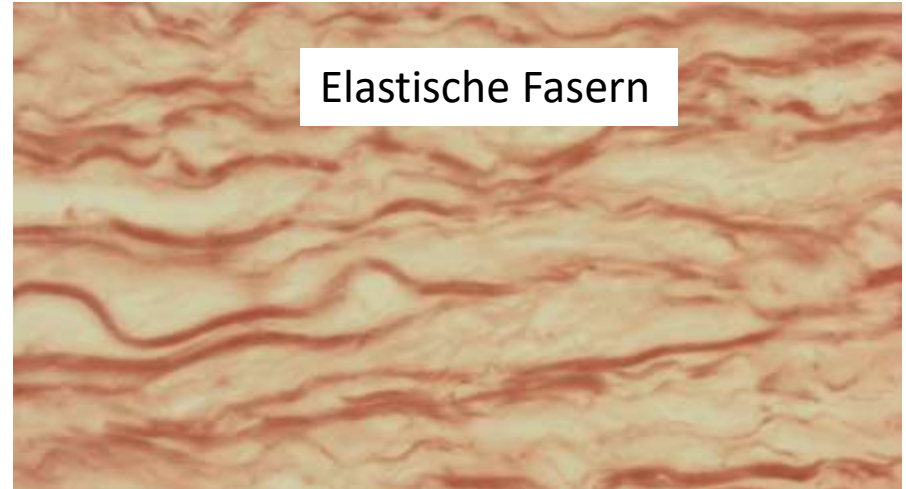
Kollagenfasern



Elastische Fasern



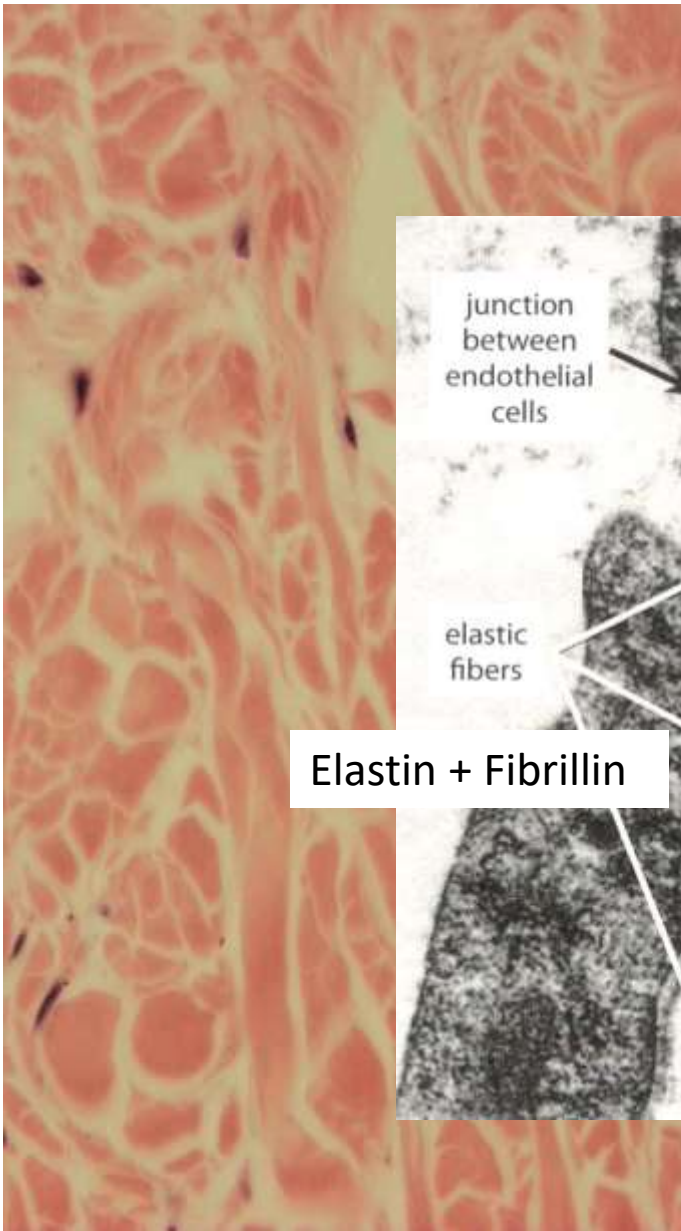
Elastische Fasern



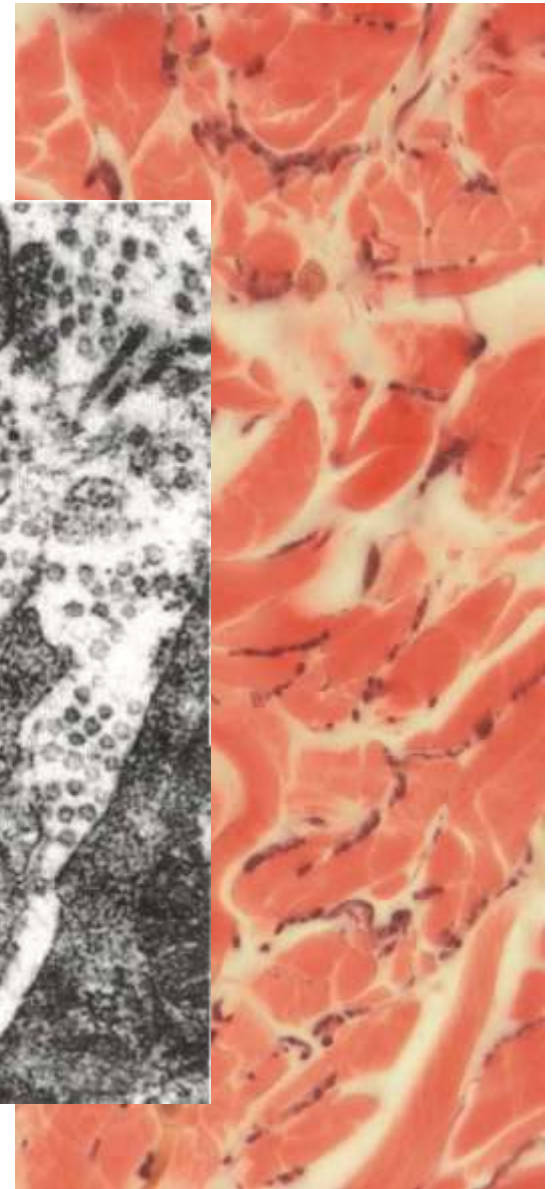
Retikuläre Fasern



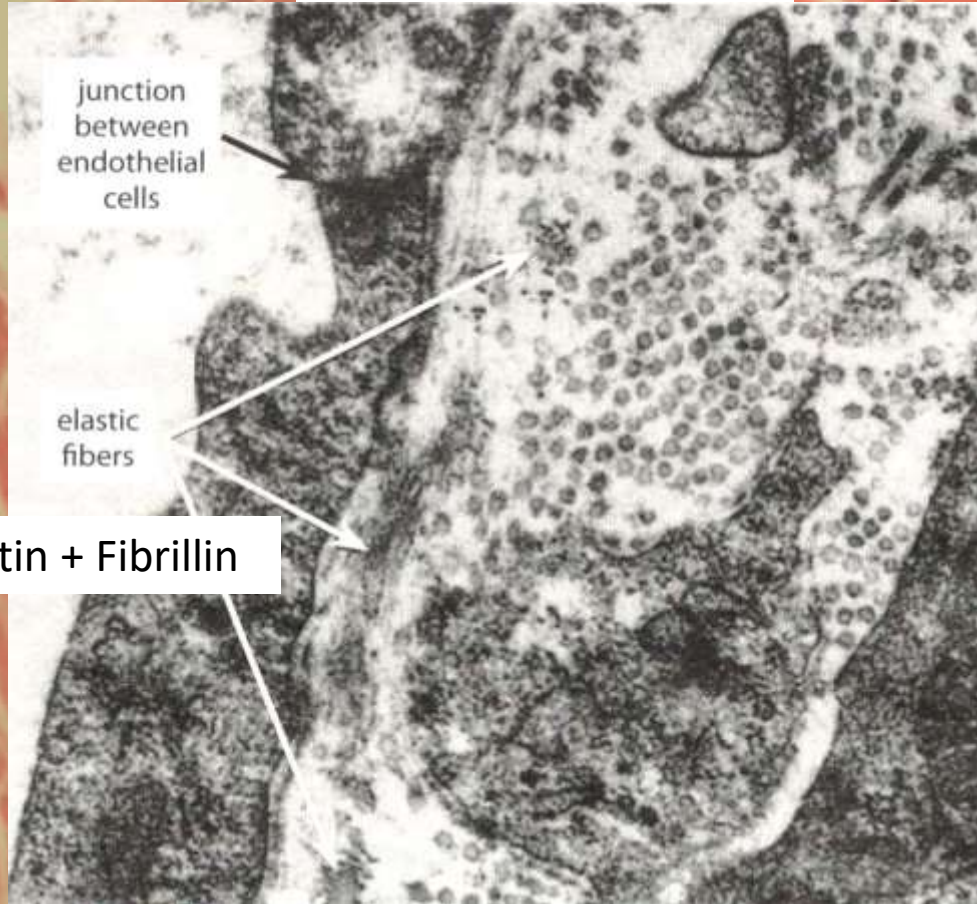
Kollagen und elastische Fasern



Kollagenfasern H-E



Kollagen- und elastische Fasern



Haut

# Typen des Kollagens

## Fibrilläre Kollagene

Typ I. – im Allgemeinen

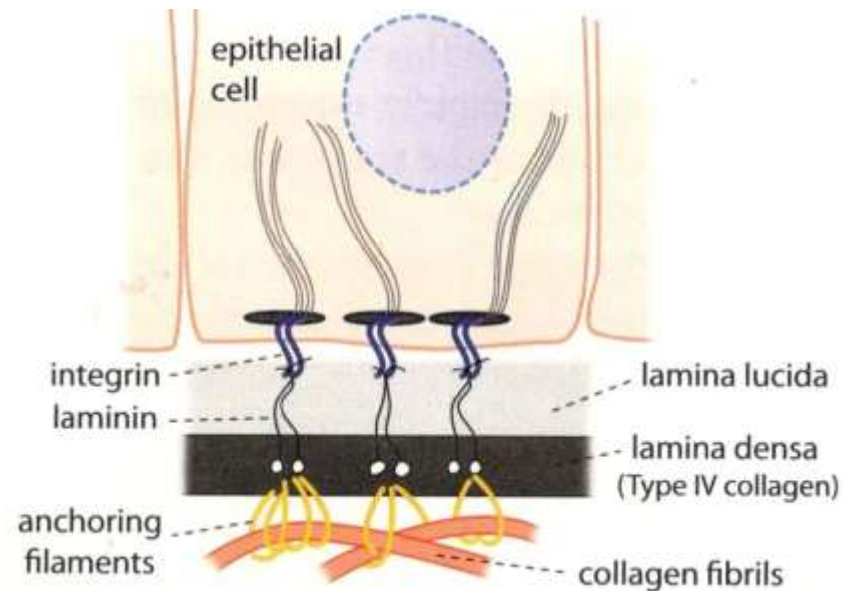
Typ II. - Hyalinknorpel

Typ III. – Retikuläre Fasern

## Netzbildende Kollagene

Typ IV – Lamina basalis

Typ VII – Zwischen Lamina basalis und Retikuläre Fasern



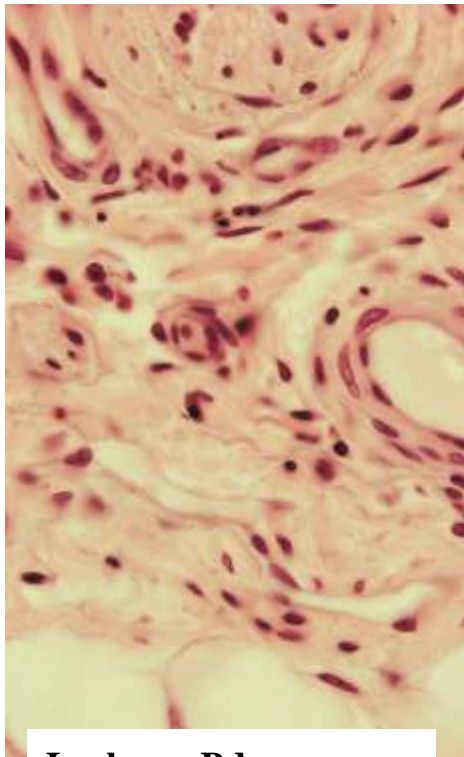
Typ VII

Typ III

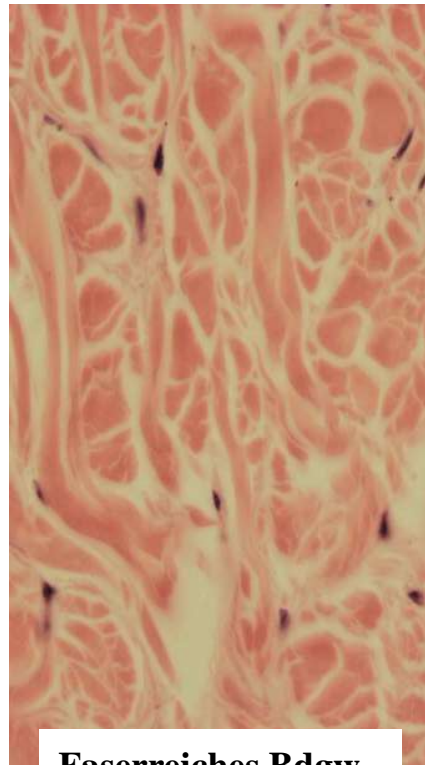
# Bindegewebearten



Name	Zellen	Interzellulärer Raum	Fasern	Vorkommnis
<b>Lockeres Bdgw.</b>	Fibrozyten, Makrophagen, Mastzellen	Bedeutend (Wasserraum)	Kollegen- und elastische Fasern	Füllt den Raum zwischen Organen. Führt die Gefäße, besonders die Kapillaren
<b>Straffes Bdgw.</b>	Fibrozyten (Tendinozyten)	Reduziert	Kollagenfasern	Parallel orientiert: Sehne, Gelenkbänder, Organkapsel. Plattenartig: Kornea
<b>Elastisches Bdgw.</b>	Fibrozyten	Reduziert	Elastische Fasern	Elastische Bänder (Lig. nuchae)



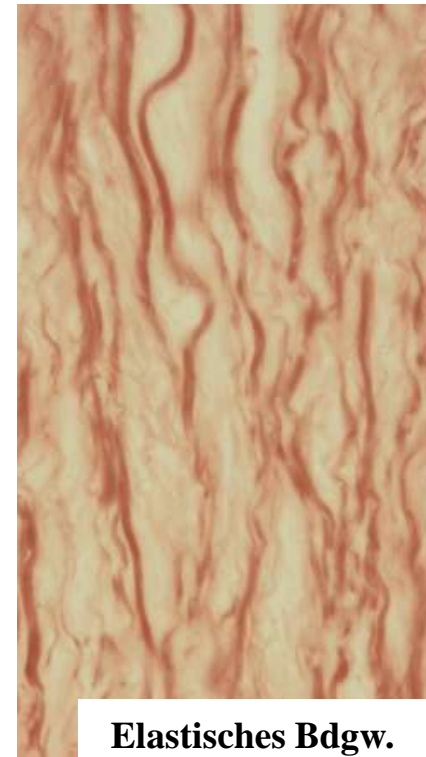
**Lockeres Bdgw.**



**Faserreiches Bdgw.**



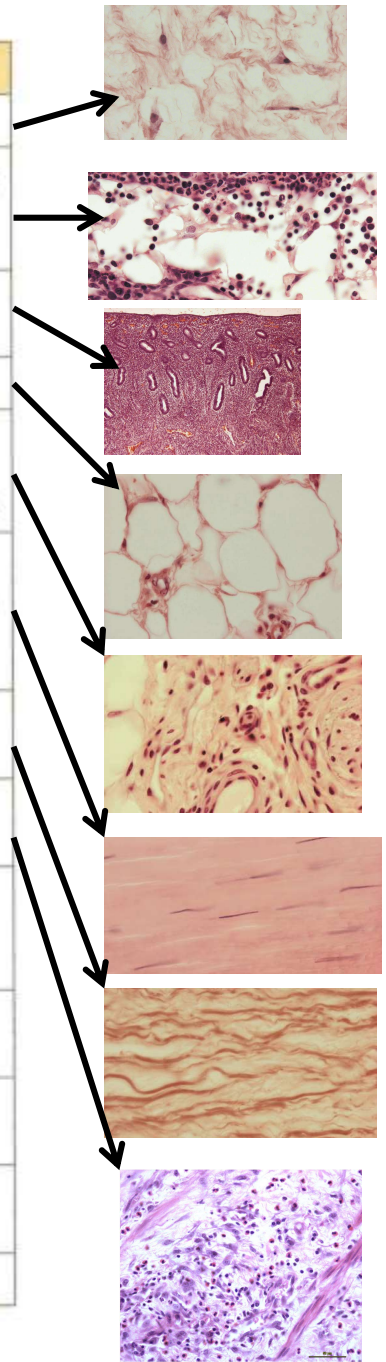
**Straffes Bdgw.**



**Elastisches Bdgw.**

**Table 2-1.** Table comparing connective and supportive tissue

Name	cells	extracellular space	fibers	location
Mesenchyme	mesenchymal cells	significant	-	Wharton's jelly
Reticular connective tissue	reticular cells, macrophages	significant, filled with the cells of hemopoietic and lymphatic organs	reticular fibers	hemopoietic and lymphatic organs
Cell rich connective tissue	special (decidual) cells	moderate	collagen and reticular fibers	mucosa of uterus, lamina propria (stroma)
Adipose tissue	adipocytes	moderate	reticular fibers	adipose tissue
Loose connective tissue	fibrocytes, macrophages, heparinocytes	significant (water space)	collagen, elastic	space filling between organs, along the blood vessels, especially capillaries
Dense connective tissue	fibrocytes (tendocytes)	moderate	collagen	parallel orientation: tendon, articular ligaments, capsules of organs; laminar orientation: cornea
Elastic connective tissue	fibrocytes	moderate	elastic fibers	elastic ligaments
Scar tissue	fibroblasts, macrophages, plasma cells, granulocytes	moderate	collagen	healing wound
Blood	erythrocytes, granulocytes, lymphocytes, monocytes, thrombocytes	significant, filled with blood plasma	-	blood vessels
Cartilage, hyaline cartilage	chondrocytes	significant	Type II collagen	cartilage of ribs, cartilage of joints
Cartilage, fibrous cartilage	chondrocytes	moderate	Type I collagen	discus, meniscus, articular cartilage
Cartilage, elastic cartilage	chondrocytes	moderate	elastic fibers	auricle, epiglottis
Bone	osteocytes	significant	Type I collagen	bones



Abbildungen von:

Röchlich Pál, Szövevény, Semmelweis Kiadó, 2006

Réthy M., Szentágothai J., Functional anatomy - anatomy, histology and embryology for medical and dental students, Medicina, 2018

