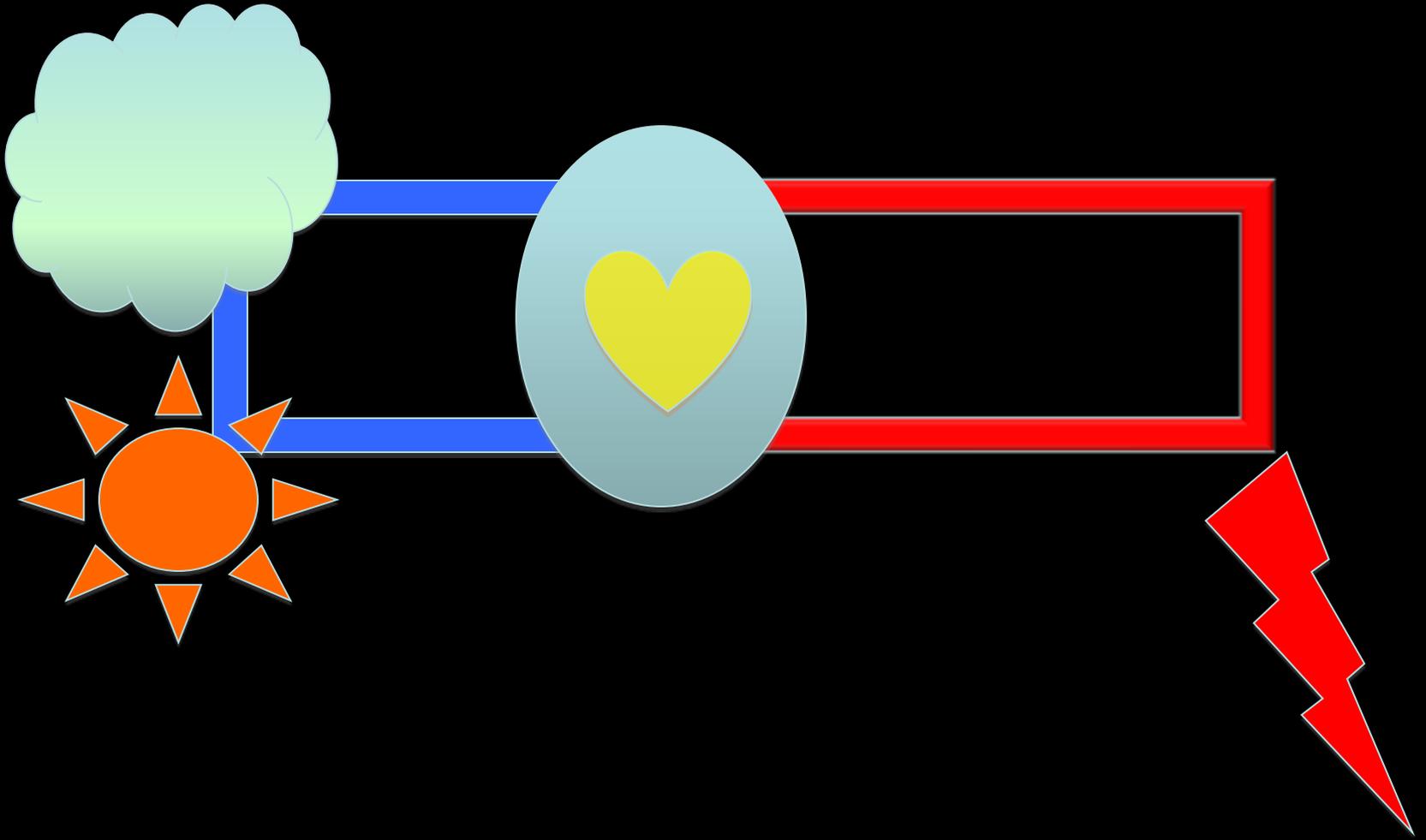


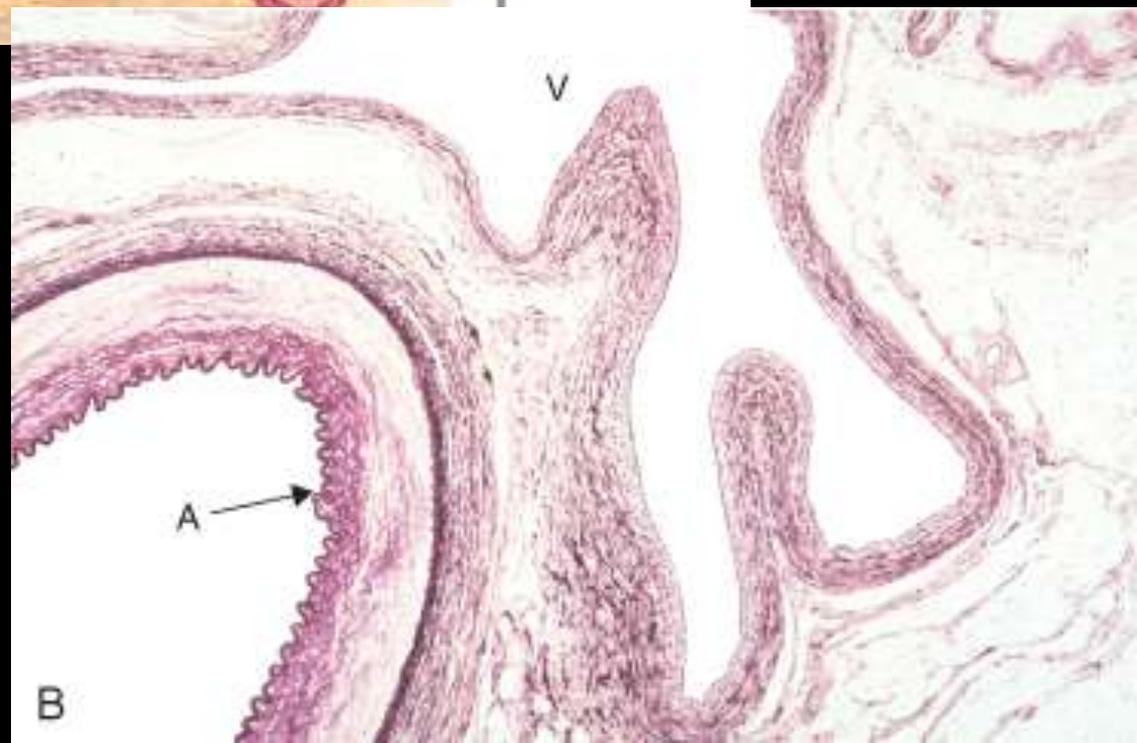
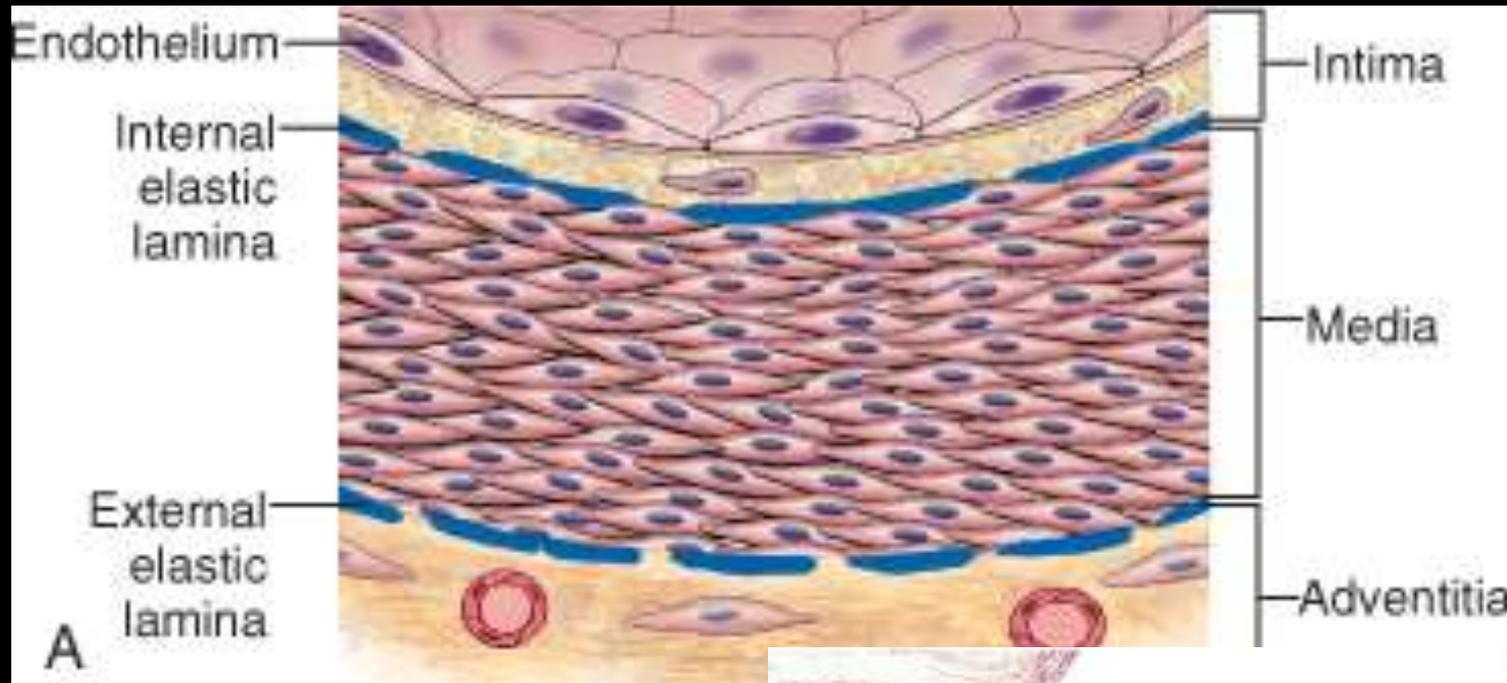
# ***Histologie de l'appareil circulatoire***

Pr A. Gérard Abadjian  
Faculté de Médecine  
USJ 2012

# ***Introduction***

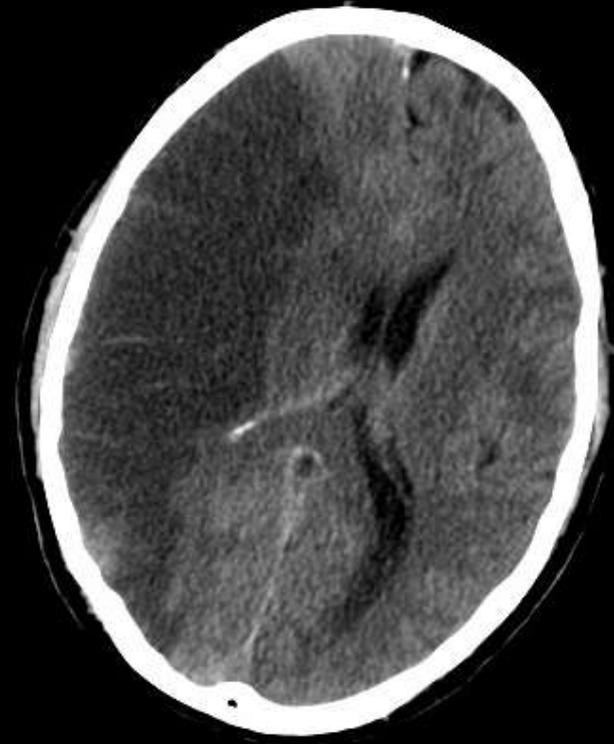
- Rôle:
  - Assurer le mouvement continue des fluides
  - Transport de l'oxygène, métabolites, hormones...
  - Régulation de la température
- Système sanguin:
  - Pompe centrale, le cœur
  - Le système artériel, capillaires, veinules pc.
  - Le système veineux
- Système lymphatique:
  - Drainage de l'excès de fluide extravasculaire
  - Transport de la lymphe aux ganglions
- Structures de base commune:
  - Intima, endothélium
  - Média
  - Adventice





## ***Cas clinique***

- Sujet adulte agé
- Confusion et désorientation depuis quelques jours
- Perte de connaissance
- Hospitalisation:



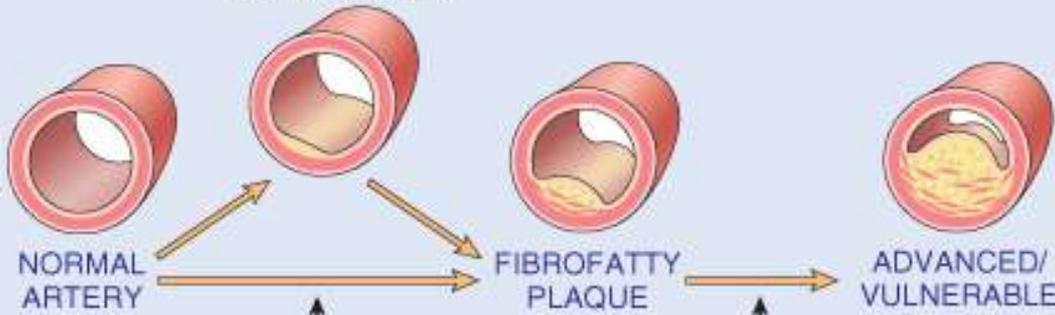
# Athérosclérose

Nomenclature and main histology	Sequences in progression	Main growth mechanism	Earliest onset	Clinical correlation
<b>Type I (initial) lesion</b> Isolated macrophage foam cells	<pre>           graph TD             I((I)) --&gt; II((II))             II --&gt; III((III))             III --&gt; IV((IV))             IV --&gt; V((V))             V --&gt; VI((VI))             VI --&gt; IV           </pre>	Growth mainly by lipid accumulation	From first decade	Clinically silent
<b>Type II (fatty streak) lesion</b> Mainly intracellular lipid accumulation			From third decade	
<b>Type III (intermediate) lesion</b> Type II changes and small extracellular lipid pools				
<b>Type IV (atheroma) lesion</b> Type II changes and core of extracellular lipid		Accelerated smooth muscle and collagen increase	From fourth decade	Clinically silent or overt
<b>Type V (fibroatheroma) lesion</b> Lipid core and fibrotic layer, or multiple lipid cores and fibrotic layers, or mainly calcific, or mainly fibrotic				
<b>Type VI (complicated) lesion</b> Surface defect, hematoma-hemorrhage, thrombus				

### Pre-Clinical Phase

Usually young age

#### FATTY STREAK



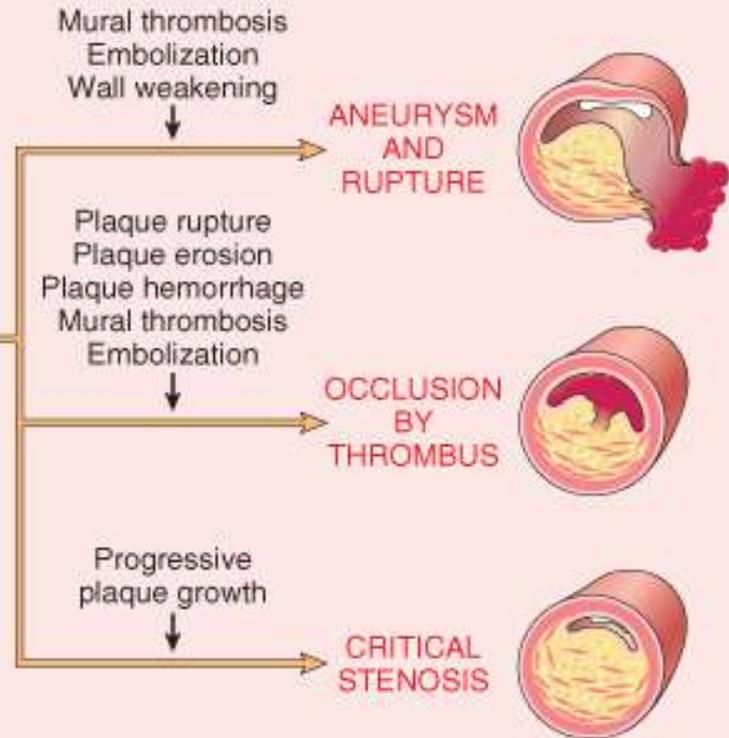
*At lesion-prone areas, and accelerated by risk factors:*  
Endothelial dysfunction  
Monocyte adhesion/emigration  
SMC migration to intima  
SMC proliferation  
ECM elaboration  
Lipid accumulation

Cell death/degeneration  
Inflammation  
Plaque growth  
Remodeling of plaque and wall ECM  
Organization of thrombus  
Calcification

Clinical horizon

### Clinical Phase

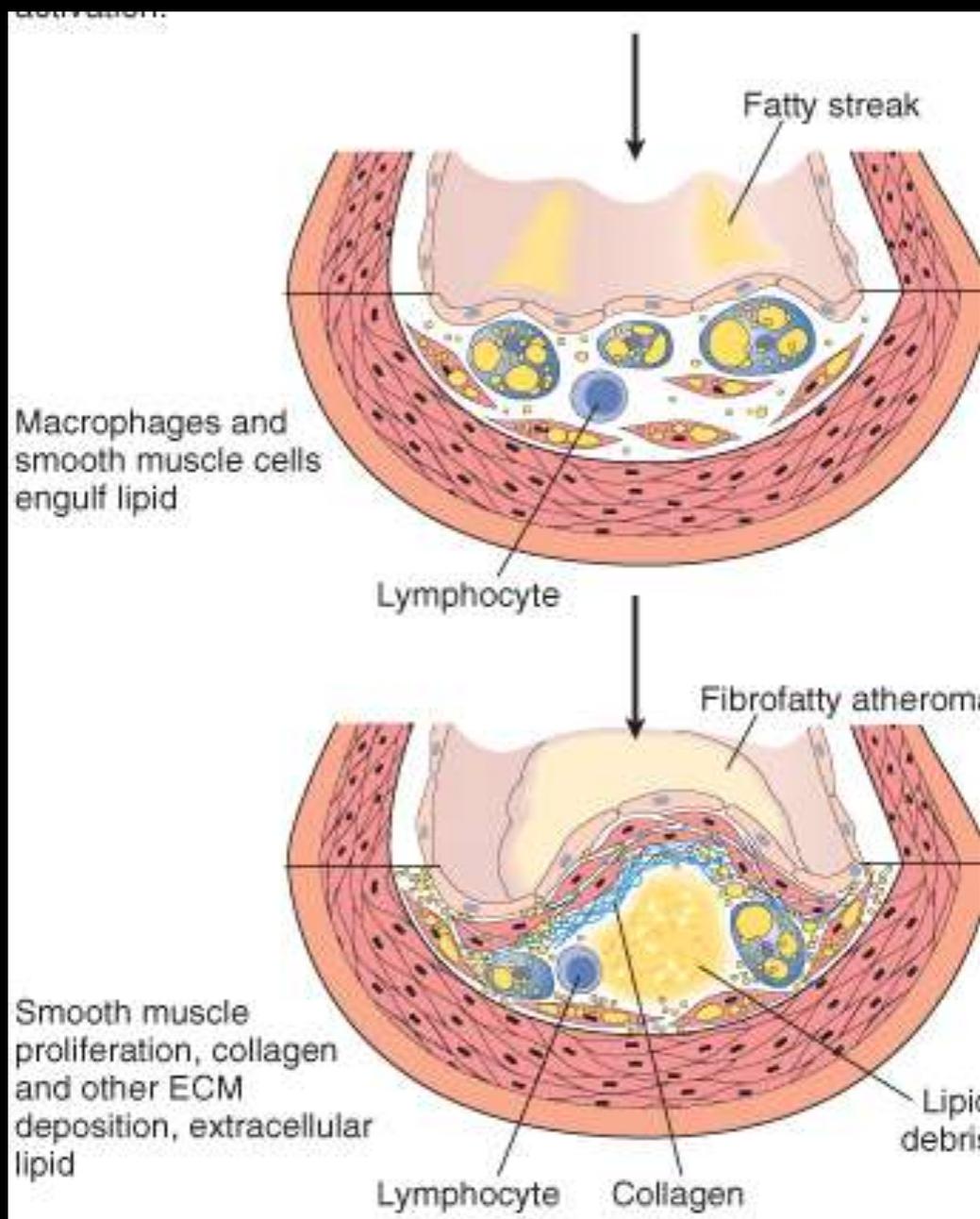
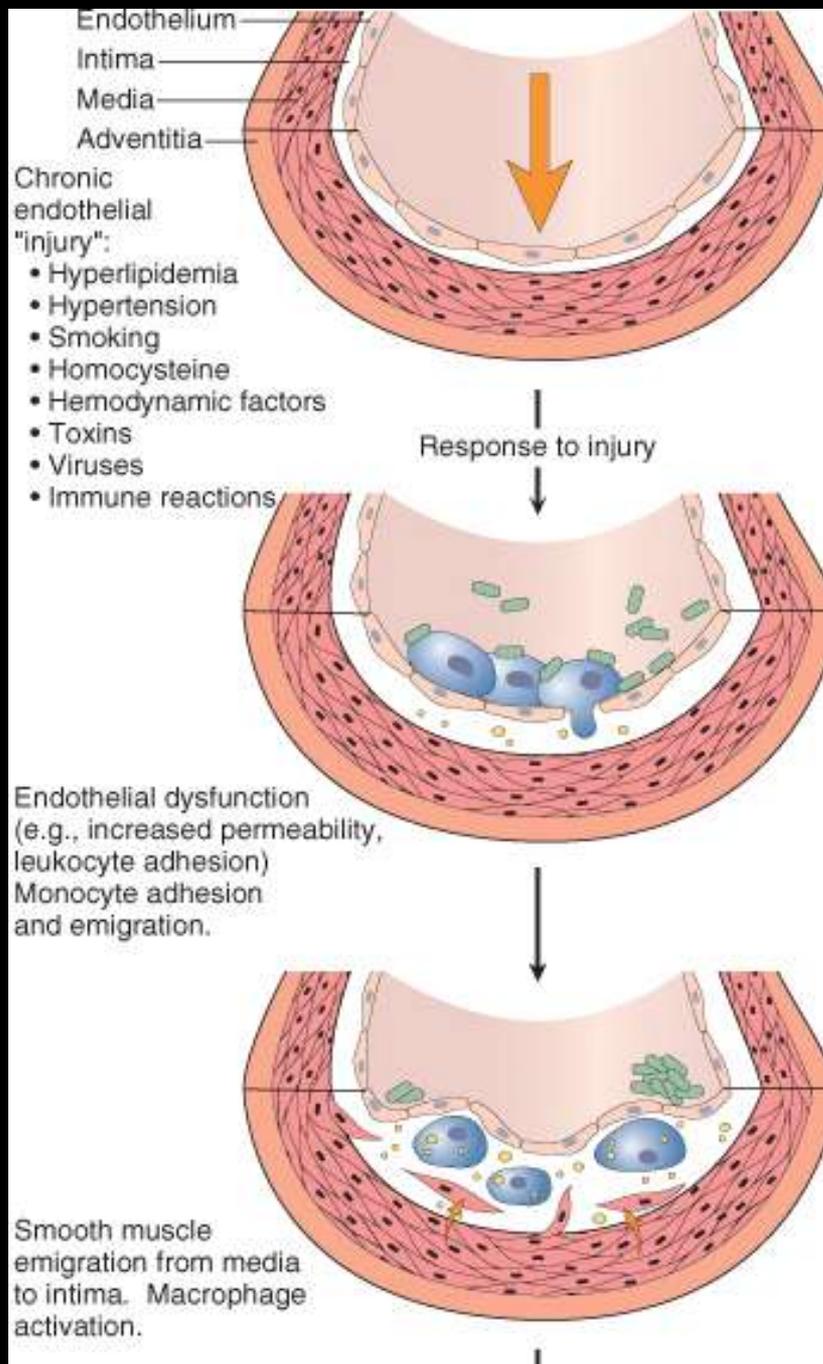
Usually middle age to elderly

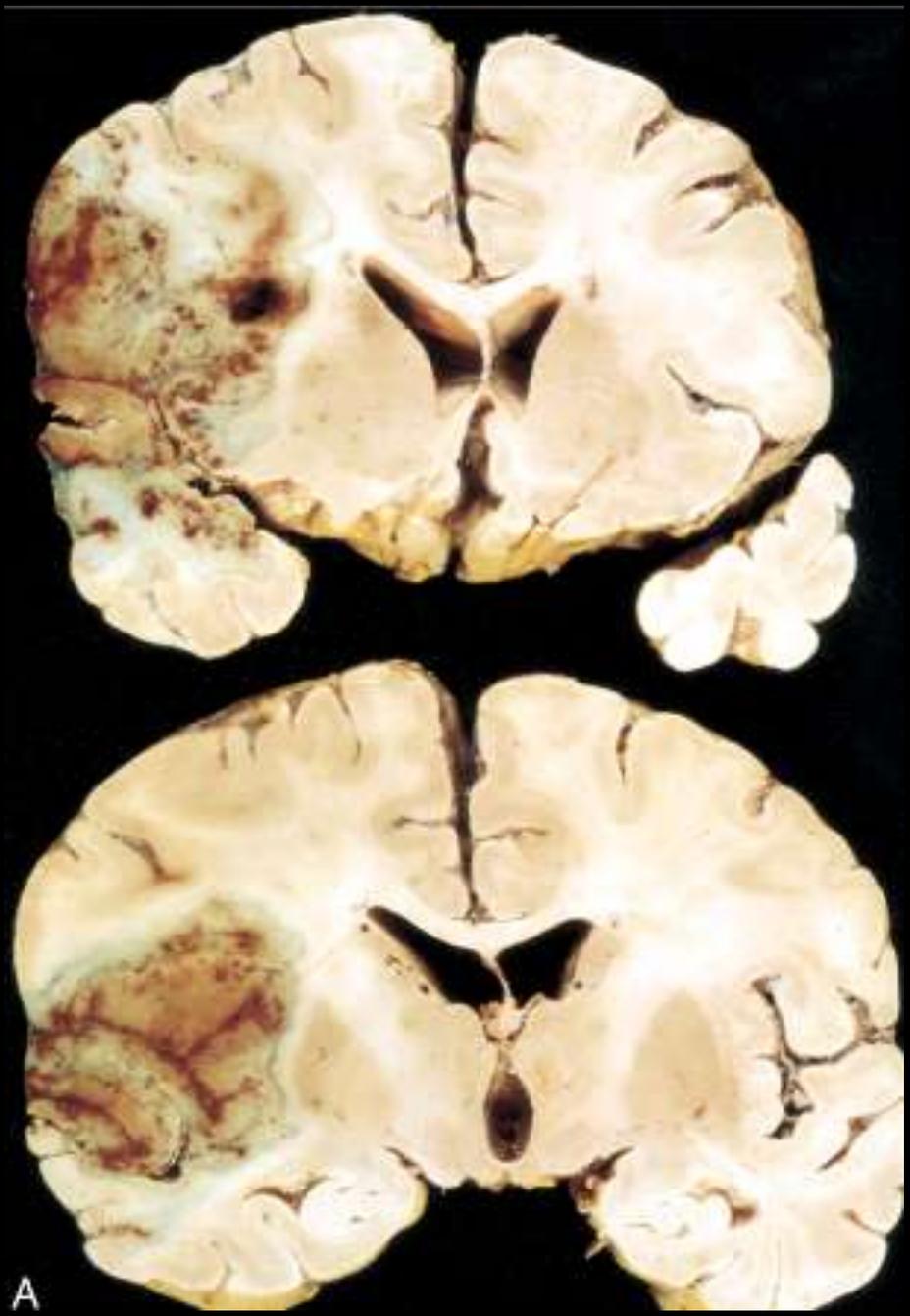






B

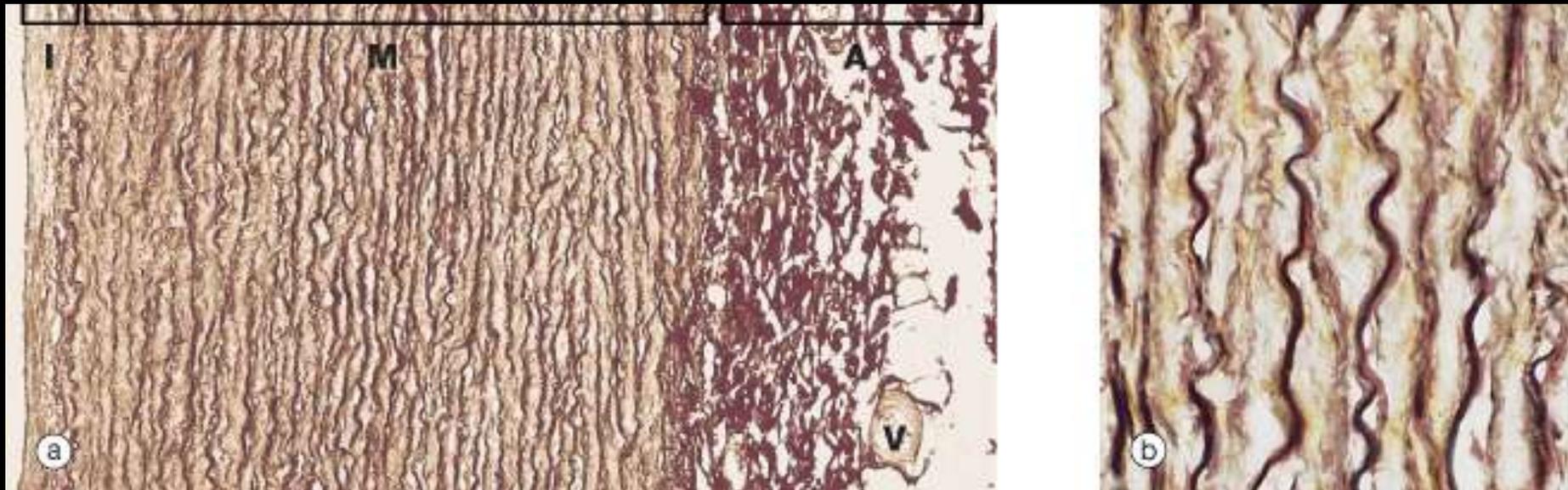




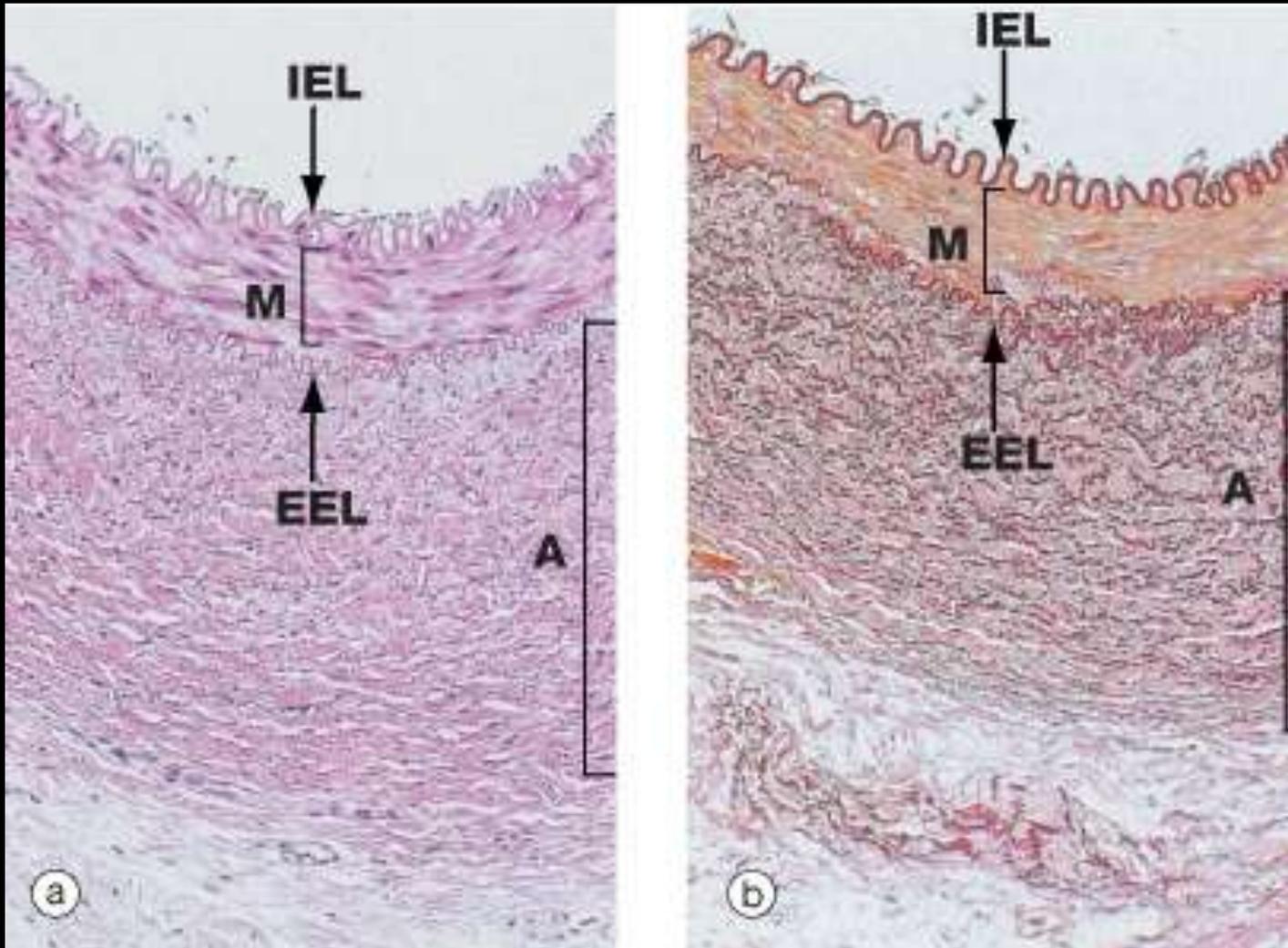
A

# ***Le système artériel***

- Rôle: Distribution du sang aux capillaires
- Variation du calibre: systole-diastole: fibres élastiques
- 3 types principaux de vaisseaux:
  - Artères élastiques: Aorte et branches
  - Artères musculaires: Branches de distribution (Extrémités et cérébrales)
  - Artérioles: Branches terminales



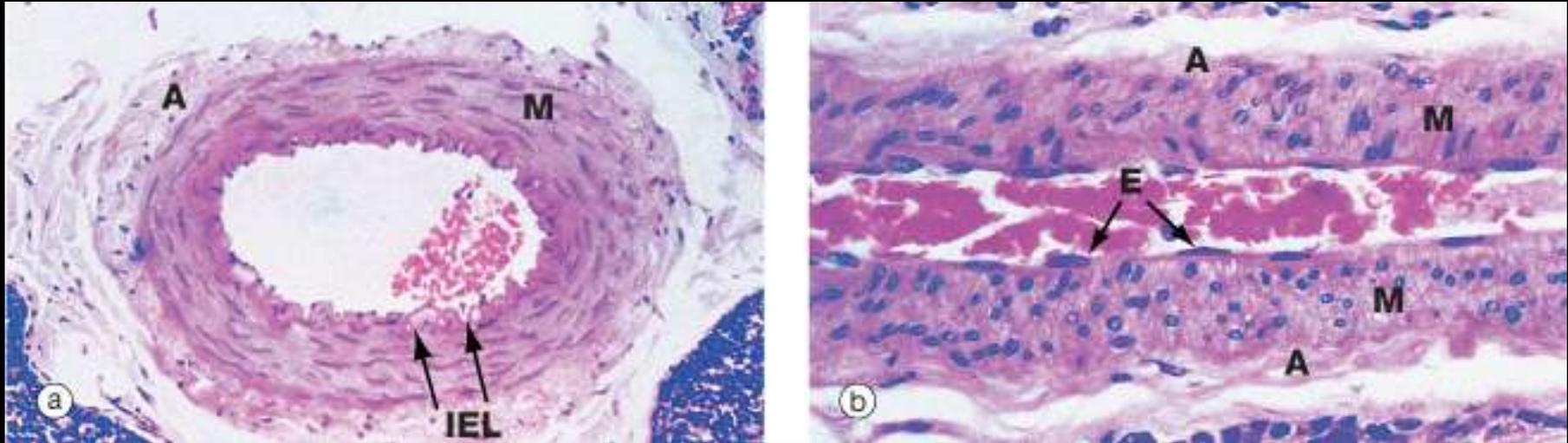
## Artère musculaire (HE x 100 – FElast. X 100)



- Limitante élastique interne
- Média

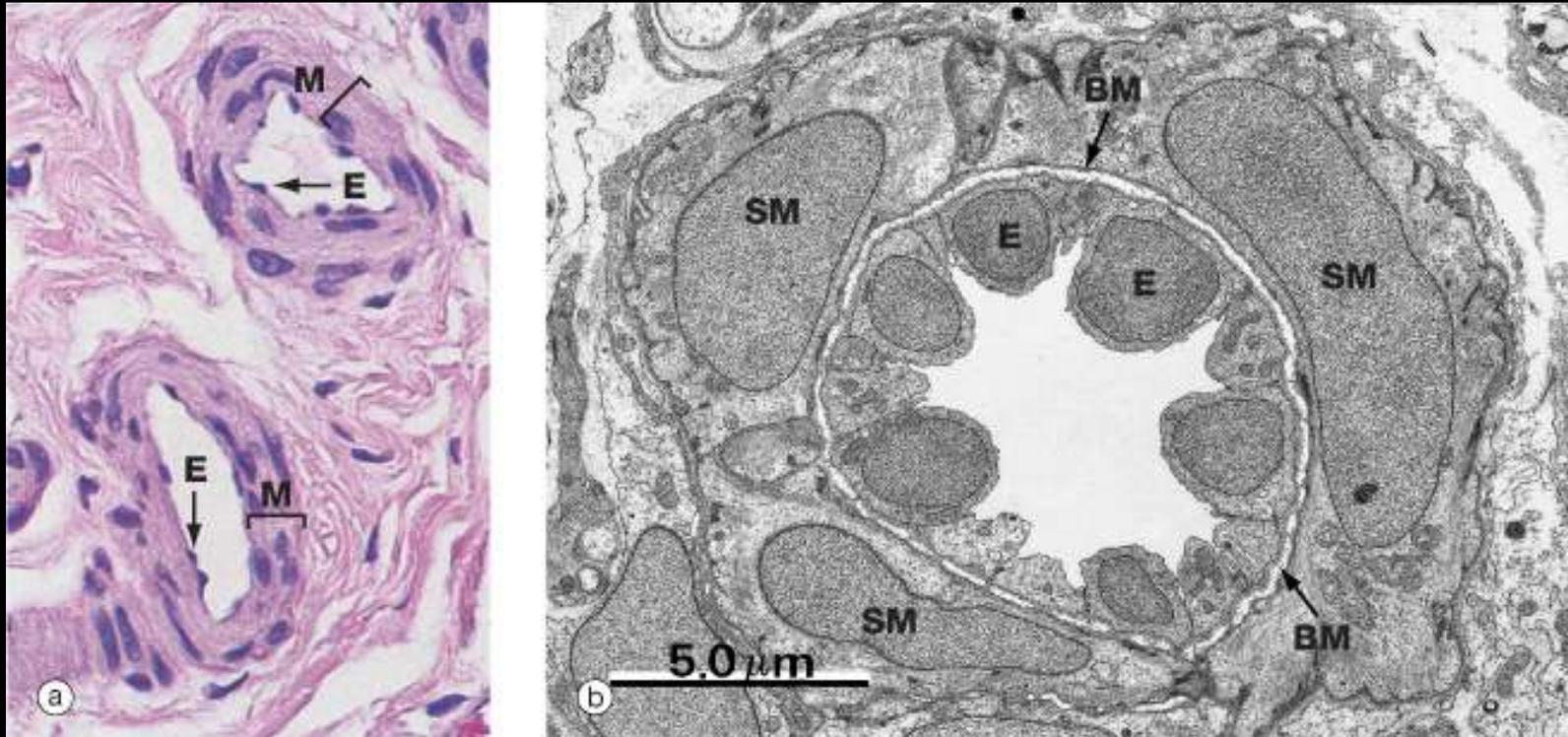
- Limitante élastique externe
- Adventice, fibroélastique

## ***Petites artères musculaires (CT 125 – CL 320)***



- Calibre 0.5 – 2 mm
- Limitante élastique interne
- Média 3 à 10 couches de cellules musculaires, peu de fibres élastiques
- Limitante élastique externe peu marquée
- Adventice

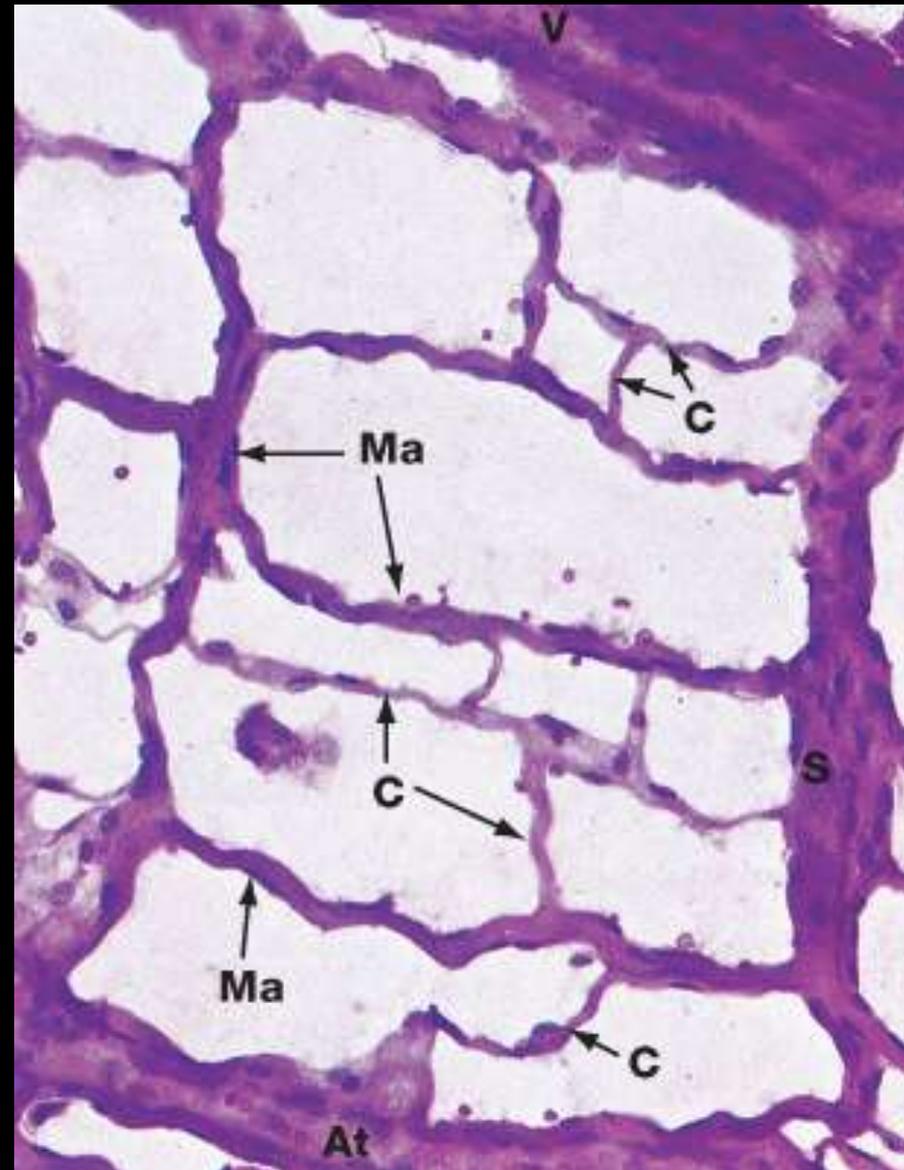
# Artérioles (HE 100 – ME 5000)



- Transition progressive
- Perte de la limitante
- Média de 3 couches cellulaires
- Adventice mal délimitée

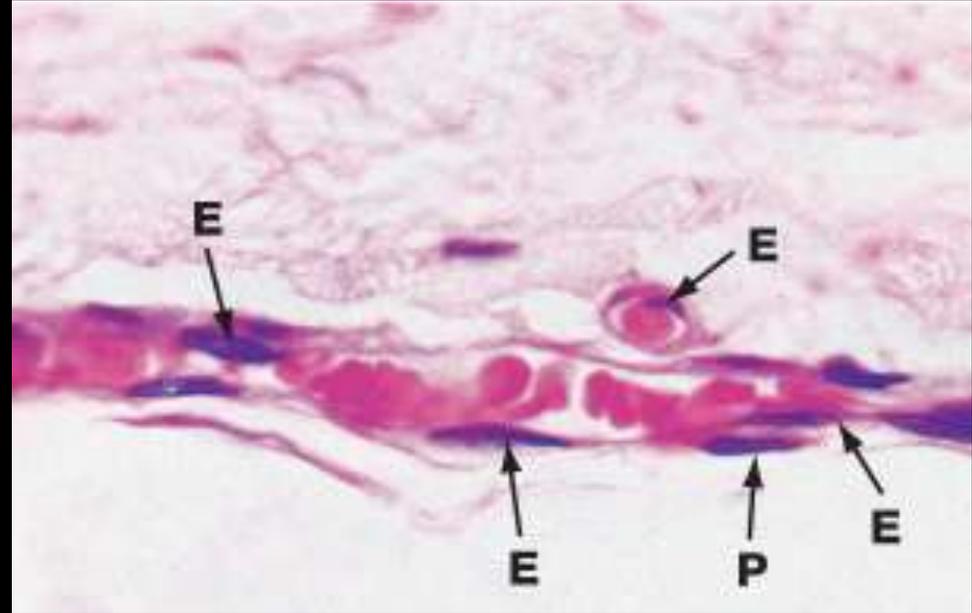
# ***Microcirculation (Etal. Mésentérique 120)***

- Echanges gazeux, liquidiens, métabolites
- Réseau capillaire
- Contrôle: sphincters pré-capillaires
- Veinules post-capillaires, veinules collectrices, veinules musculaires.
- Métartéριοles Ma.
- Shunt artério-veineux
- Régulation: SN autonome, hormonal.

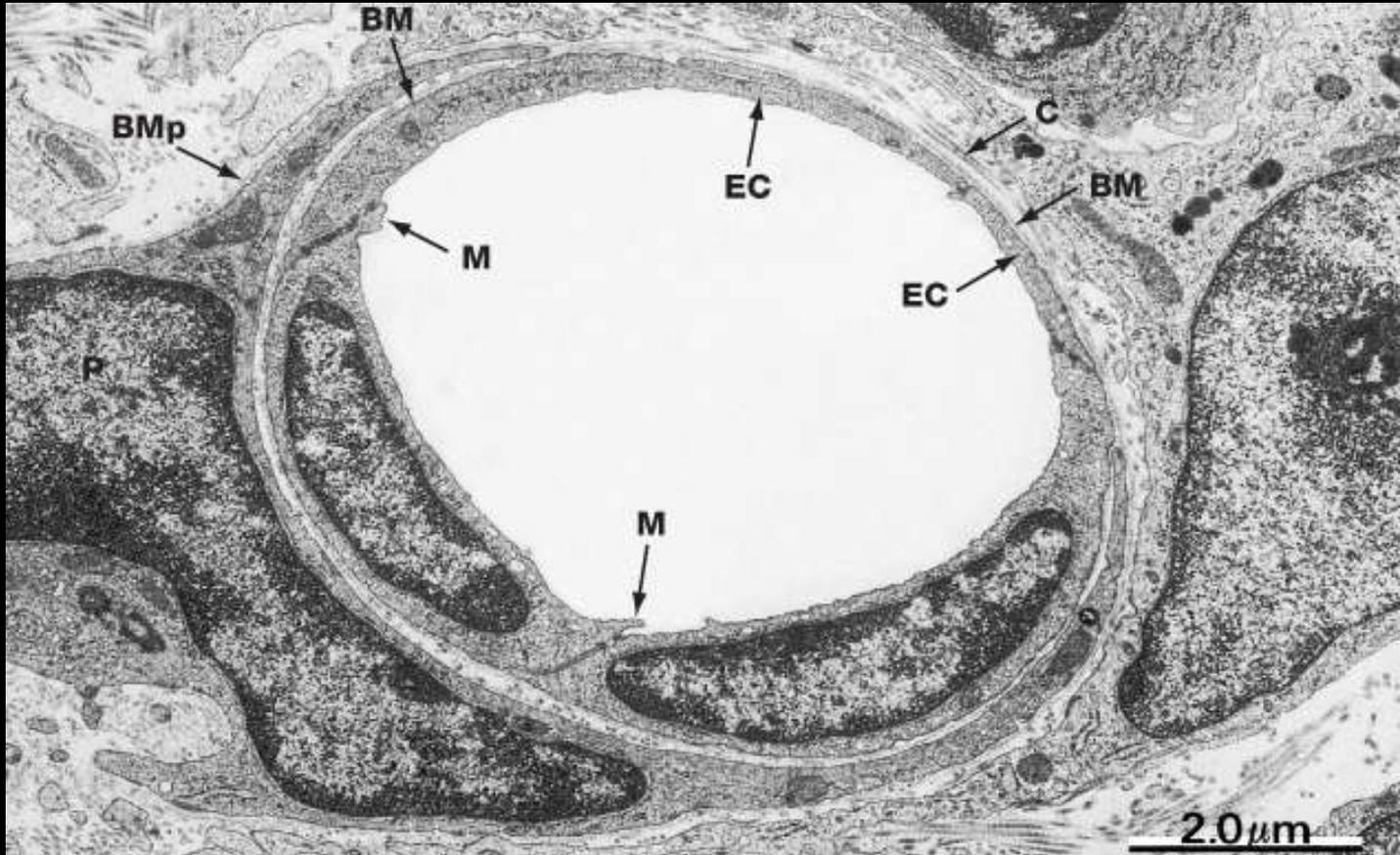


## ***Capillaires (HE x 800)***

- Cellules endothéliales aplaties
- Arrondies en coupe transversale
- Couche musculaire et adventitielle absentes
- Péricyte: contraction
- Diamètre du capillaire: GR

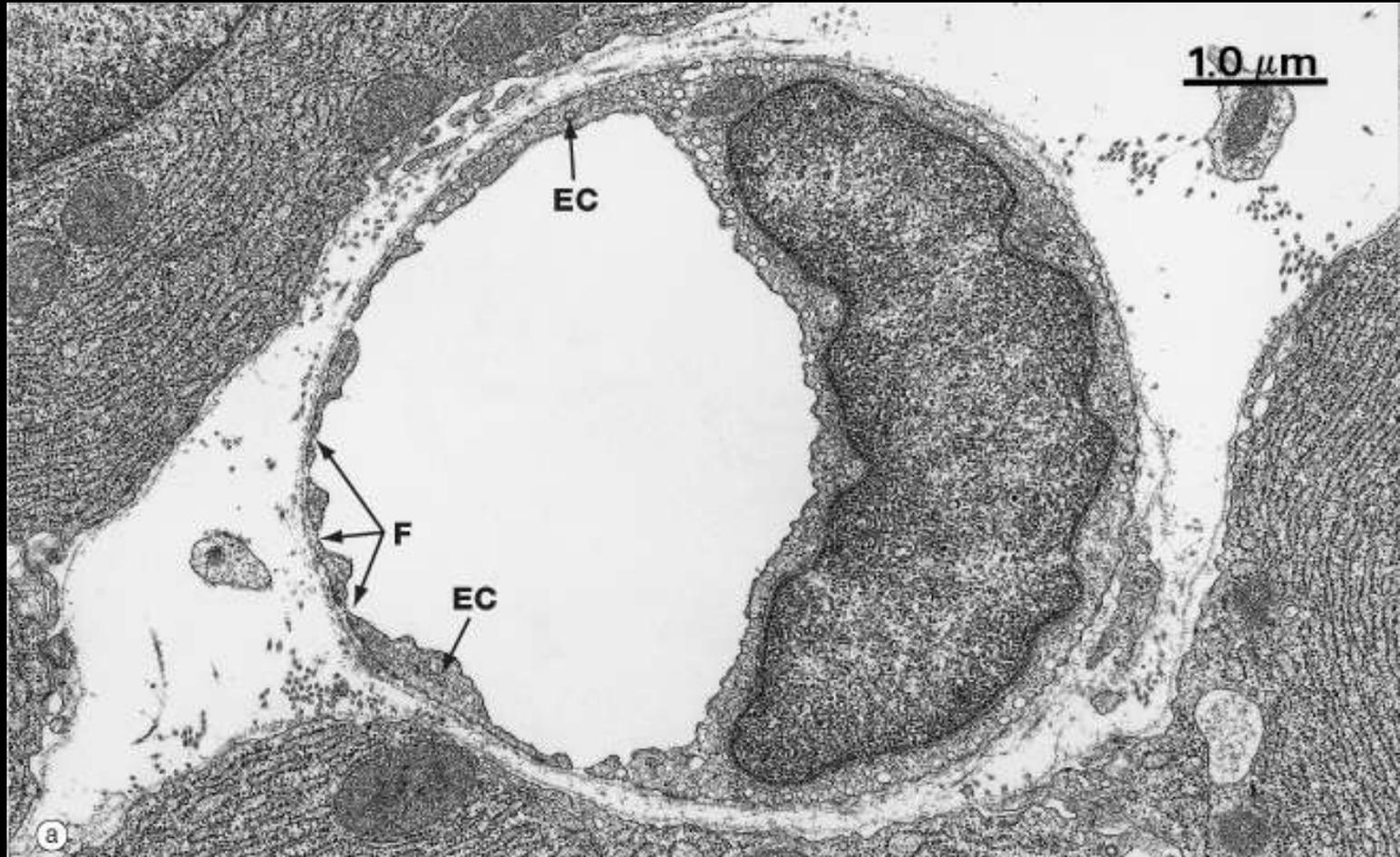


# Capillaire à endothélium continu (ME 12 000)



- Jonctions serrées
- Replis marginaux
- Membrane basale
- Péricyte (MB)
- Echanges:
  - Diffusion passive
  - Vacuoles de pinocytose
  - Espaces intercellulaires

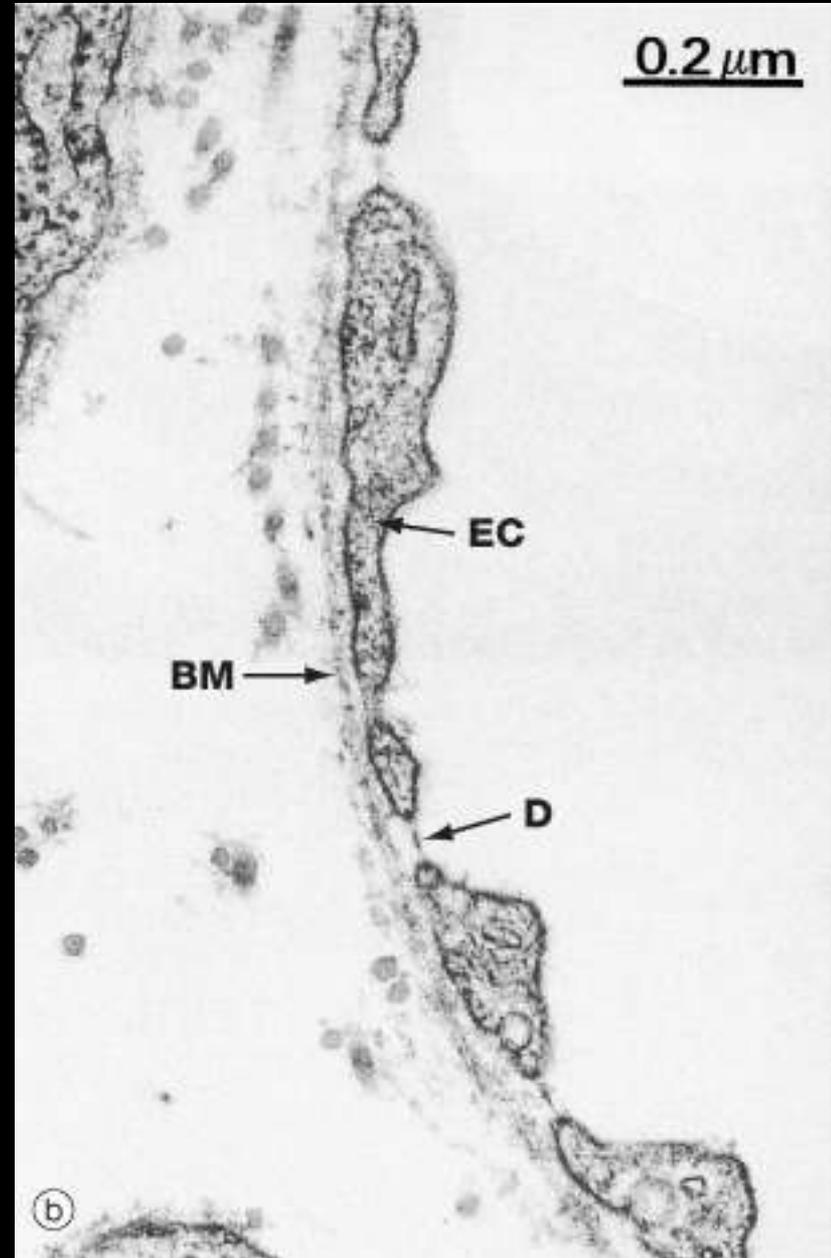
# Capillaire à endothélium fenestré (ME 15 000)



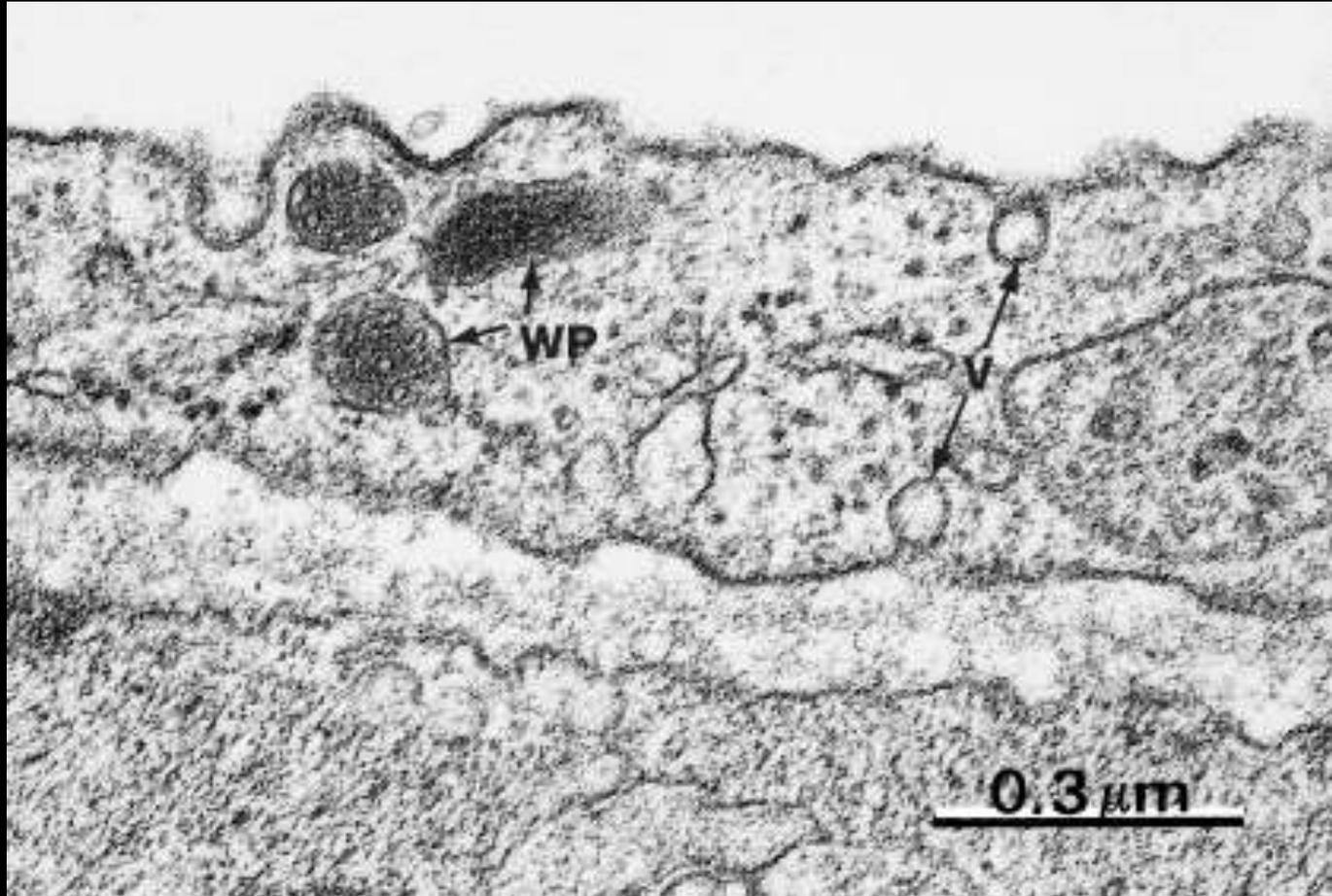
- Echanges moléculaires intensifs (Intestins, Endocrine, Rein)
- Fenestrations (pores)
- Passage rapide de molécules
- Membrane basale, Péricytes rares.
- MB discontinue (Moelle, Rate, Foie)

# ***Capillaire à endothélium fenestré (ME 15 000)***

- Pores: Diaphragme
- Fenestrations sans diaphragme dans les capillaires glomérulaires (rein)



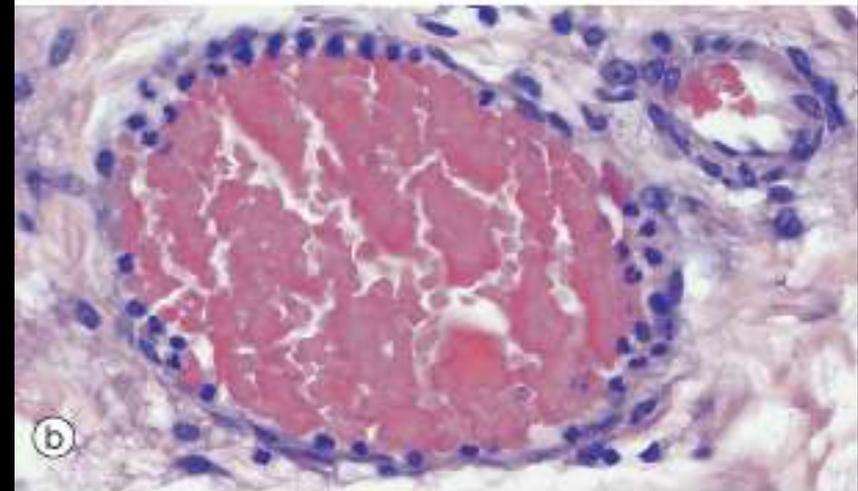
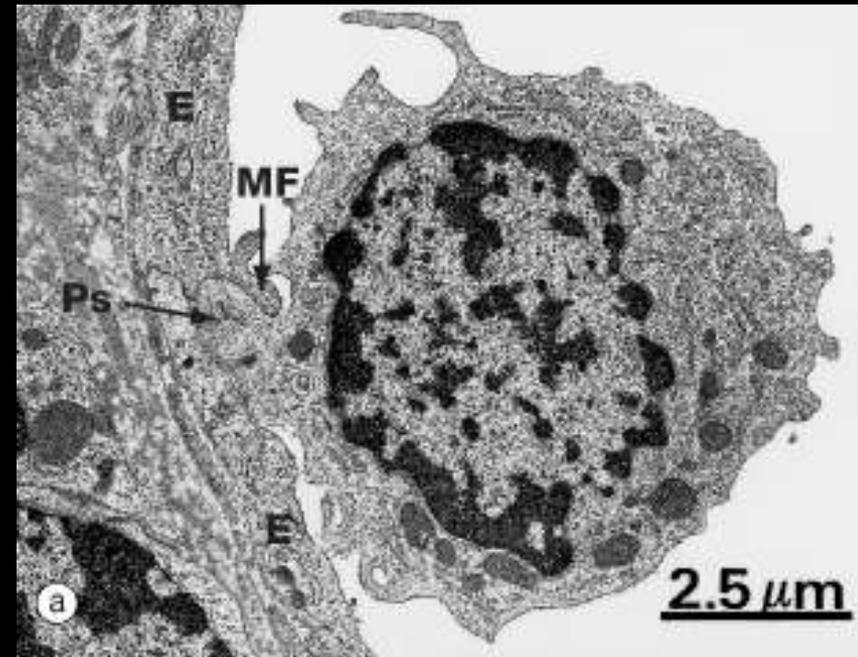
# Cellule endothéliale (ME 68 000)



- Vésicules de pinocytose
- Corps de Weibel-Palade
- Contrôle de la coagulation et de la thrombose
- Vasoconstriction-dilatation
- Perméabilité

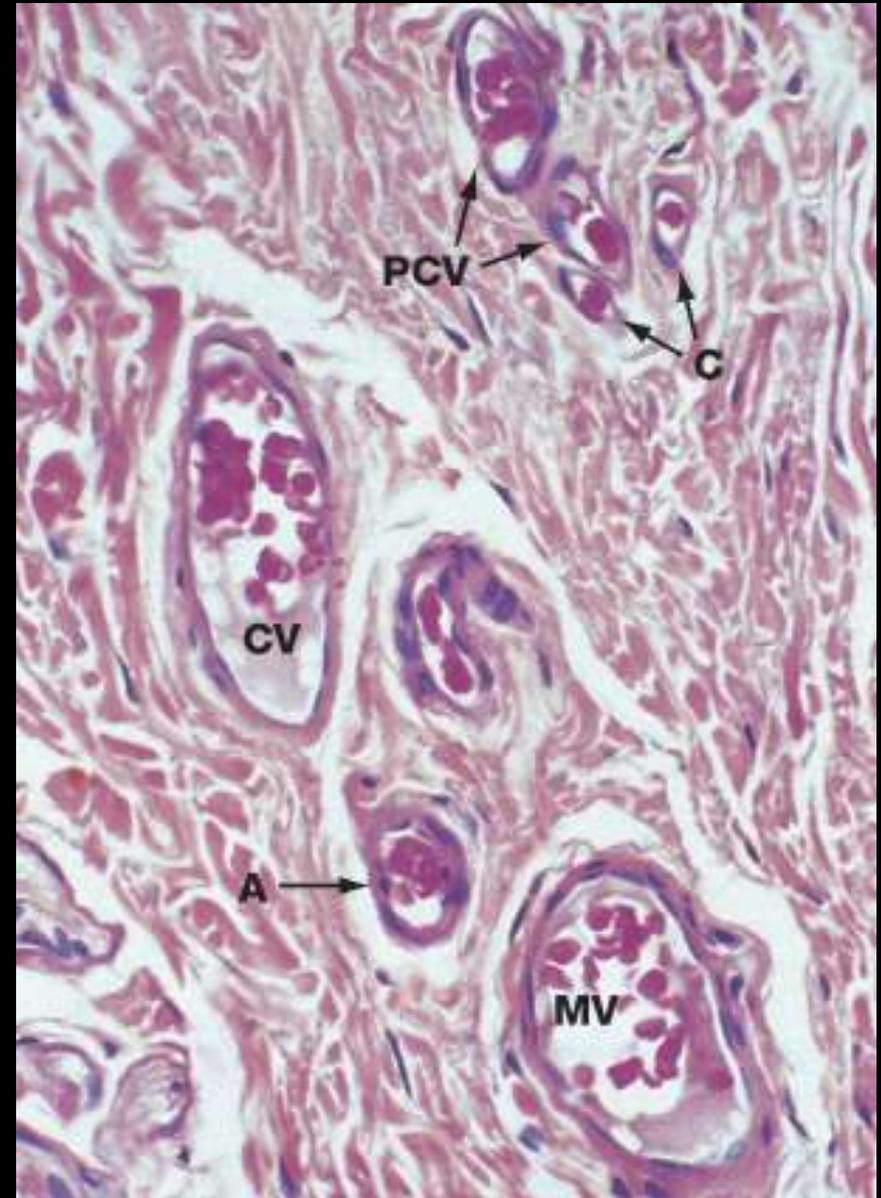
# ***Migration cellulaire (ME 6 000 – HE 600)***

- Capillaires et veinules post-capillaires
- Pseudopodes
- Repli marginal
- Jonction intercellulaires complexes rares dans les veinules pc
- Margination leucocytaire

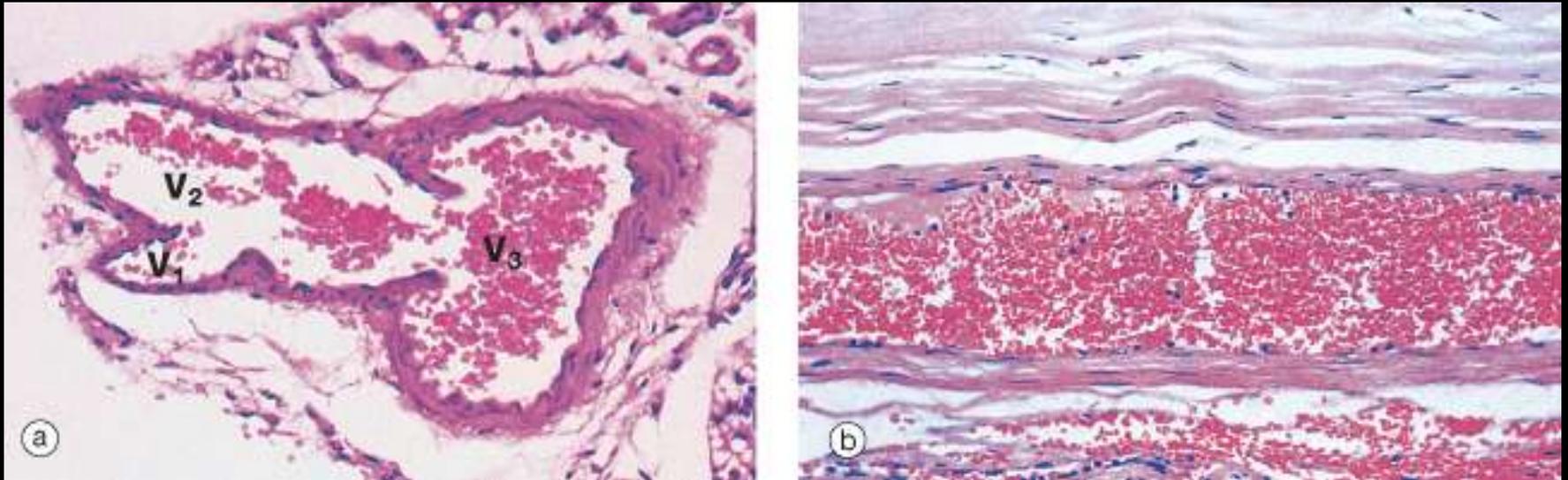


# ***Le système veineux***

- Compartiment de basse pression
- Contraction de la paroi et compression extrinsèque
- Valves
- 3 couches
- Constituants élastiques et musculaires peu marqués
- Veinules postcapillaires et veinules collectrices: endothélium et péricytes
- Veinules musculaires

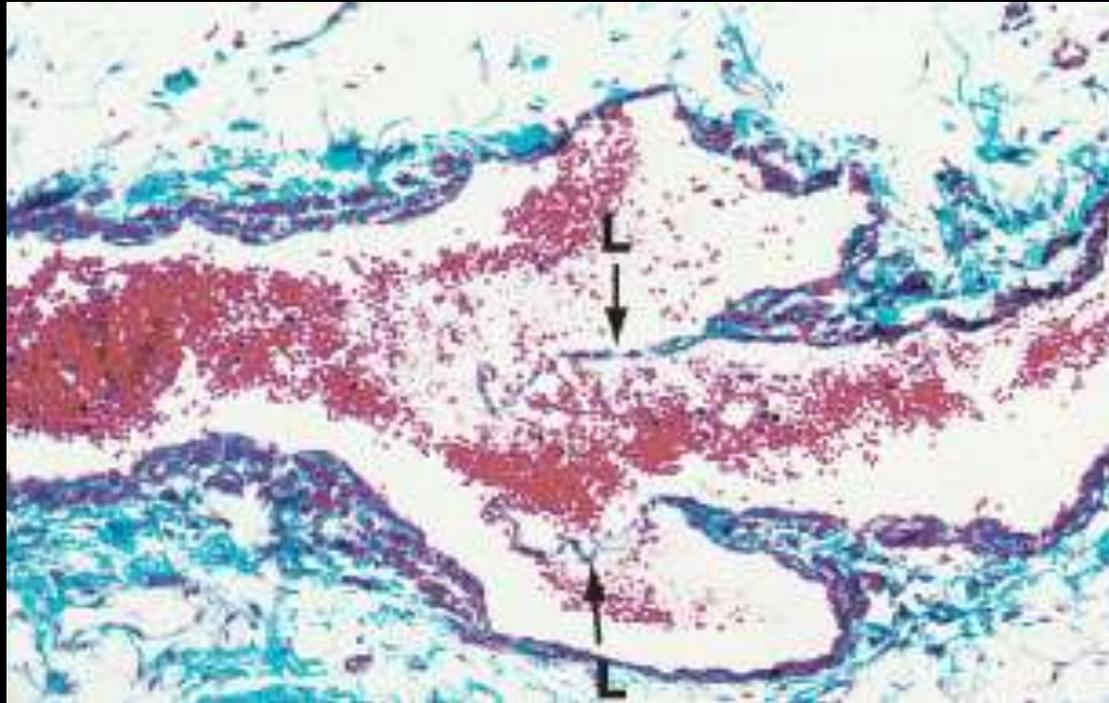


# *Veinules musculaires et petites veines (HE 125)*



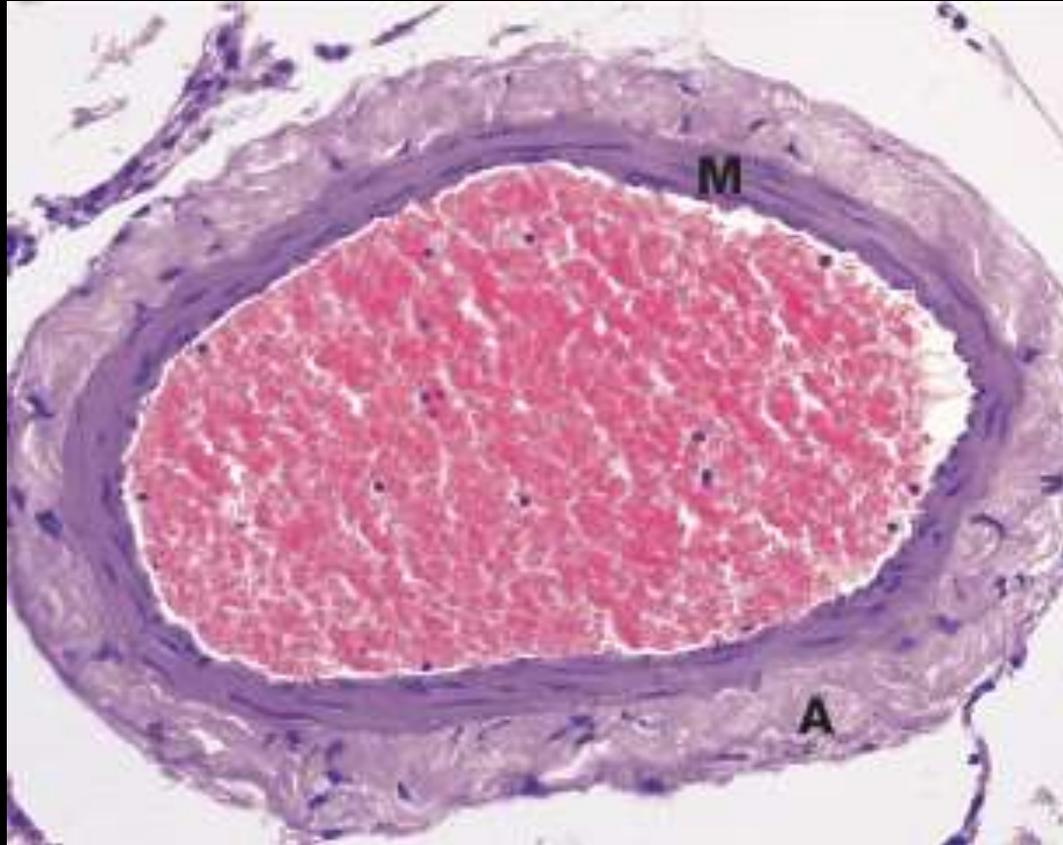
- Petite et large veinules musculaires, Valves
- Petite veine
- Variation de la couche musculaire, lame élastique interne peu développée.

## ***Veine à valvules (Trichrome x 125)***



- Projection fibroélastique
- Veines de plus de 2 mm
- Extrémités

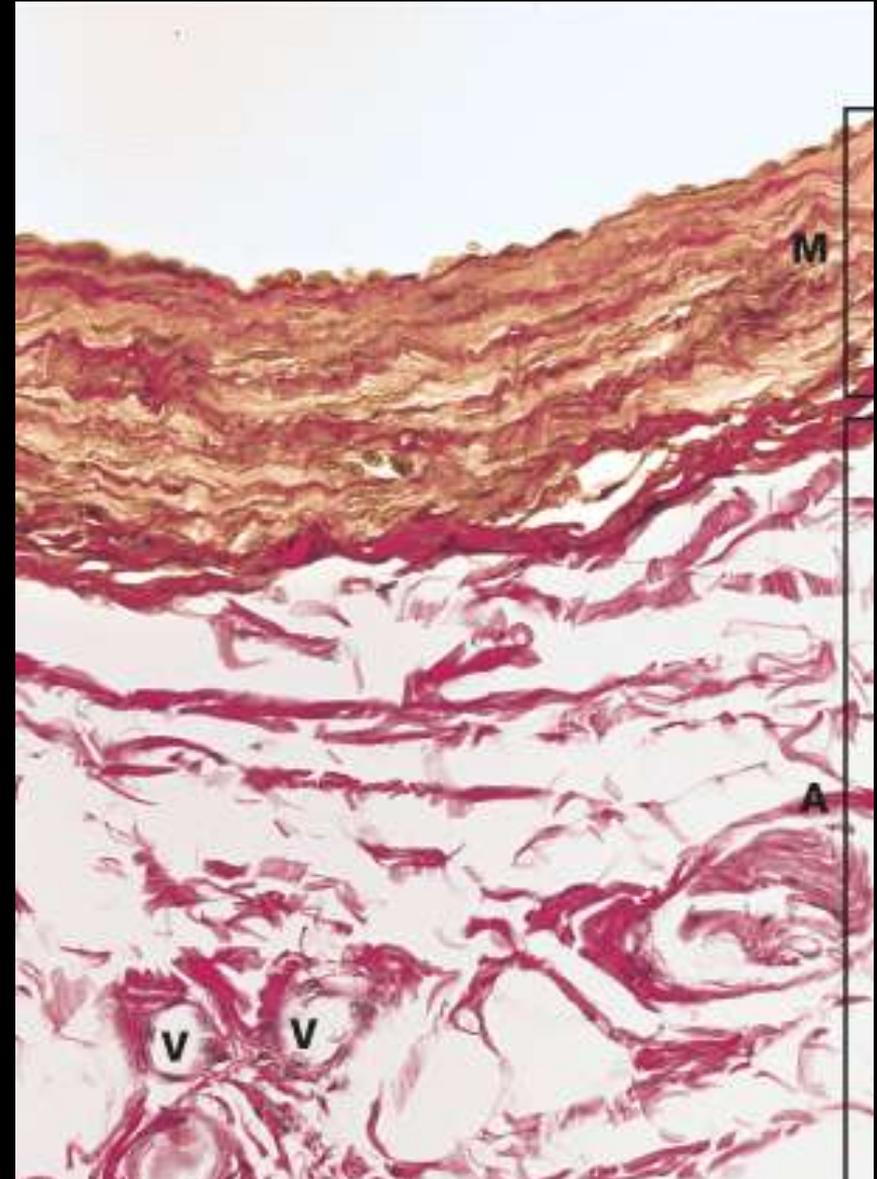
## ***Veine moyenne (HE x 180)***



- Intima
- Média de 2 à 4 couches
- Adventice plus épaisse

# *Veine musculaire large (F Elastique X 250)*

- Média: plusieurs couches de cellules musculaires
- Collagène
- Fibres élastiques rares
- Adventice: vasa-vasorum
- Pas de limitante élastique

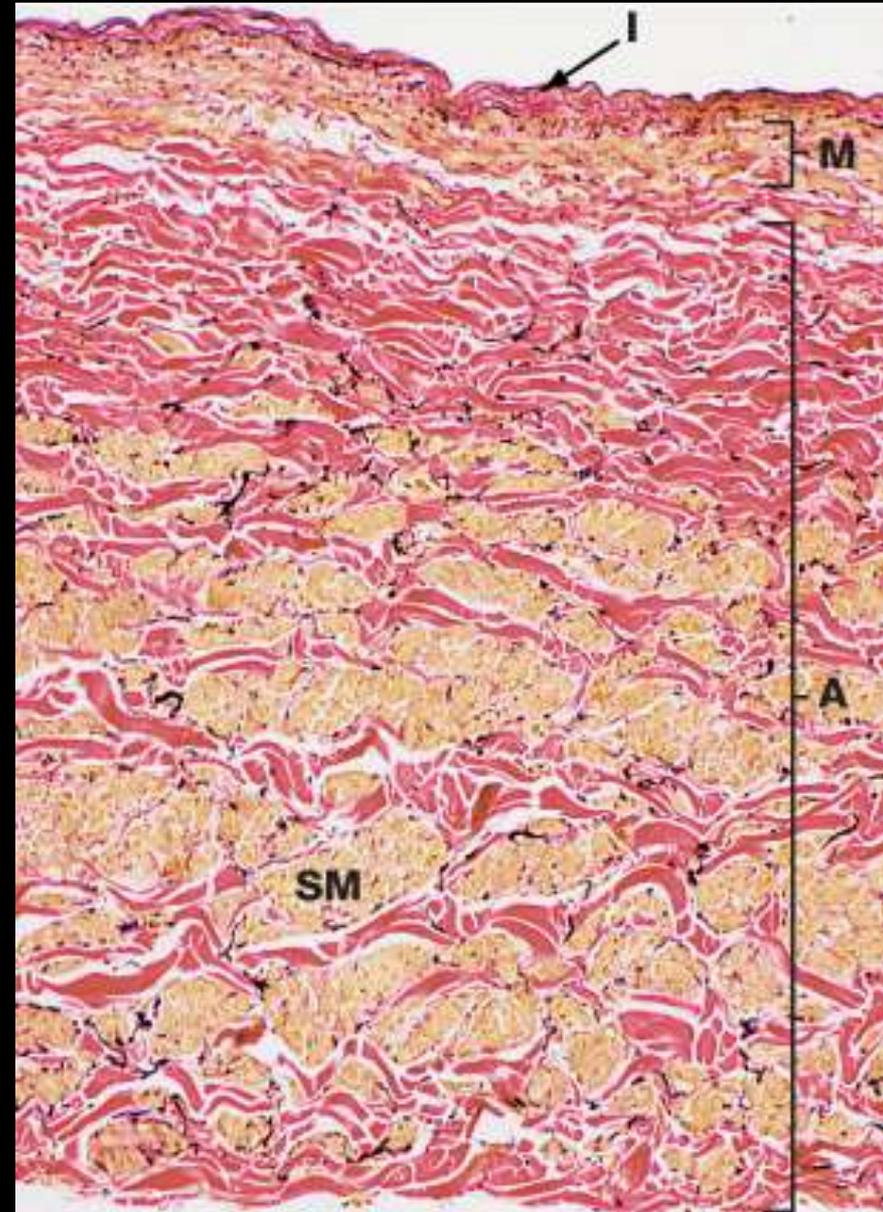


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# ***Veine cave inférieure (FElast. X 100)***

- Intima distincte, fibro-élastique
- Média: couches circulaires de cellules musculaires lisses
- Adventice: collagène et trousseaux épais longitudinaux de cellules musculaires lisses
- Fibres élastiques réparties dans toutes les tuniques



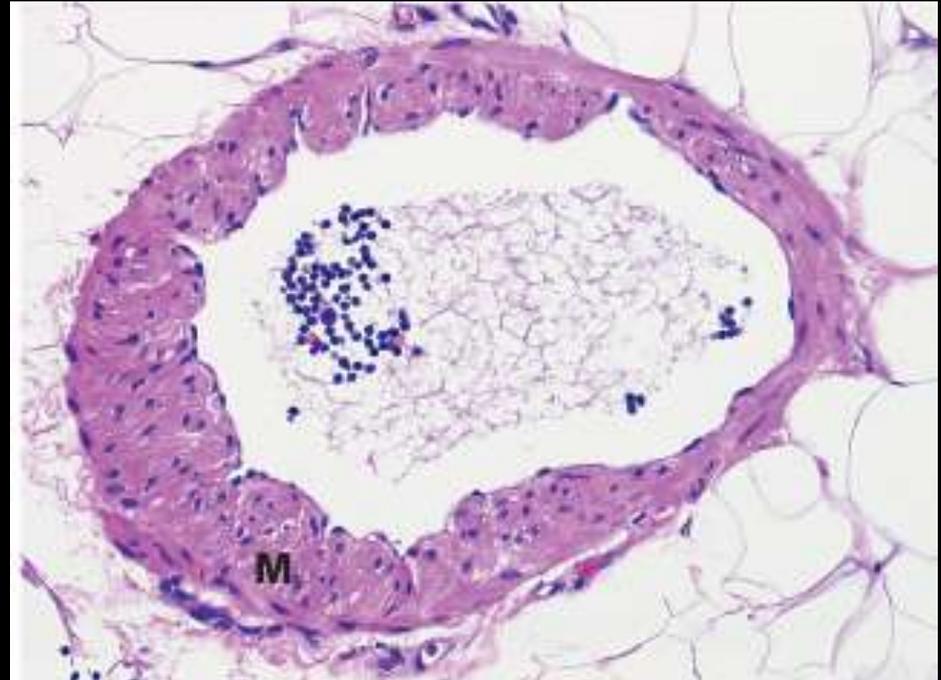
# *Le système lymphatique*

- Dans tout les tissus sauf le système nerveux central, cartilage, os, moelle osseuse, thymus, placenta, dents, cornée.
- Perméabilité supérieure au capillaire:
  - Endothélium fin
  - Membrane basale rudimentaire voire absente
  - Pas de péricytes



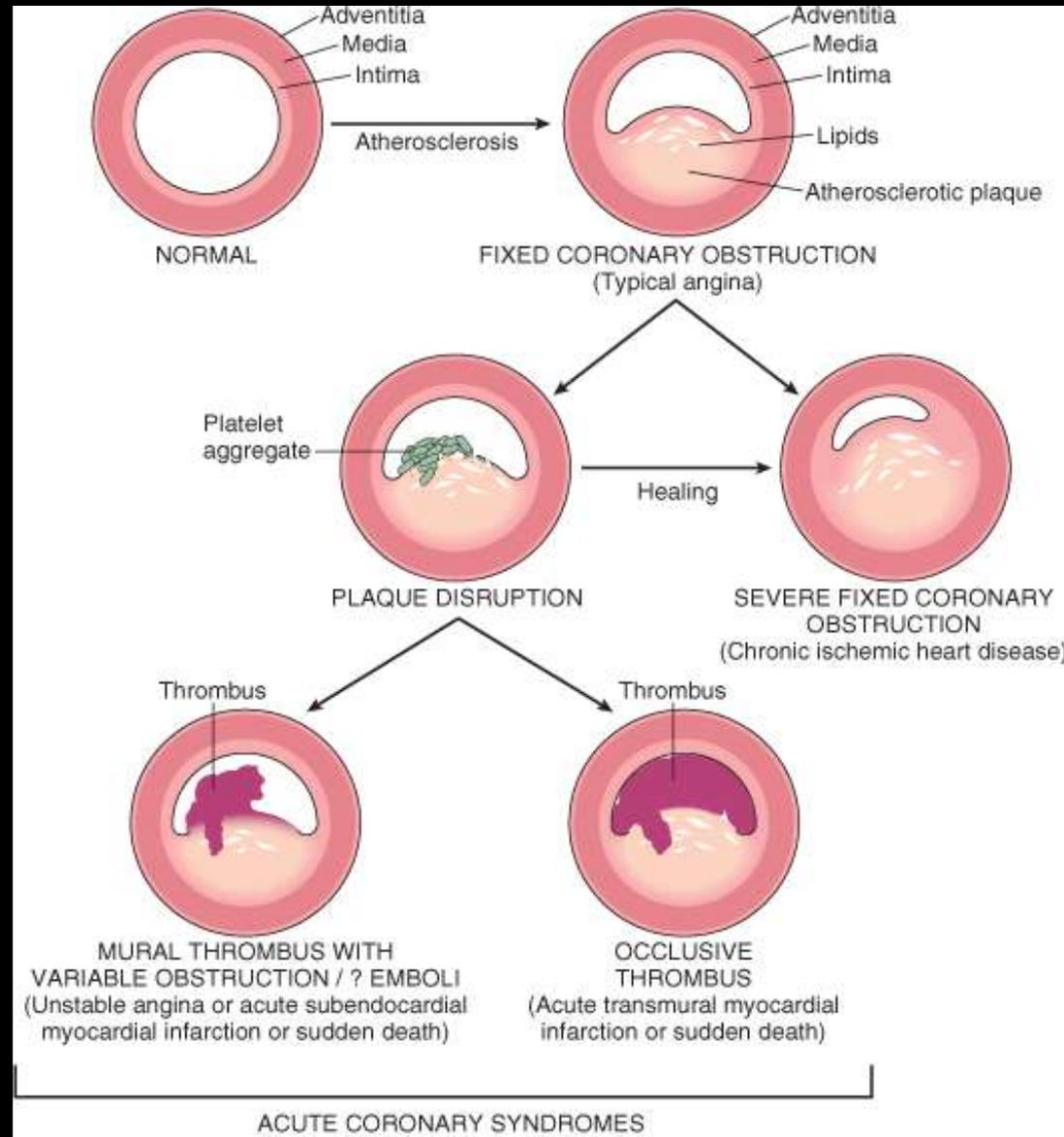
## ***Lymphatique de moyen calibre (HE x 40)***

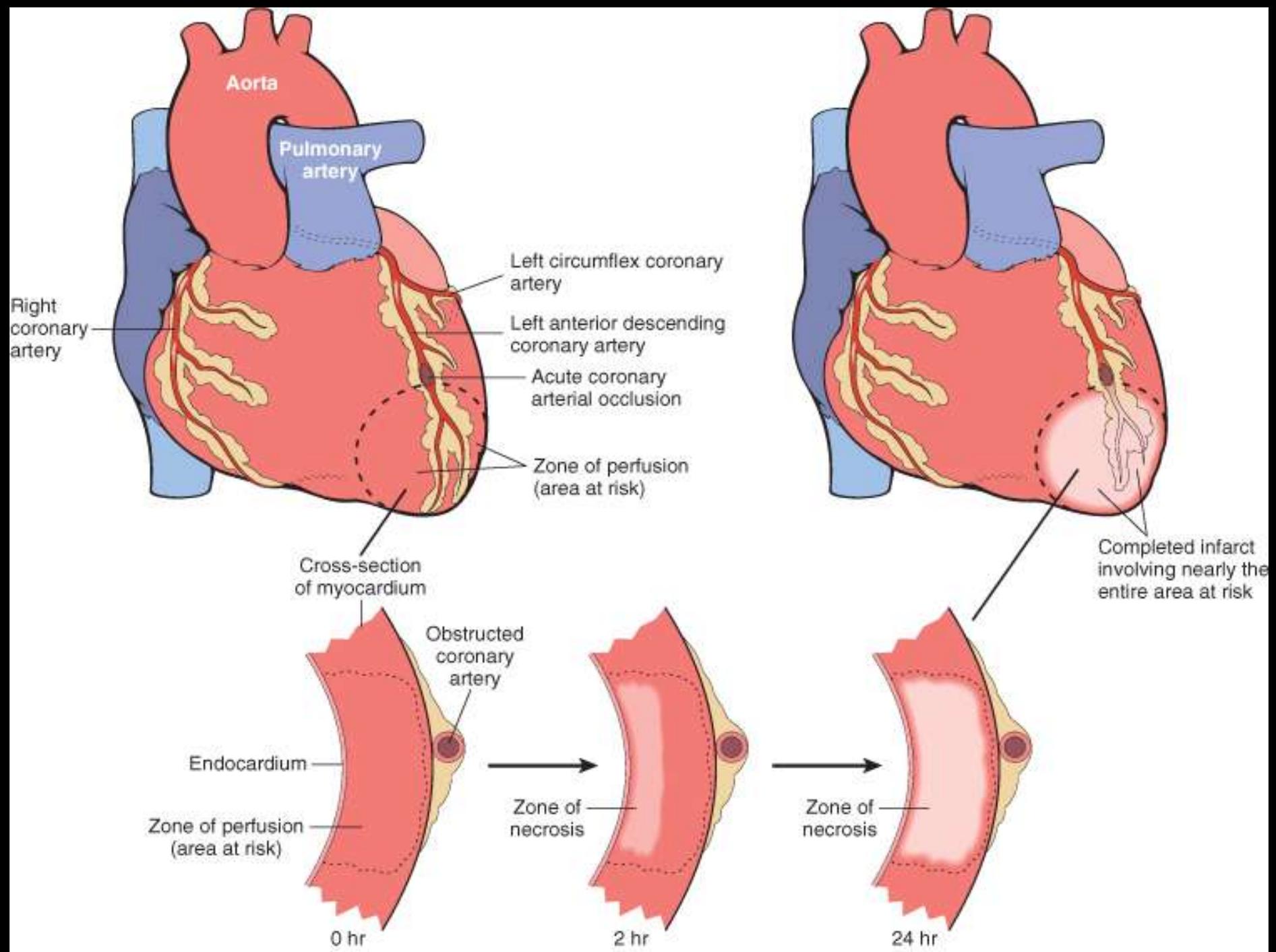
- Paroi musculaire
- Drainage vers le système veineux



# Cas clinique

- Sujet adulte
- Douleur thoracique particulière
- Irradiation
- Urgences.....







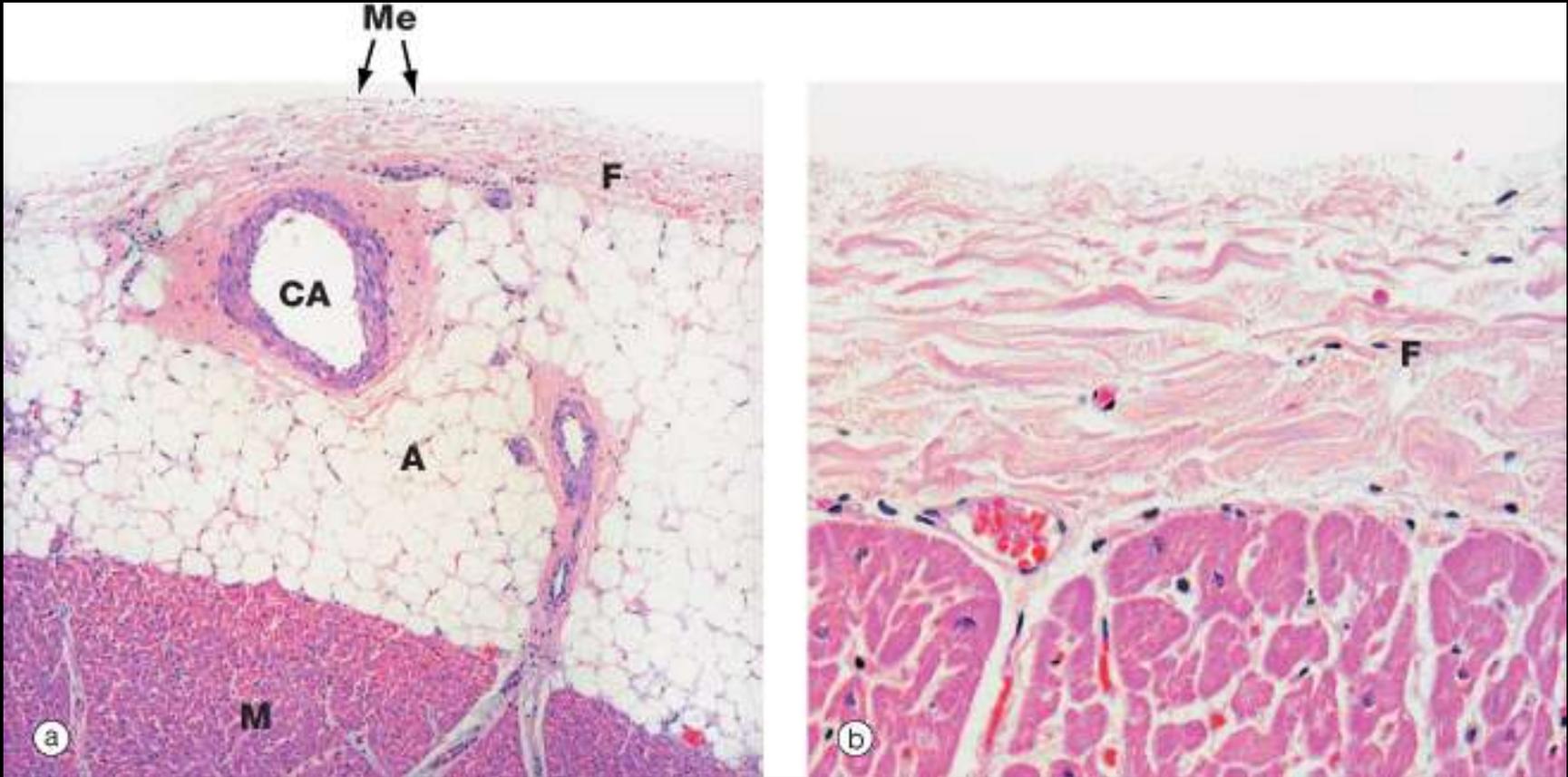
**TTC**

## *Cœur – Paroi ventriculaire gauche (HE x 3)*



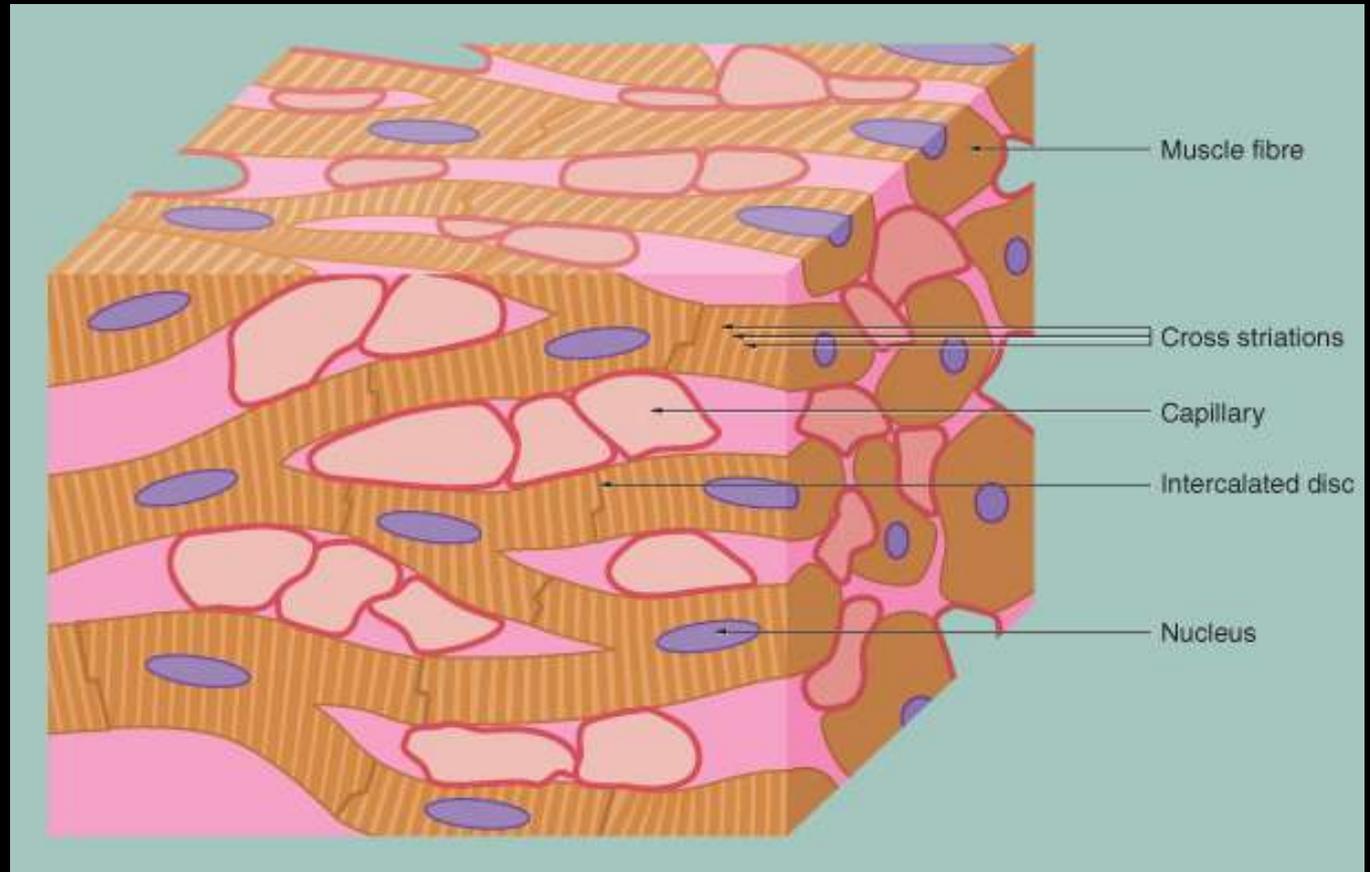
- Endocarde
- Myocarde
- Piliers
- Péricarde

# *Cœur, Péricarde viscéral (HE x 200 – 500)*



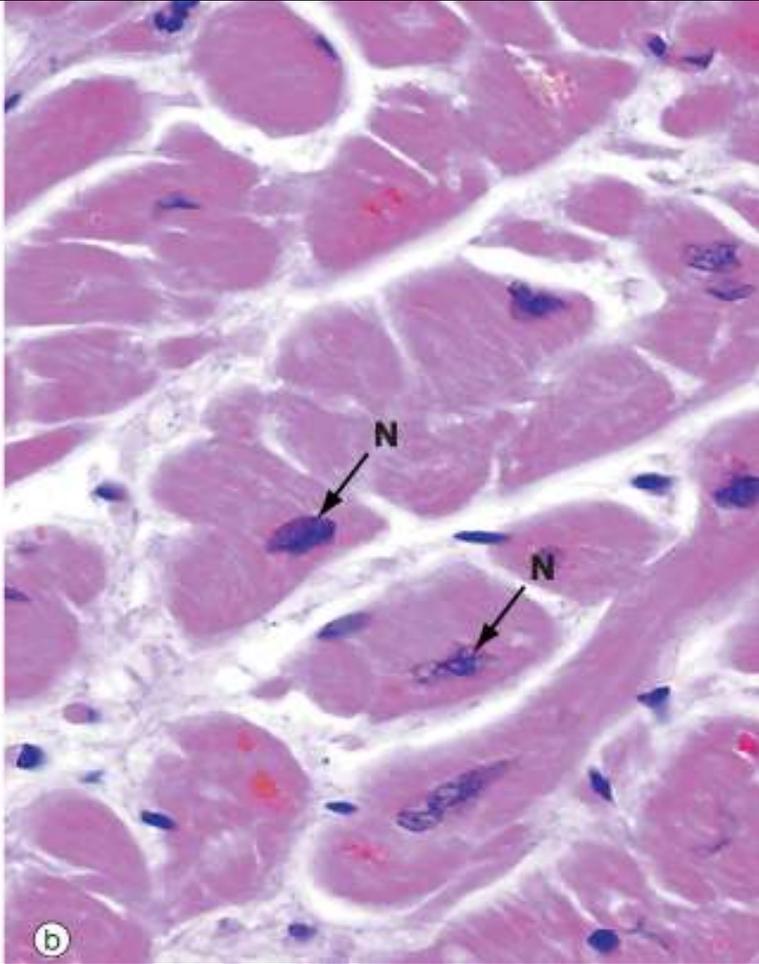
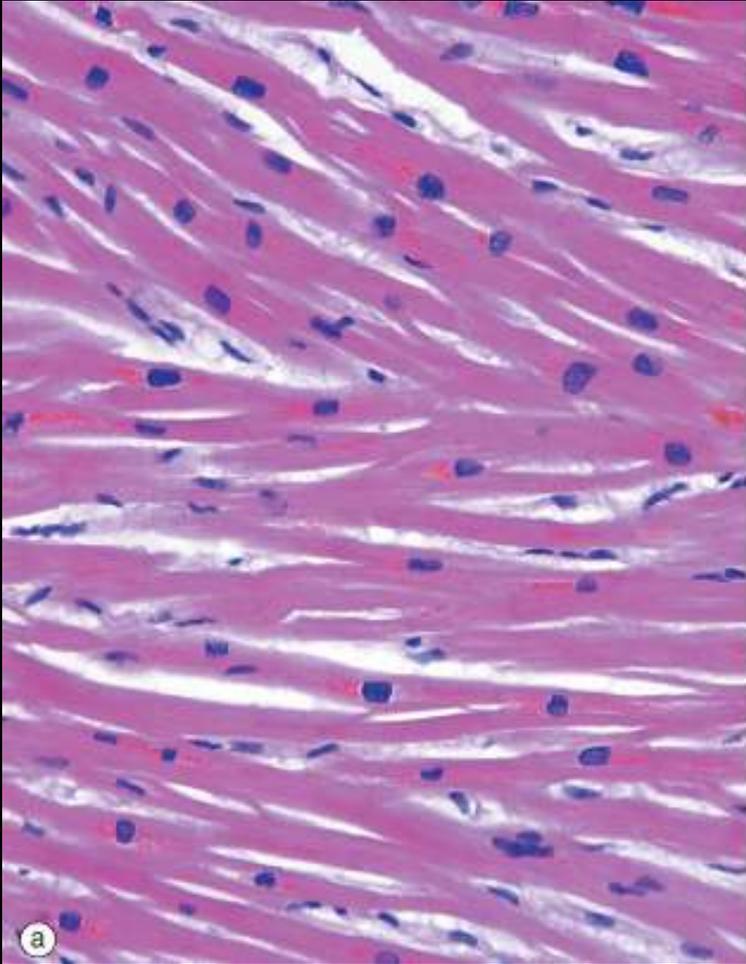
- Mésothélium
- Branche A. coronaire (adipocytes)
- Tissu fibreux dense

# Myocarde

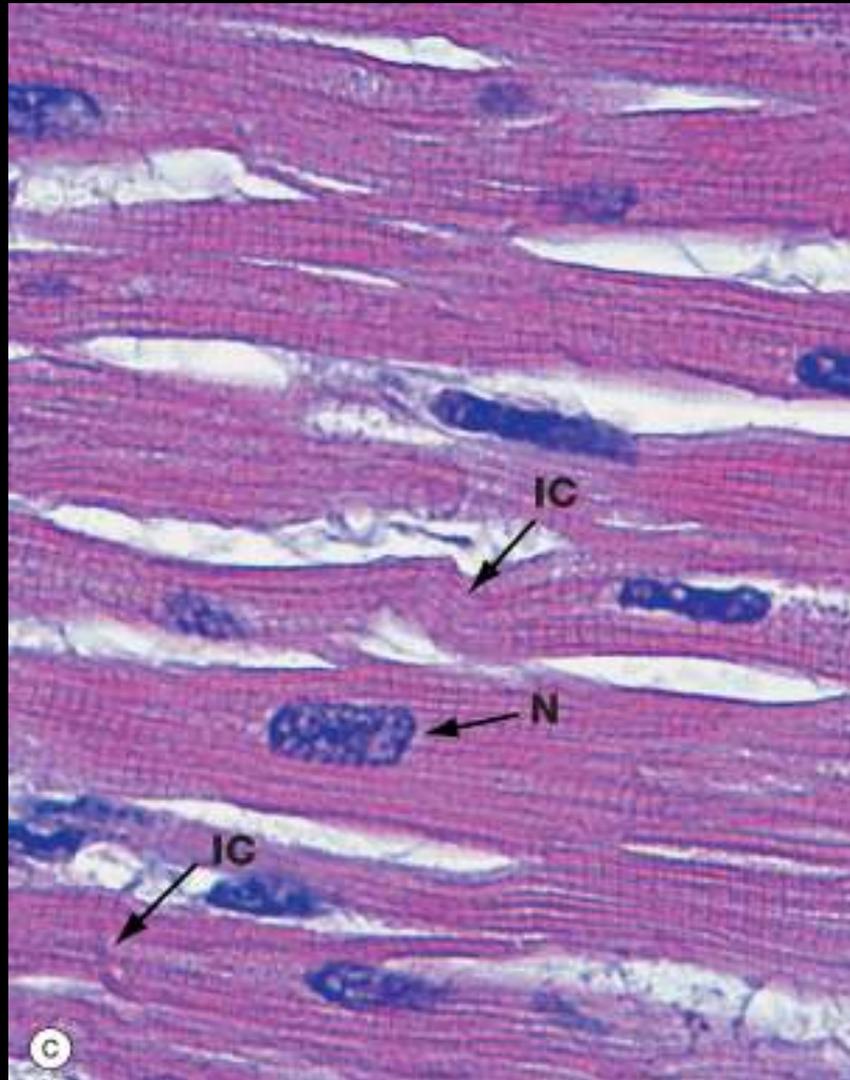


- Fibre myocardique (« syncytiale »)
- Striations
- Disque intercalaire

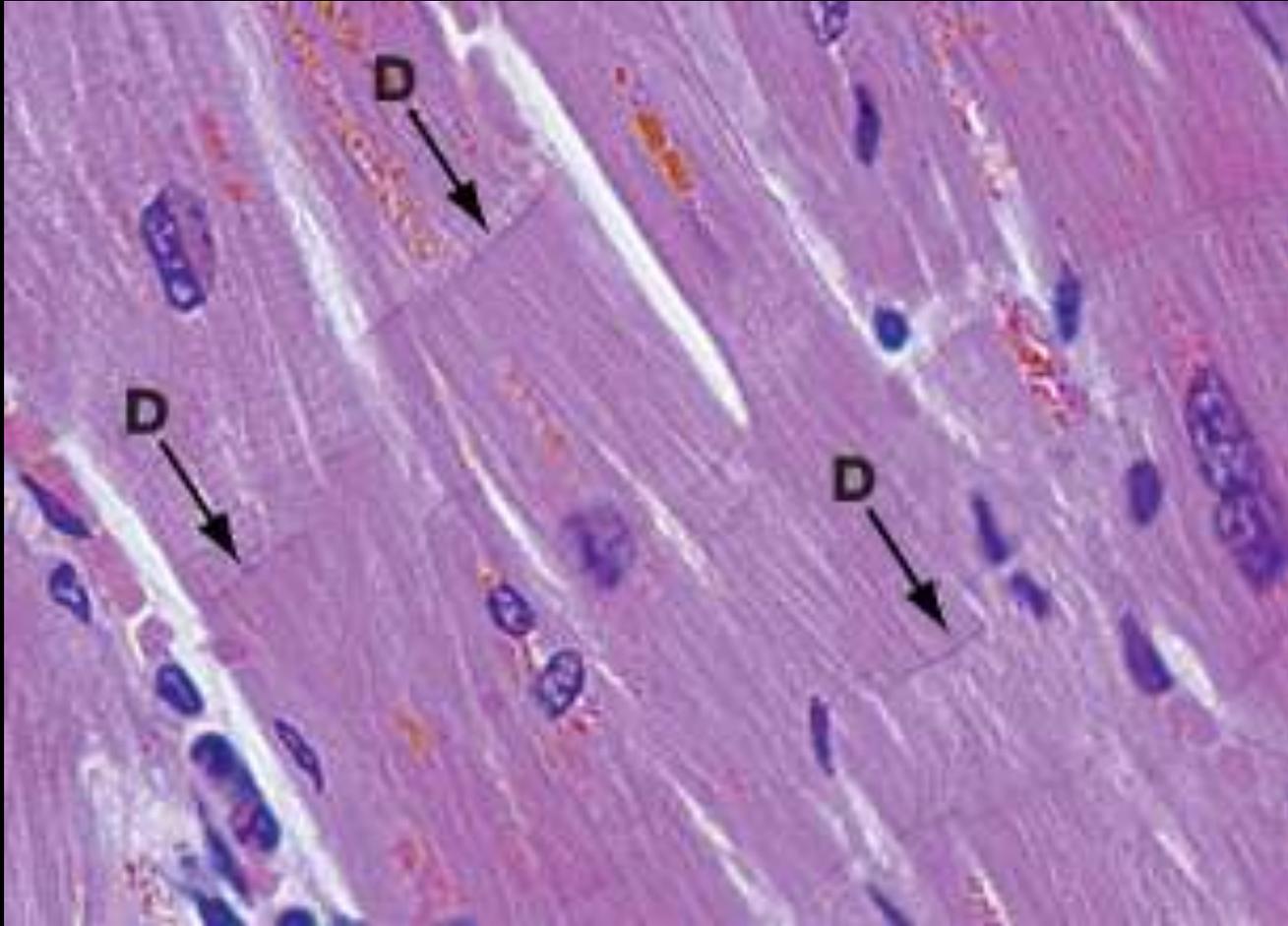
**Myocarde (Coupes long. X 200 – transv. X 500)**



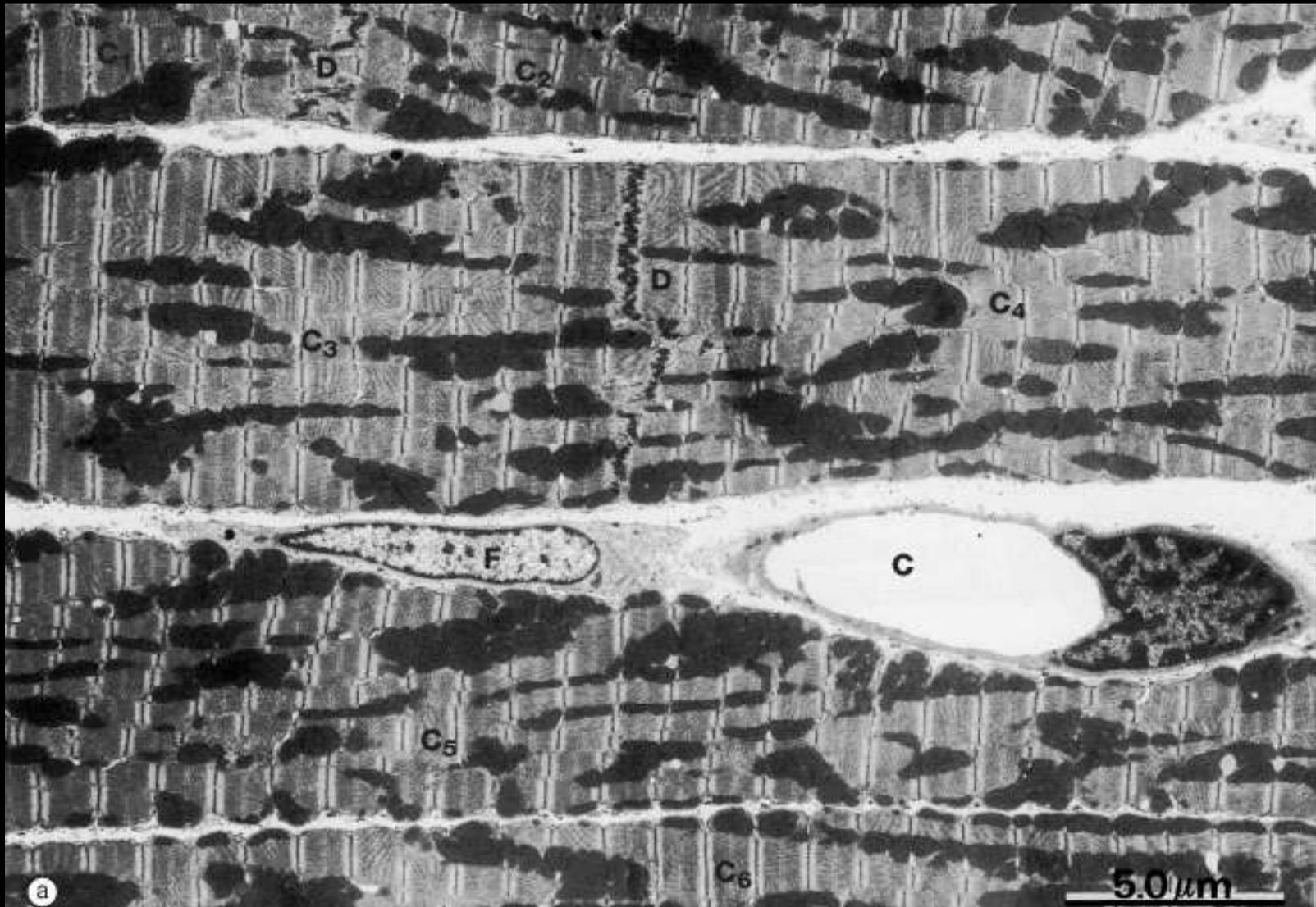
# ***Myocarde ( Polarisation HE x 500)***



# *Myocarde (Coupe long. X 500)*

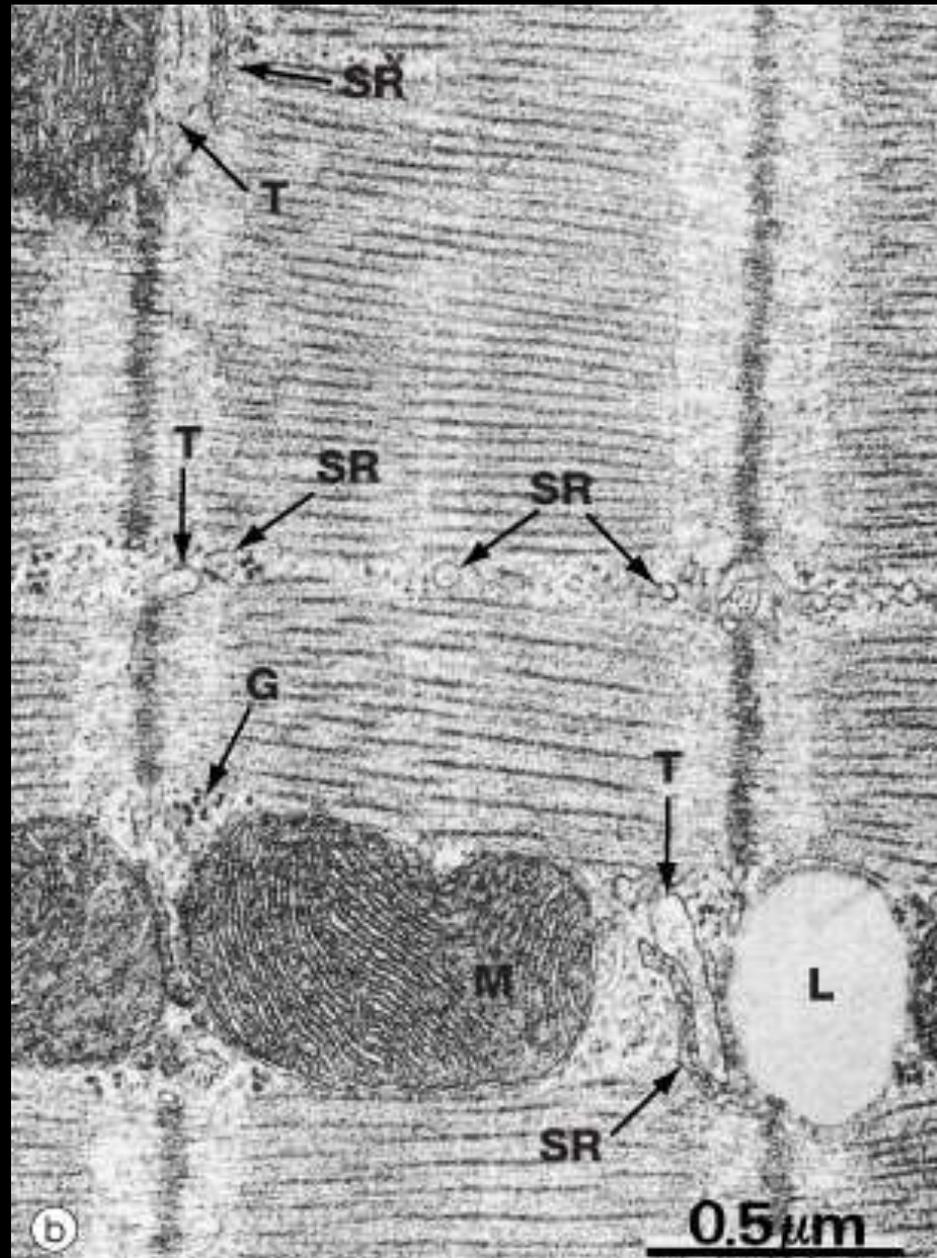


# Myocarde (ME x 5000)



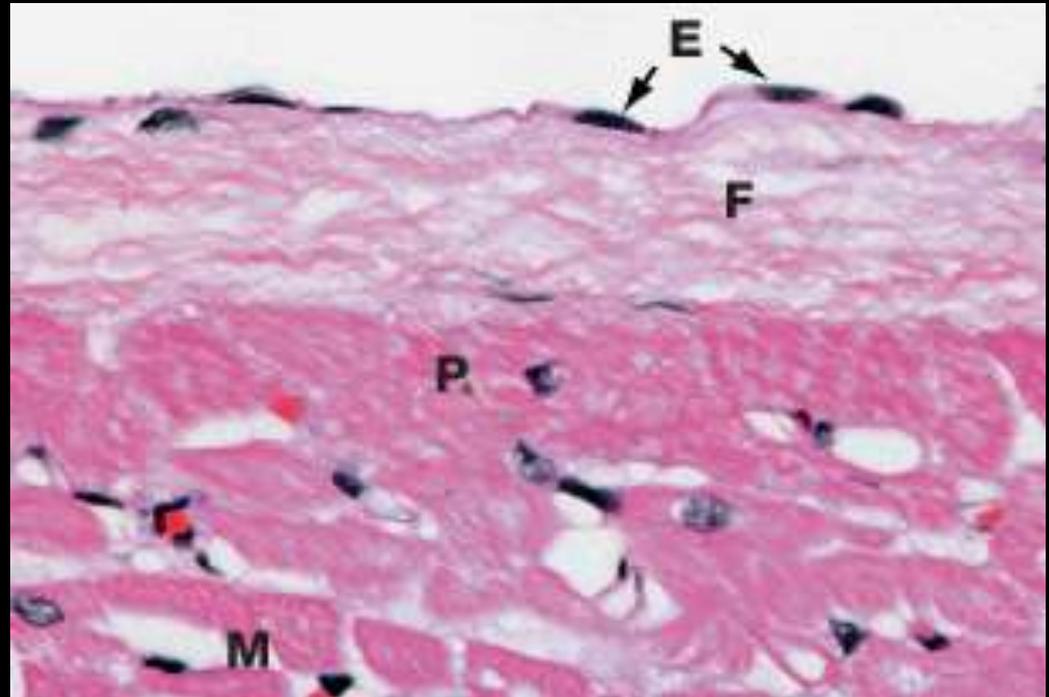
# Myocarde (ME x 38 000)

- Sarcomères arrangements tridimensionnels
- Réticulum sarcoplasmique et mitochondries
- Système tubulaire T



# Endocarde ( HE x 300)

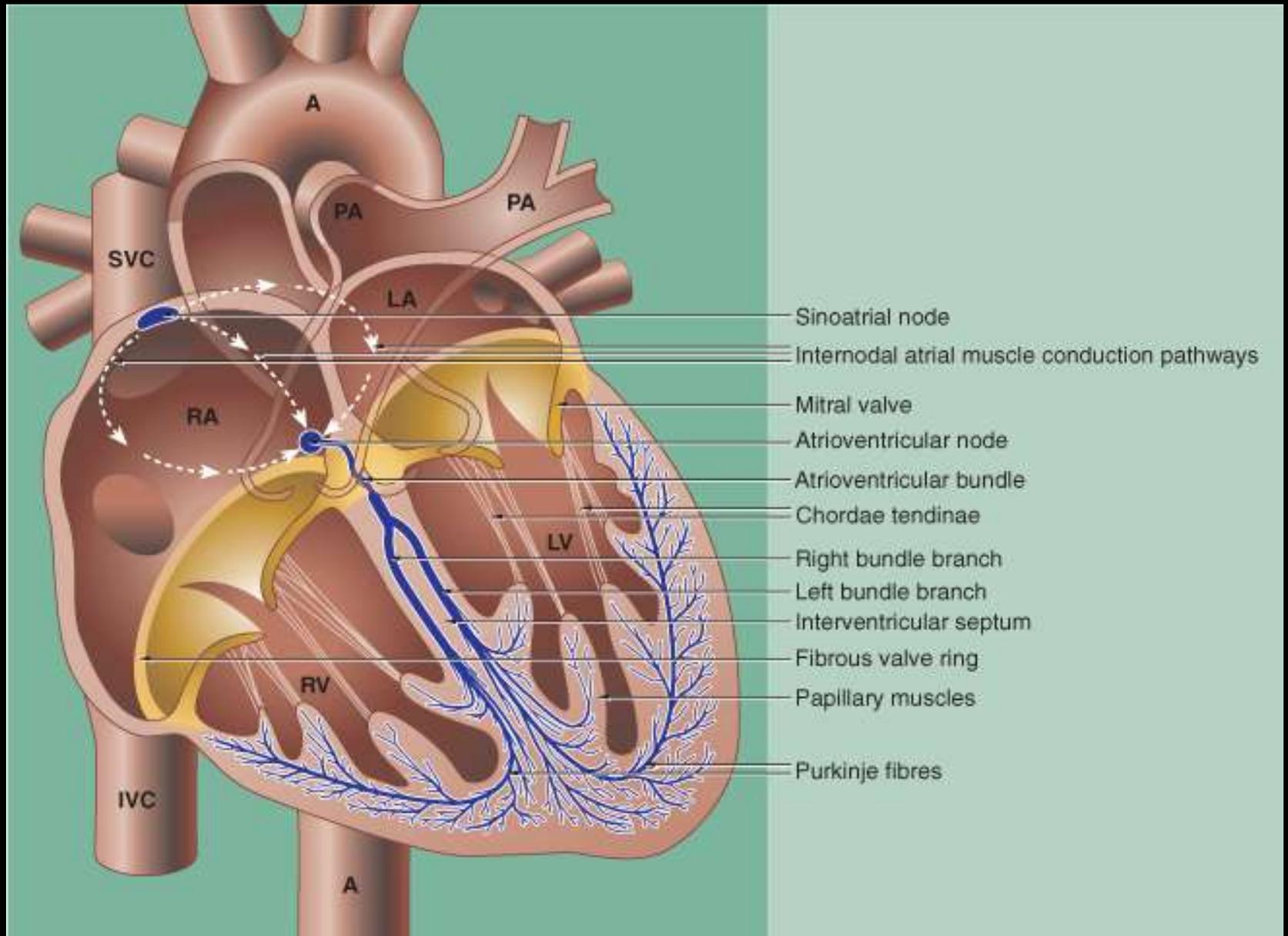
- Cellules endothéliales
- Tissu fibreux
- Fibres de Purkinje
- Myocarde



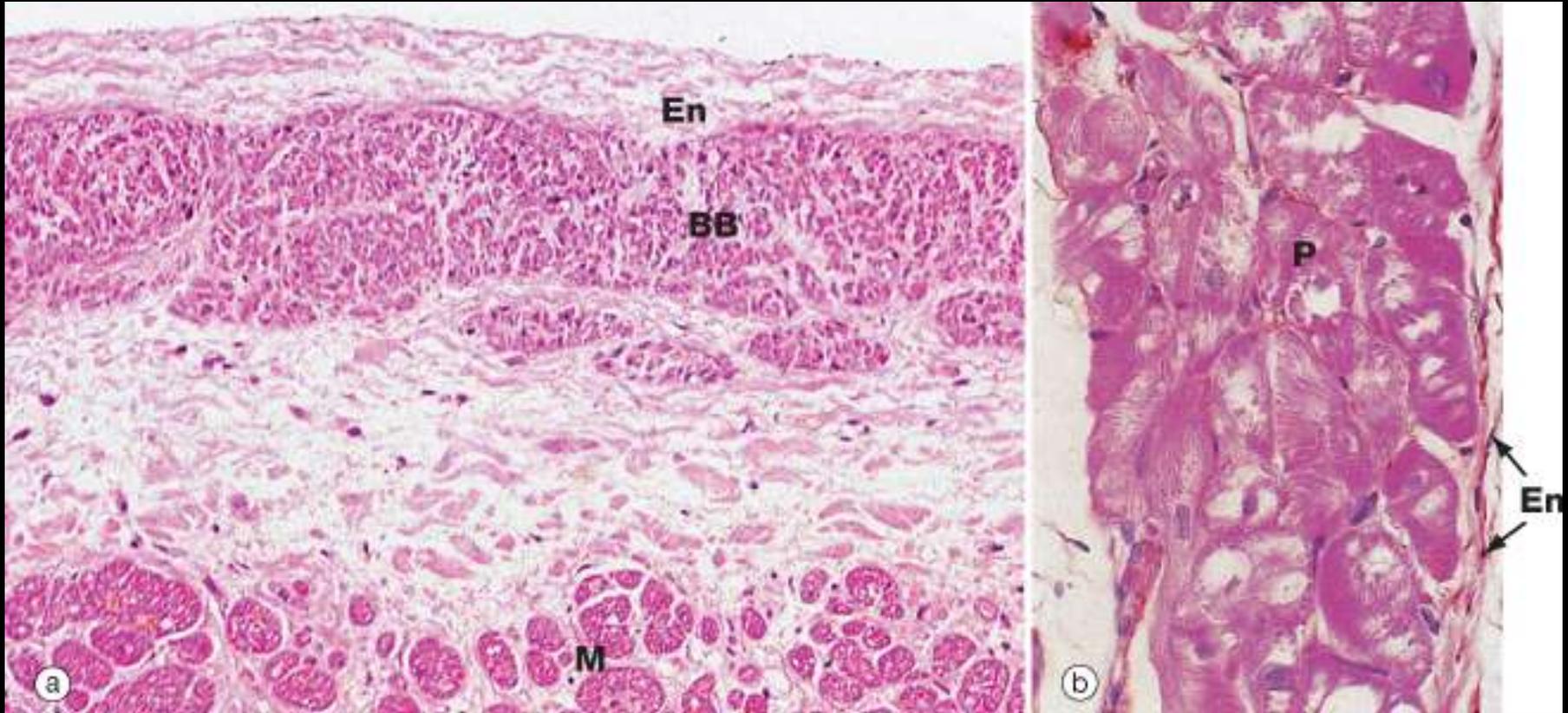
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# Systeme de conduction



# ***Faisceaux et Fibres de Purkinje (HE 150- HE élastique x 400***

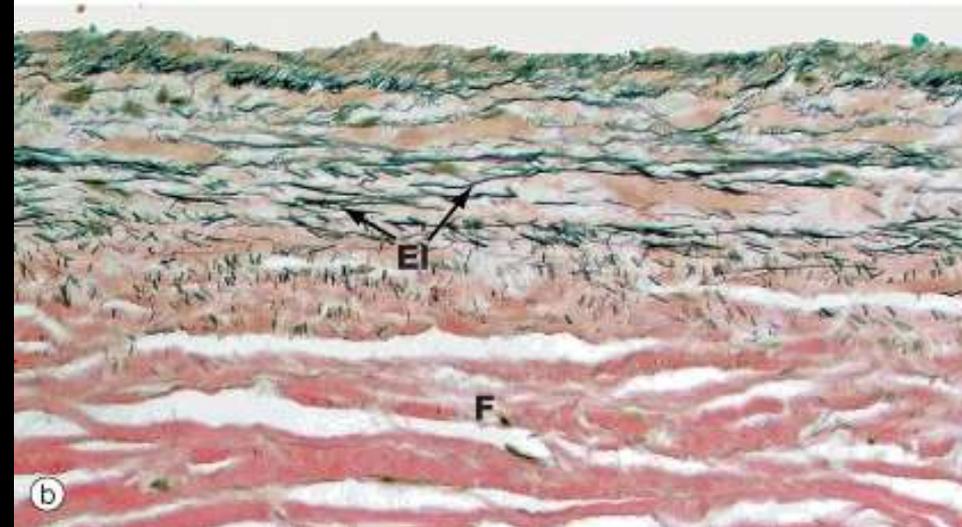
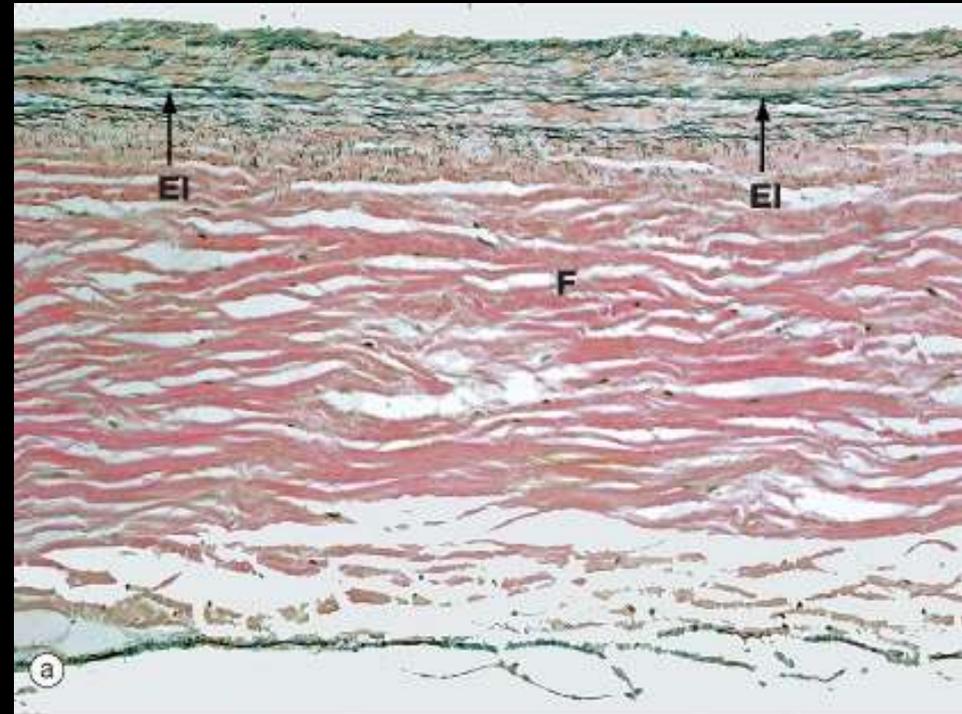


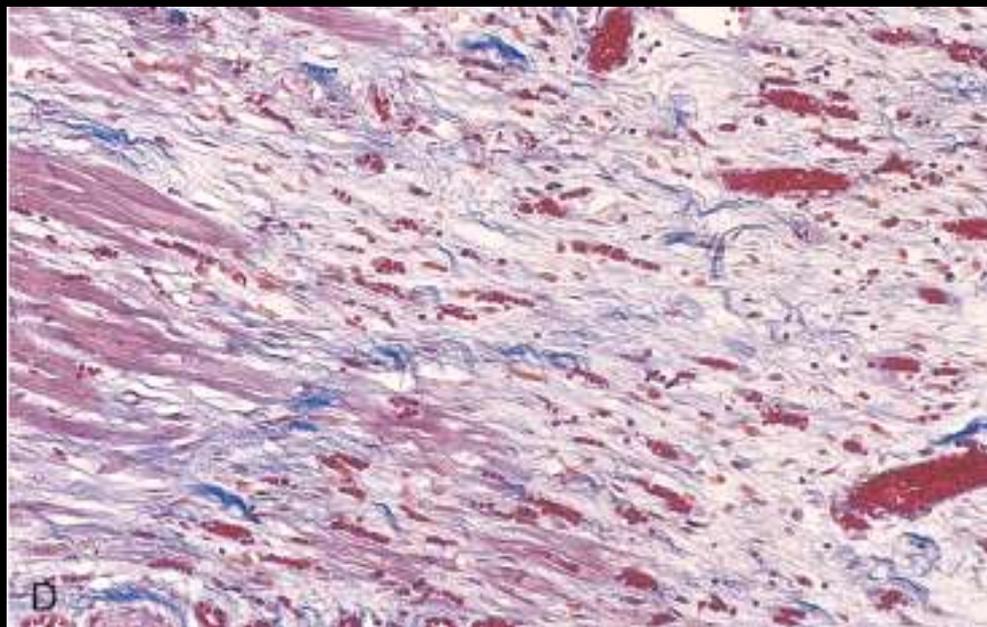
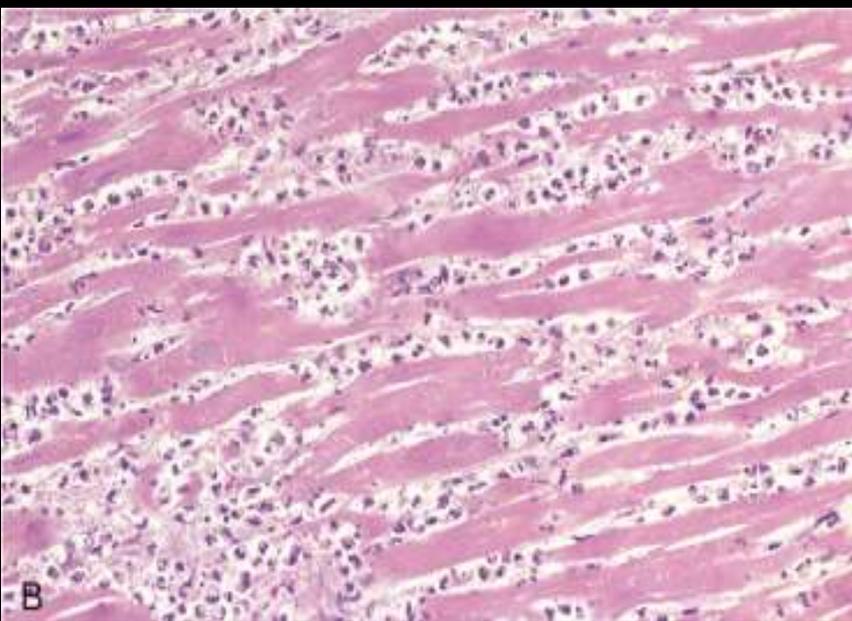
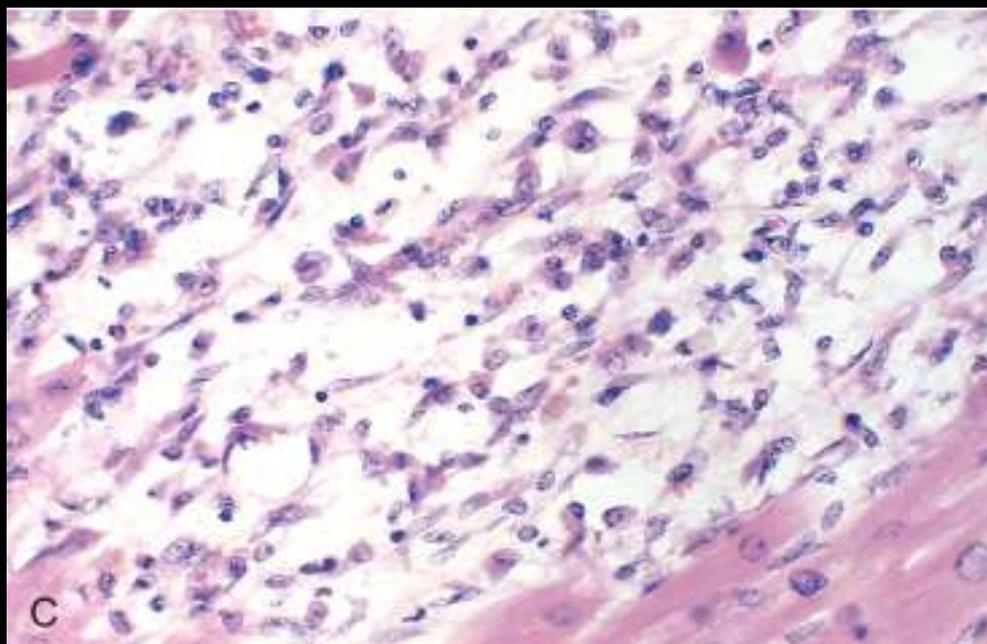
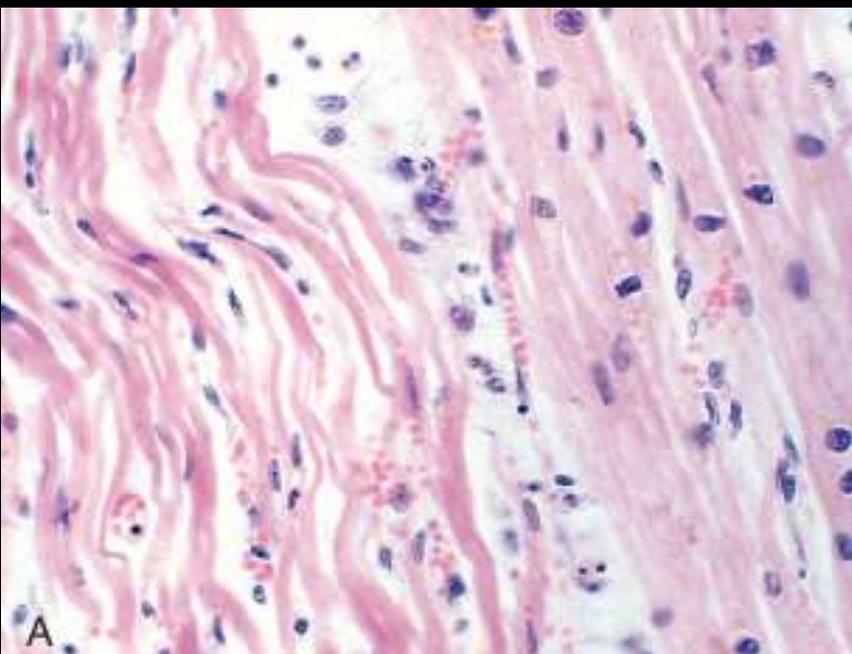
- Faisceaux de fibres conduction BB (His)
- Fibres de Purkinje:
  - Fibres plus pâle: Peu de myofibrilles, plus de glycogène, et de mitochondries.
  - Pas de système T
  - Jonction par desmosomes et Gap.

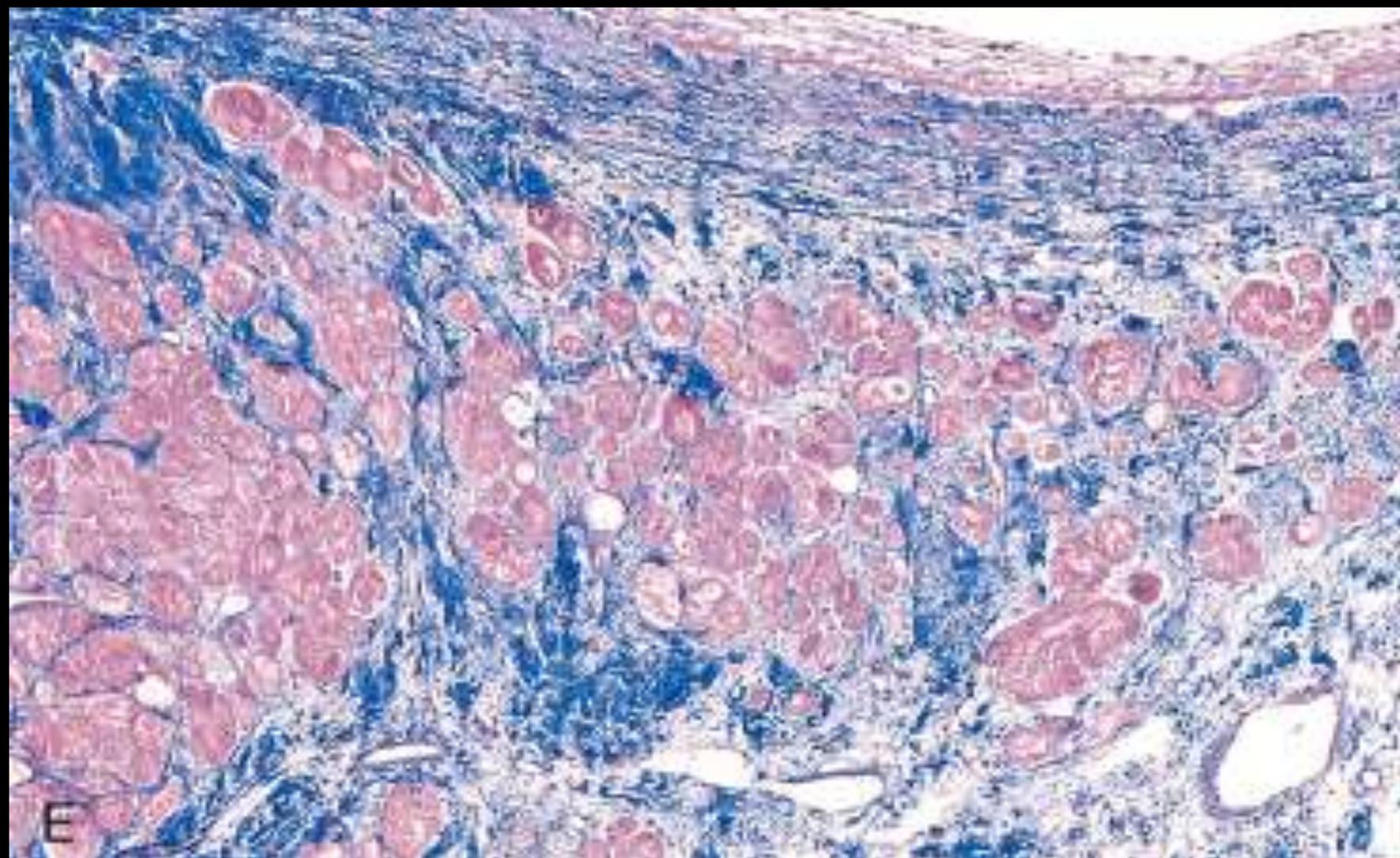


# Valvule (Elastique x 30 – x 75)

- Lame fibreuse
- Fibres élastiques







Réalisation

Gérard ABADJIAN

Beyrouth

Le 13 Mai 2007

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of a database is the record. A record is a collection of related data treated as a single entity. For example, a hockey trading card could be called a record: it brings together the name, photograph, team, and statistics of one player. Using database terms, each of these related pieces of information is called a *field*: each card *record* has a name field, field, and various player statistics fields. The building block of a database is the record. A record is a\_

This appendix is intended for users who have little or no experience working with databases or database connections. It explains general concepts, not specific procedures. To see how these concepts apply in practice, see the rest of the help system.

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*Fin*  
*The End*  
*Merci*  
*de votre attention*