Università degli studi di
Bari

Corso di Laurea in

Scienze Fisioterapiche
e nella
Professione Sanitaria in Infermiere

Facoltà di Medicina e Chirurgia

CORSO DI
ANATOMIA UMANA

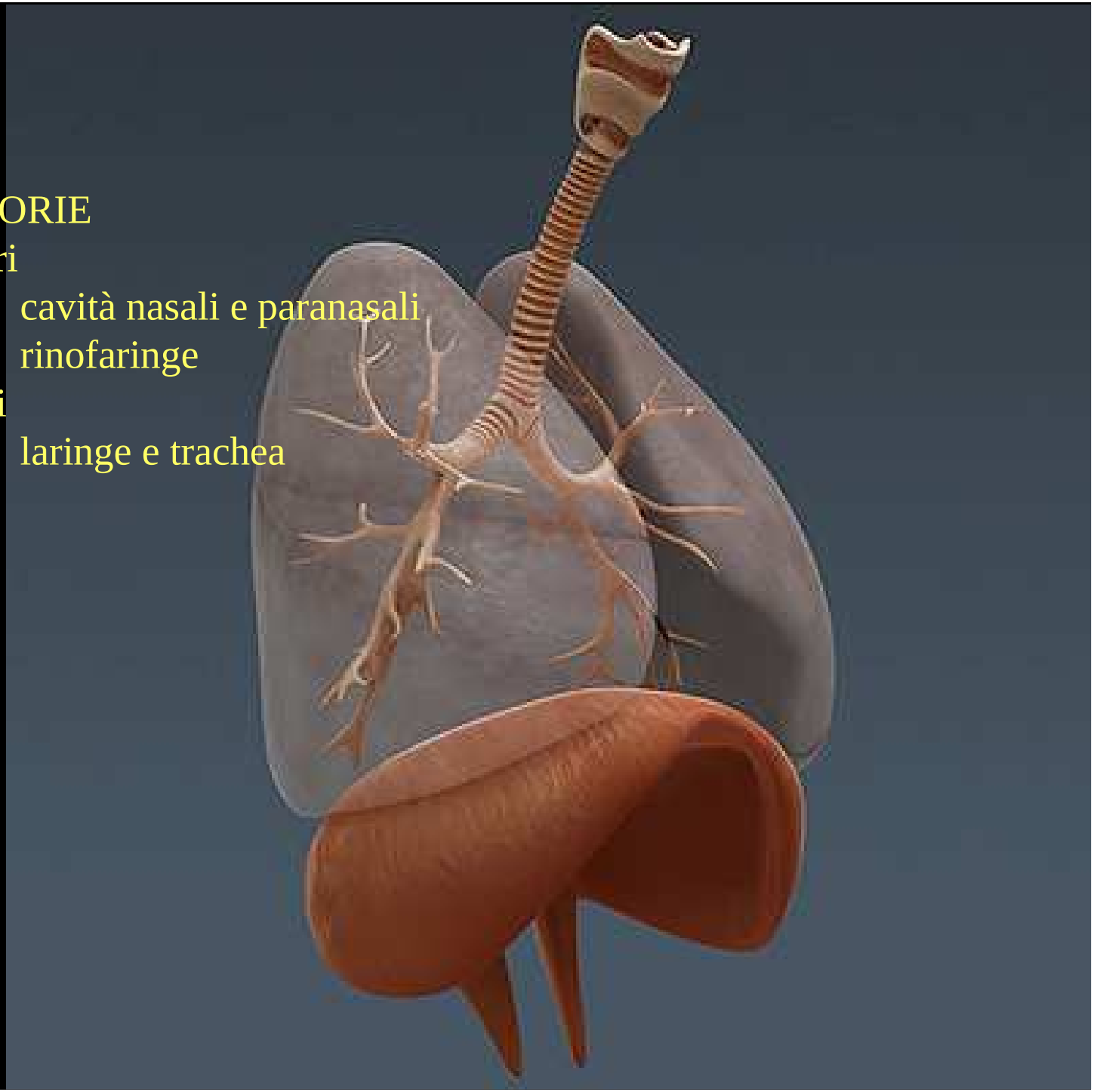
Anatomia Umana

- Anatomia Macro- e Microscopica.
  - **Apparato circolatorio**
  - **Apparato emolinfopoietico**
  - **Apparato respiratorio**
  - Apparato uropoietico
  - Apparato endocrino
  - Apparato genitale maschile
  - Apparato genitale femminile
  - Apparato tegumentario
  - Apparato locomotore
  - Apparato nervoso

VIE RESPIRATORIE

- superiori
  - cavità nasali e paranasali
  - rinofaringe
- inferiori
  - laringe e trachea

POLMONI

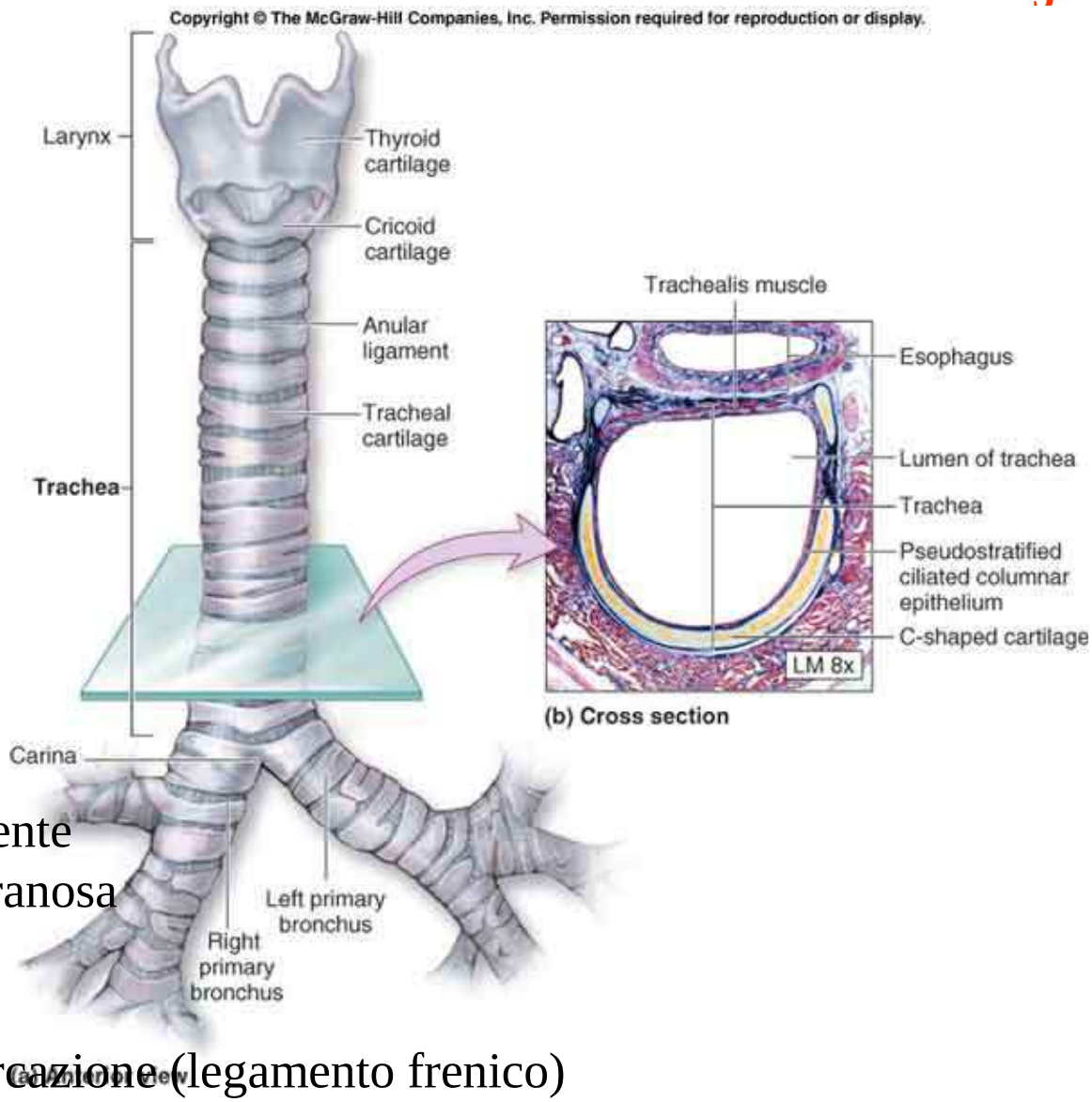


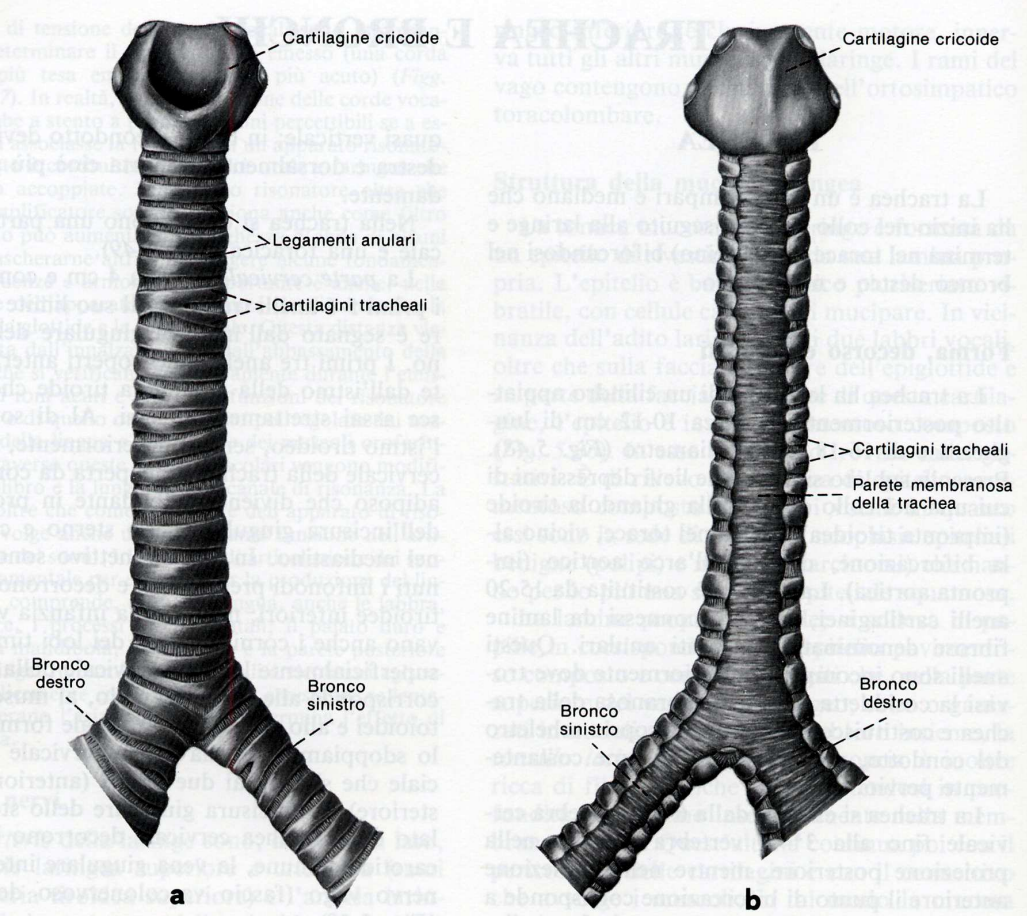
02/02/2016 11:47


SCIENCEphotoLIBRARY

TRACHEA

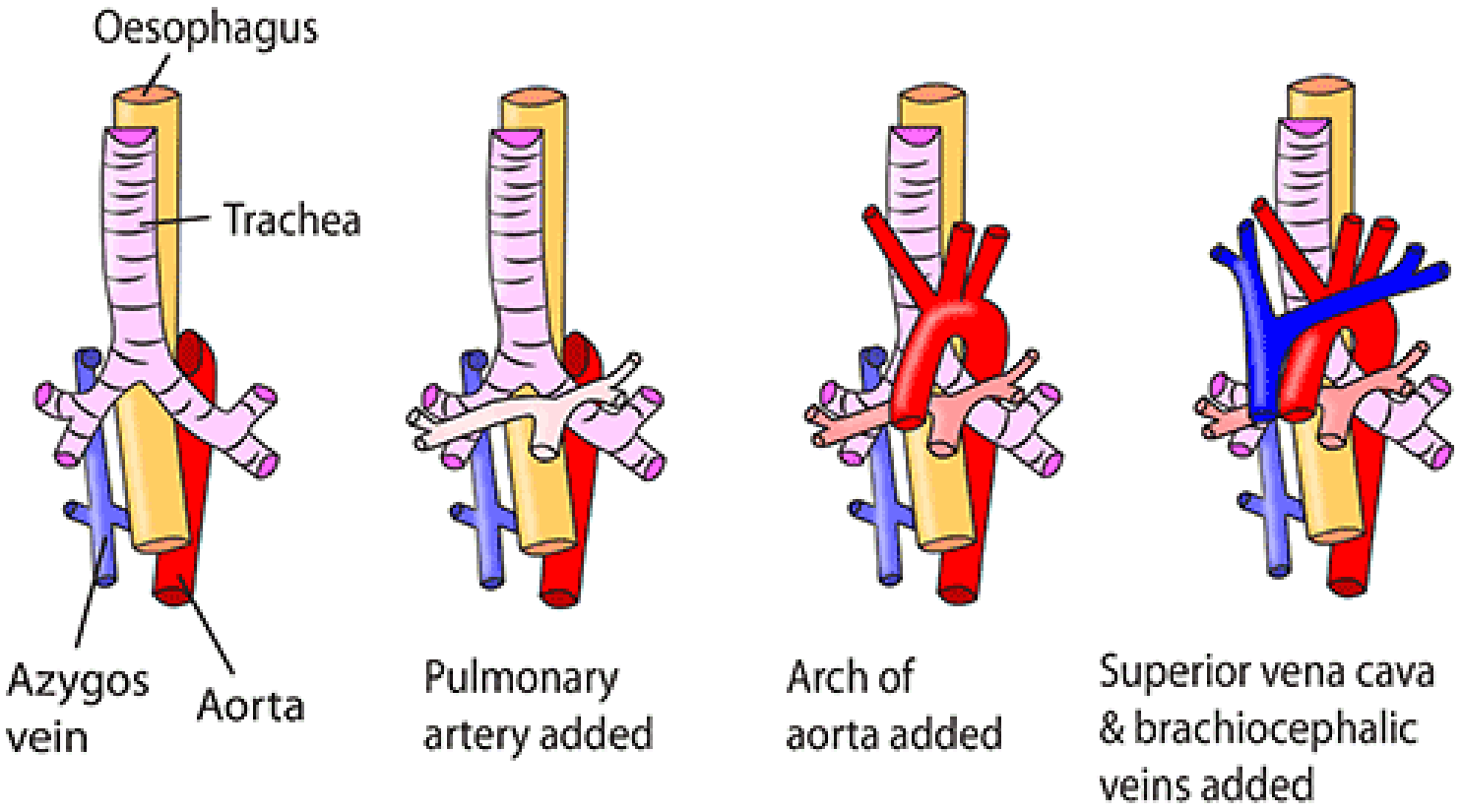
Impari mediana
Lunga 12-13 cm
Diametro 16-18mm
15-20 anelli cartilaginei
legamenti anulari
incompleti posteriormente
parete membranosa
Estensione
da C6-C7 a T3 e T4
biforcazione (legamento frenico)



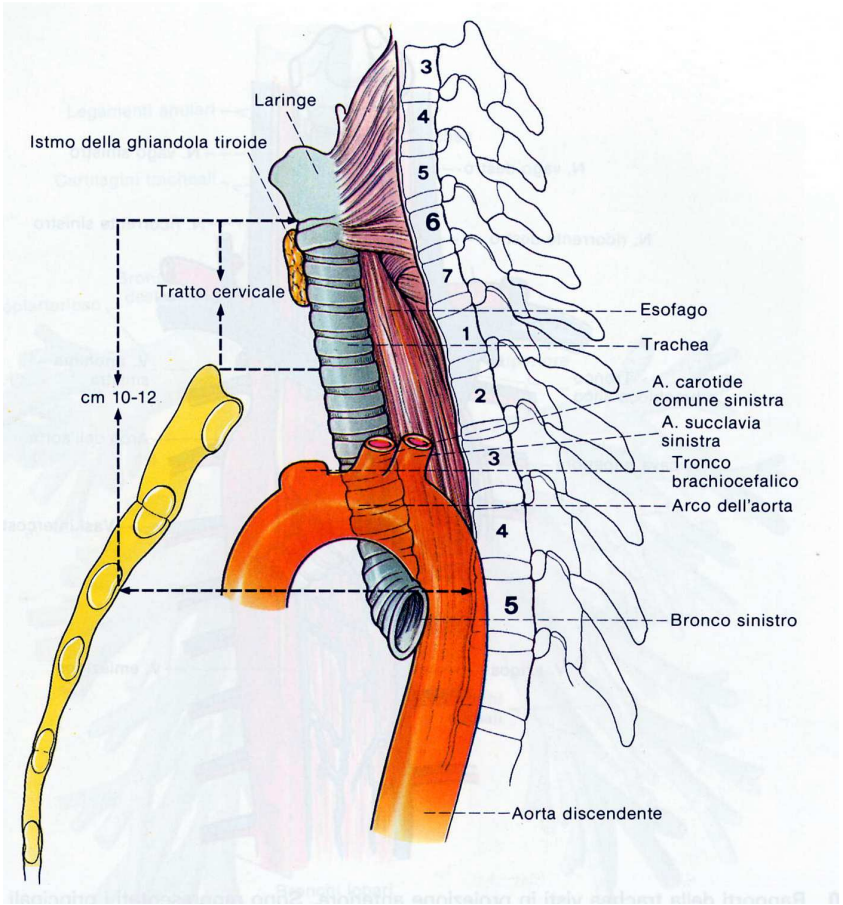

Cartilagine cricoide
Legamenti anulari
Cartilagini tracheali
Bronco destro
Bronco sinistro
a
Cartilagine cricoide
Cartilagini tracheali
Parete membranosa della trachea
Bronco sinistro
Bronco destro
b

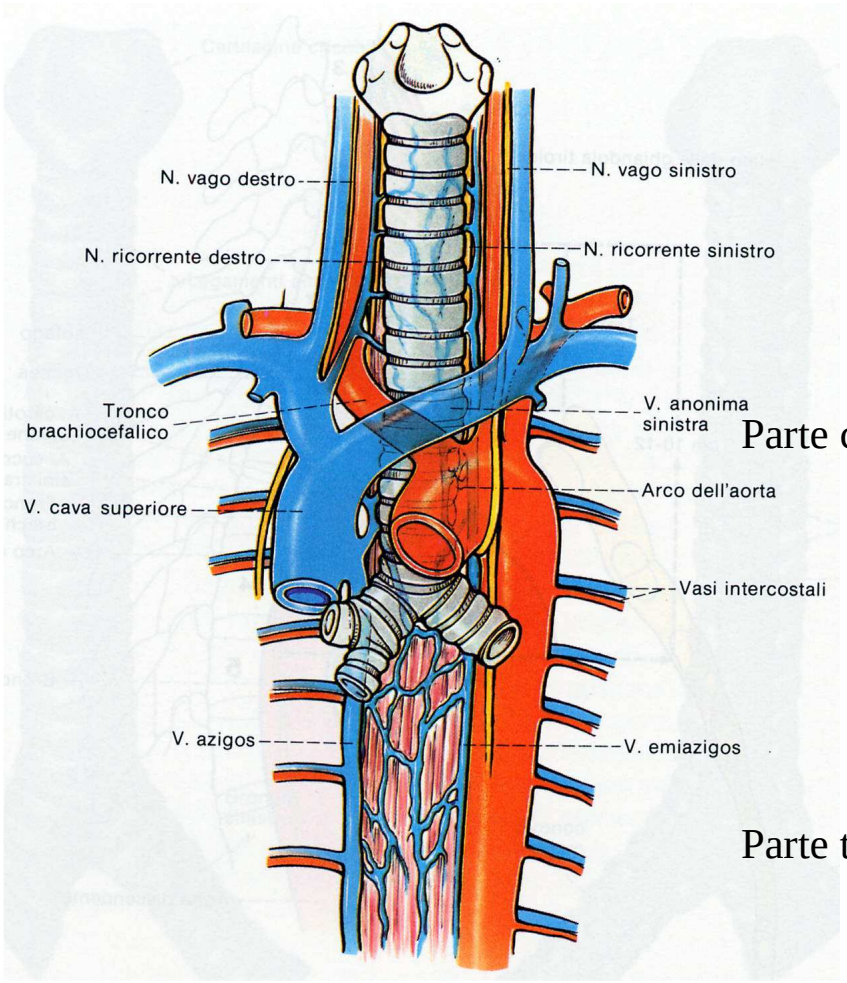

SCIENCEphotoLIBRARY

RELATIONS IN THE MEDIASTINUM



Suddivisione della trachea





Parte cervicale

5-6 anelli

Rapporti

anteriormente:

tiroide, tessuto connettivo adiposo

corni cervicali dei lobi timici

posteriormente: esofago

lateralmente: fascio vasculo-nervoso

Parte toracica

Rapporti

Vasi della trachea

Arteria della trachea – tiroidea inferiore e toracica interna
Arteria dei bronchi – rami dell'aorta

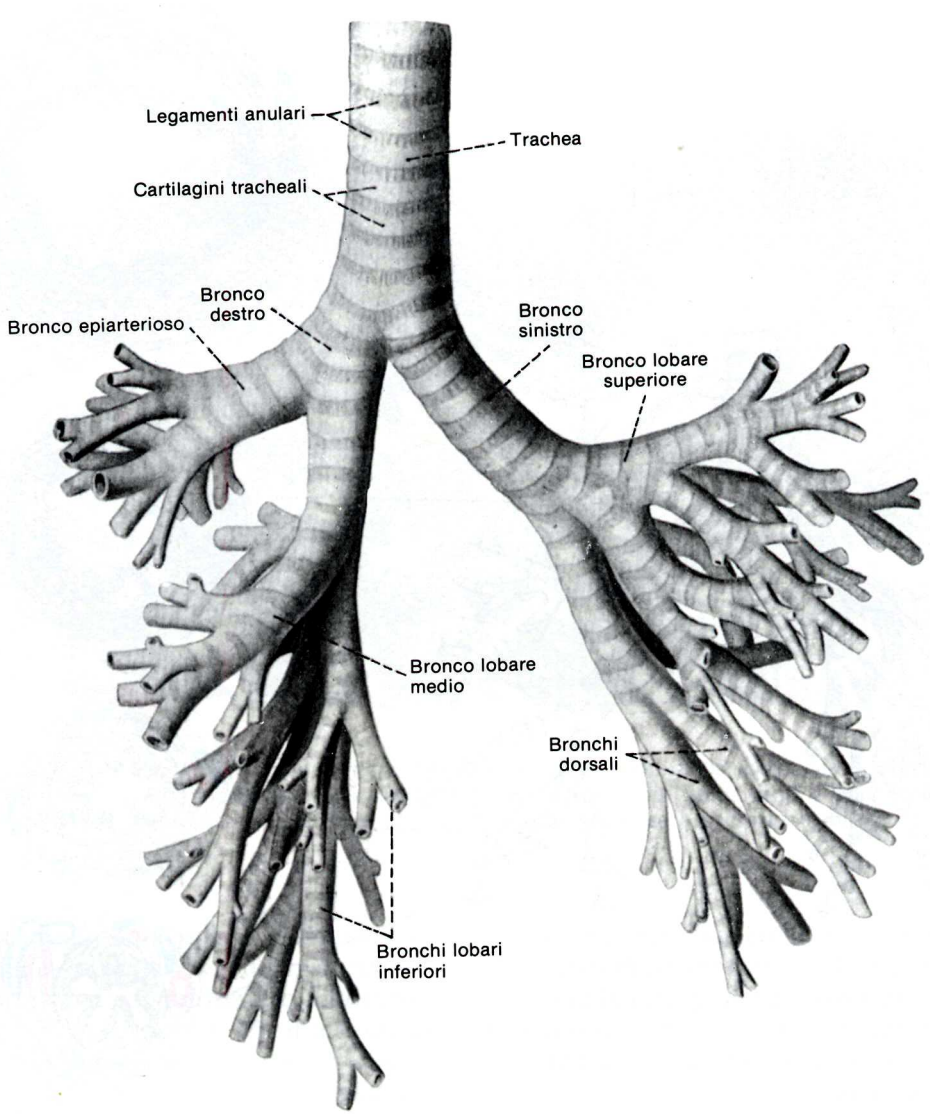
Vene della trachea – tiroidee inferiori e nelle esofagee
Vene dei bronchi – vene bronchiali

Linfatici: mediastinici

BRONCHI

Bronco destro
- ≅ 20°
- Ø 15 mm
- lunghezza 2 cm

Bronco sinistro
- ≅ 40-50°
- Ø 11 mm
- lunghezza 5 cm



STRUTTURA

Tonaca mucosa

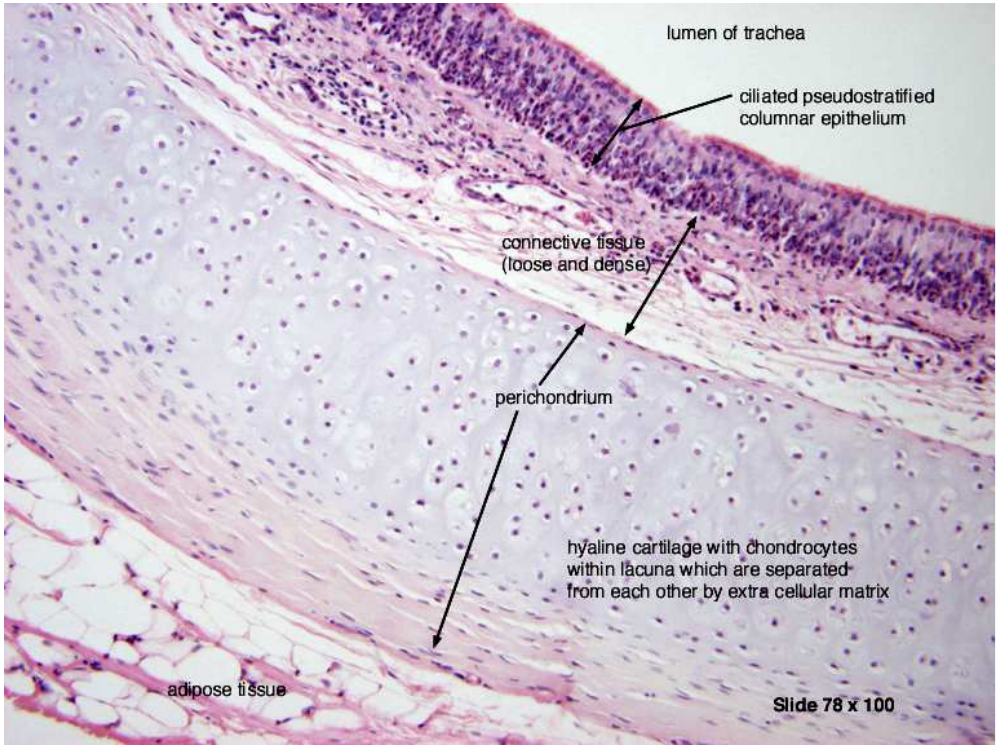
- Epitelio (respiratorio simile) e tonaca propria (connettivo elastico)

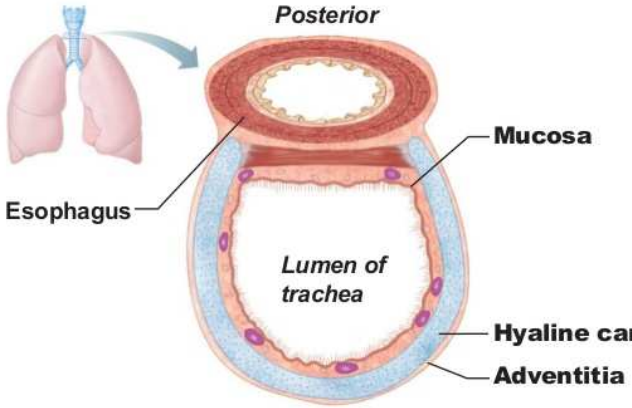
Tonaca sottomucosa

- Connettivo lasso
- Gh tubulo-acinose composte miste

Tonaca fibrosa

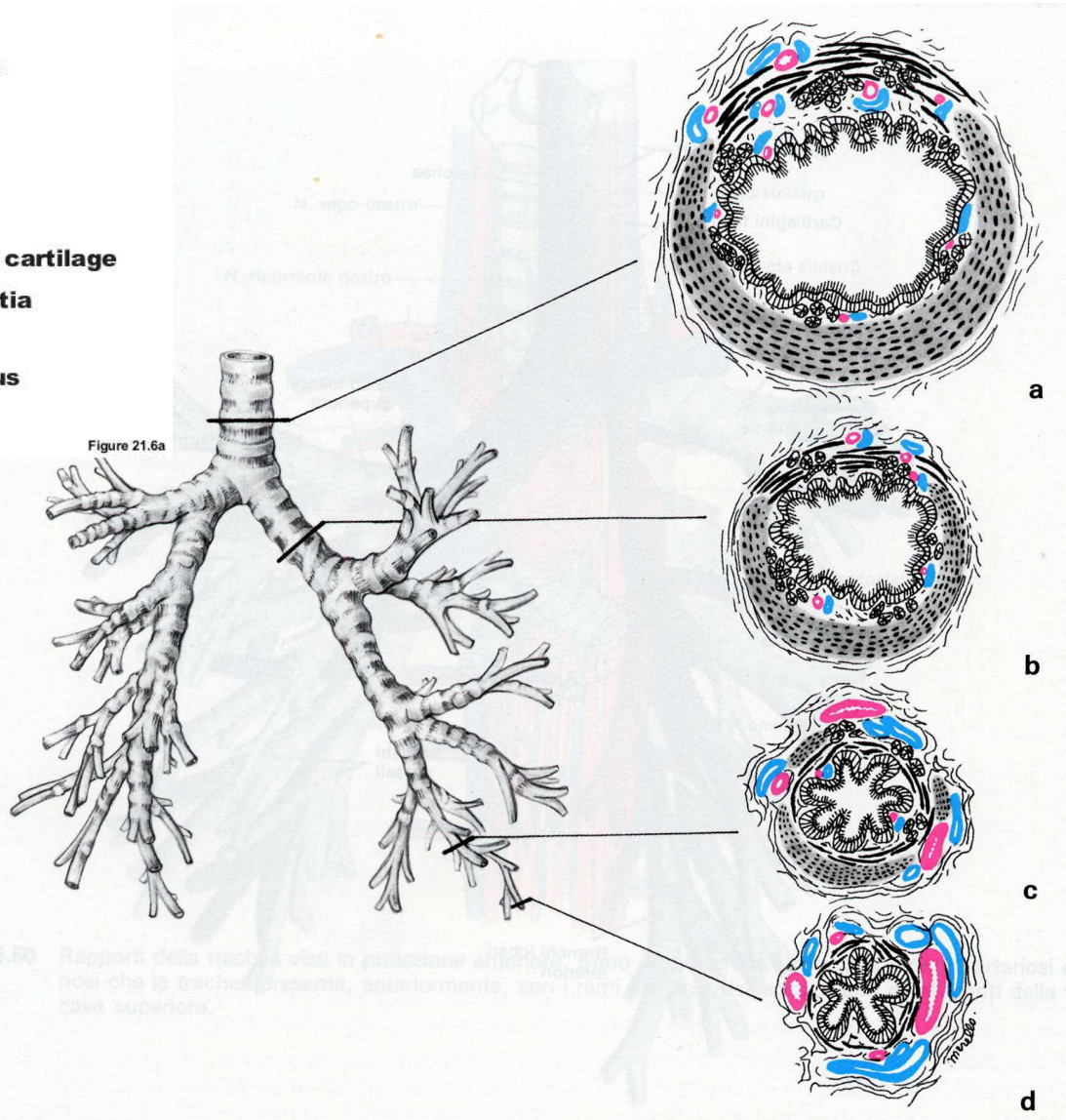
- connettivo elastico
- anelli cartilaginei
- parete membranosa
- componente muscolare liscia

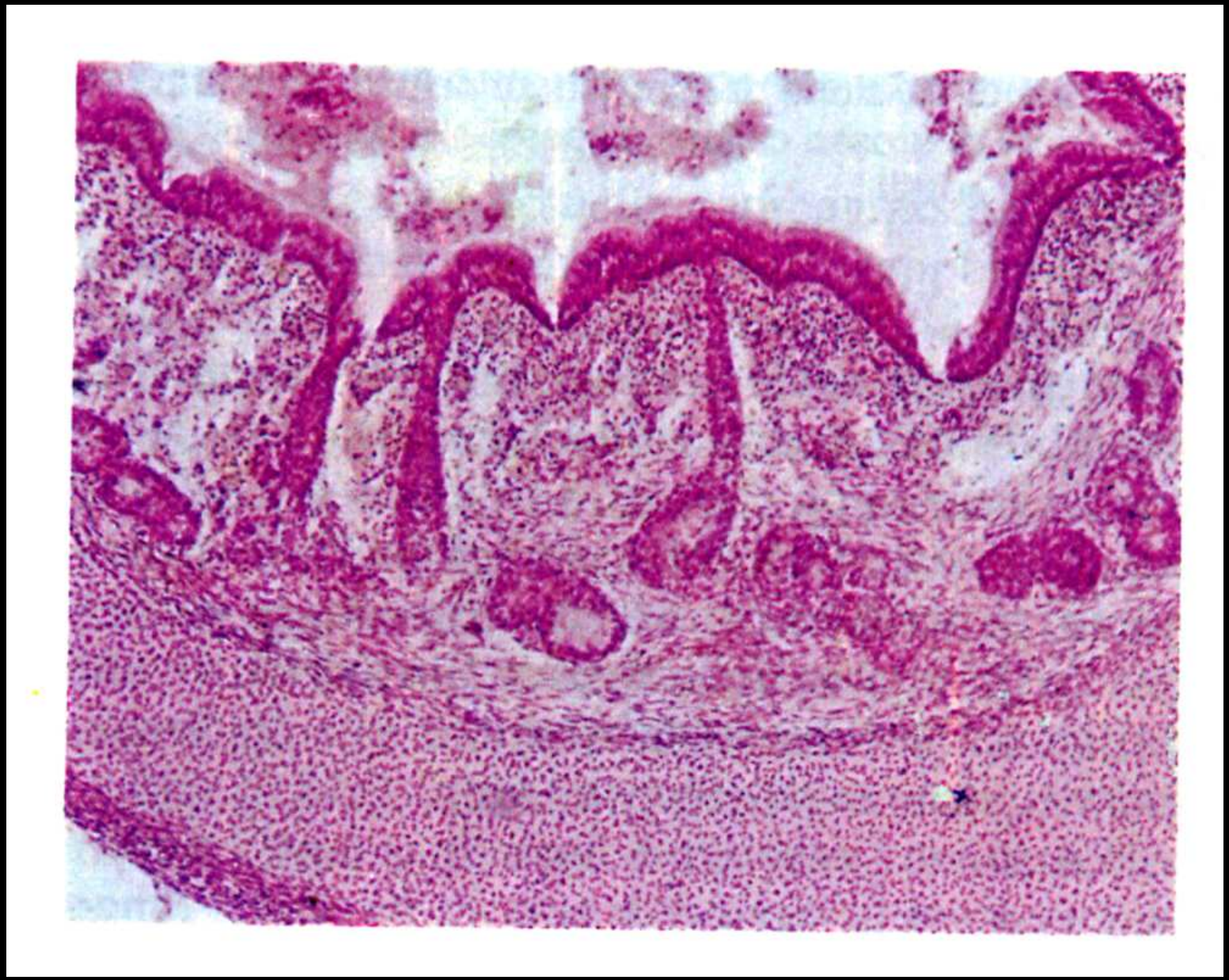




(a) Cross section of the trachea and esophagus

Figure 21.6a





CELLULE DELL'EPITELIO

1. Cellula cigliata
2. Cellula caliciforme mucipara
3. Cellula argentaffine
4. Cellula basale

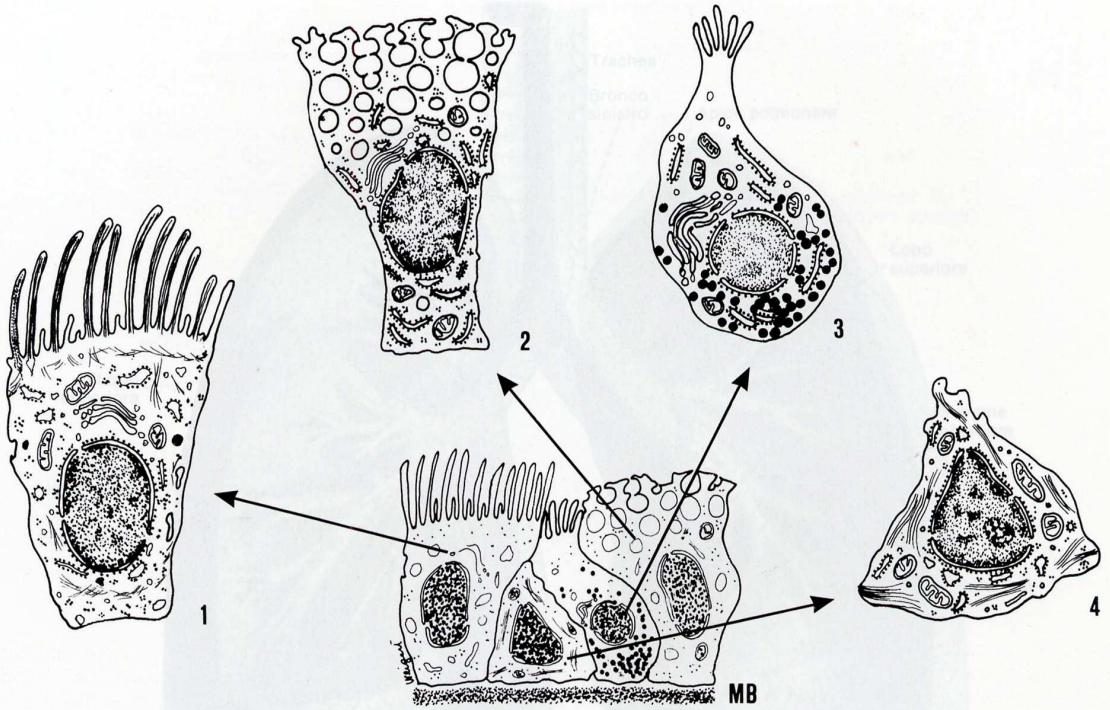


Fig. 5.57 Rappresentazione schematica dei caratteri ultrastrutturali dell'epitelio respiratorio bronchiale. **MB**, membrana basale; **1**, cellula cigliata; **2**, cellula caliciforme mucipara; **3**, cellula argentaffine (basigranulosa); **4**, cellula basale.

POLMONI

Situati nelle logge polmonari
Peso:
- 680 gr nell'uomo
- 620 gr nella donna

Capacità polmonare:
- inspirazione normale (3400-3700 mm^3)
- inspirazione forzata (5000-6000 mm^3)

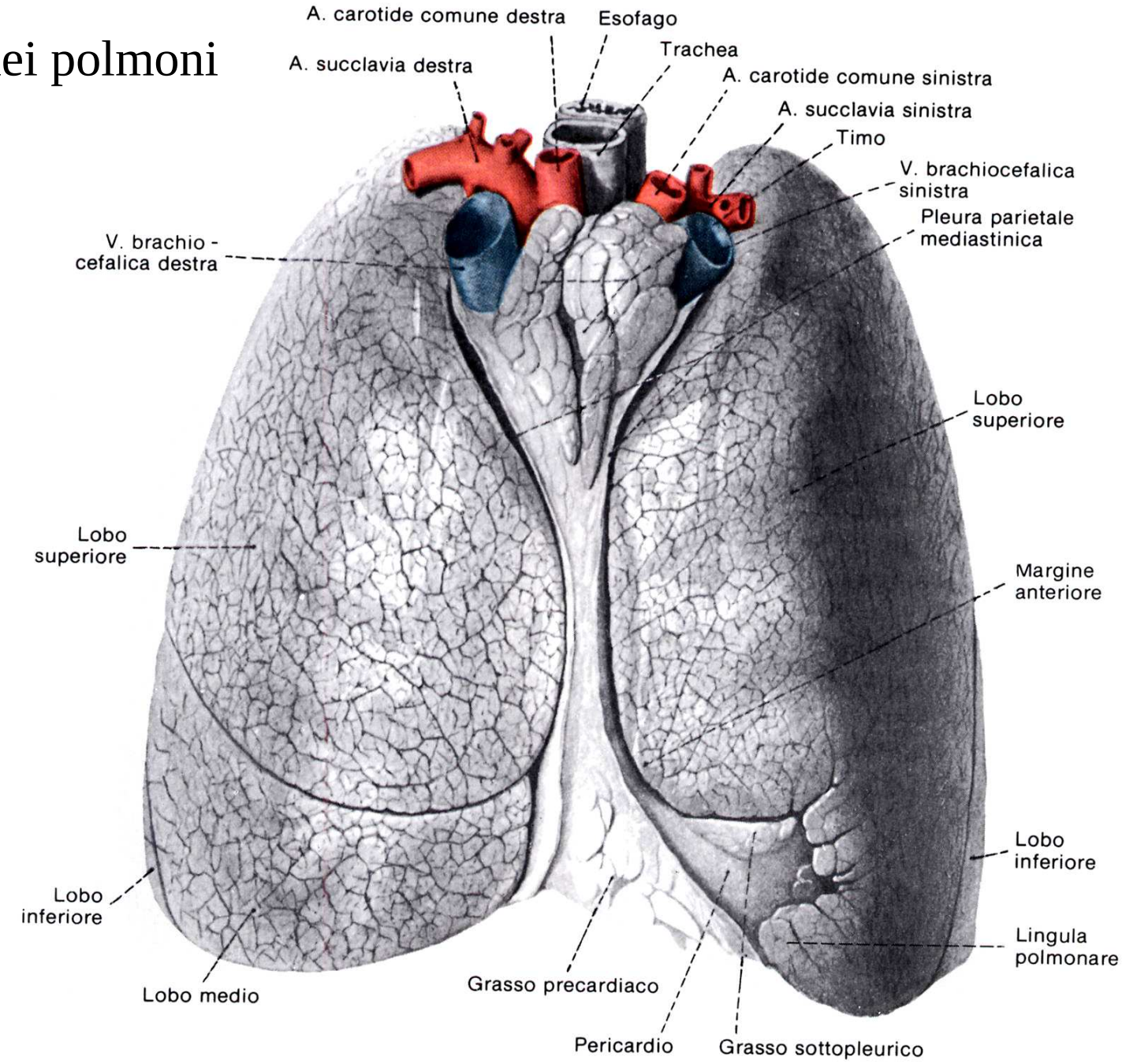
Superficie esterna:
- grafica areolare poligonali (lobuli)

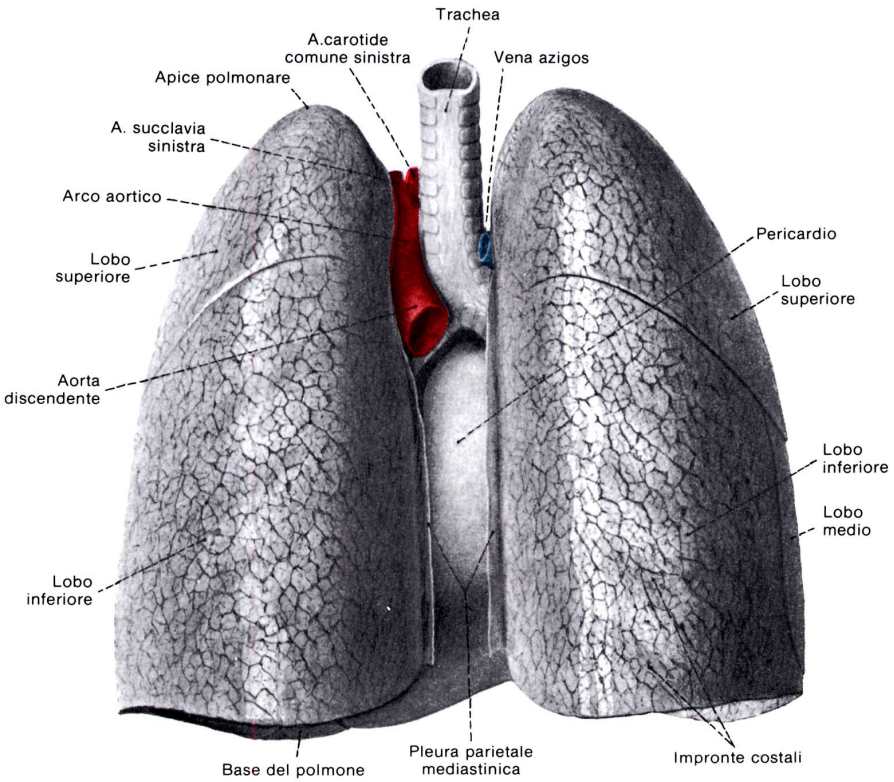
Consistenza molliccia
Parenchima elastico

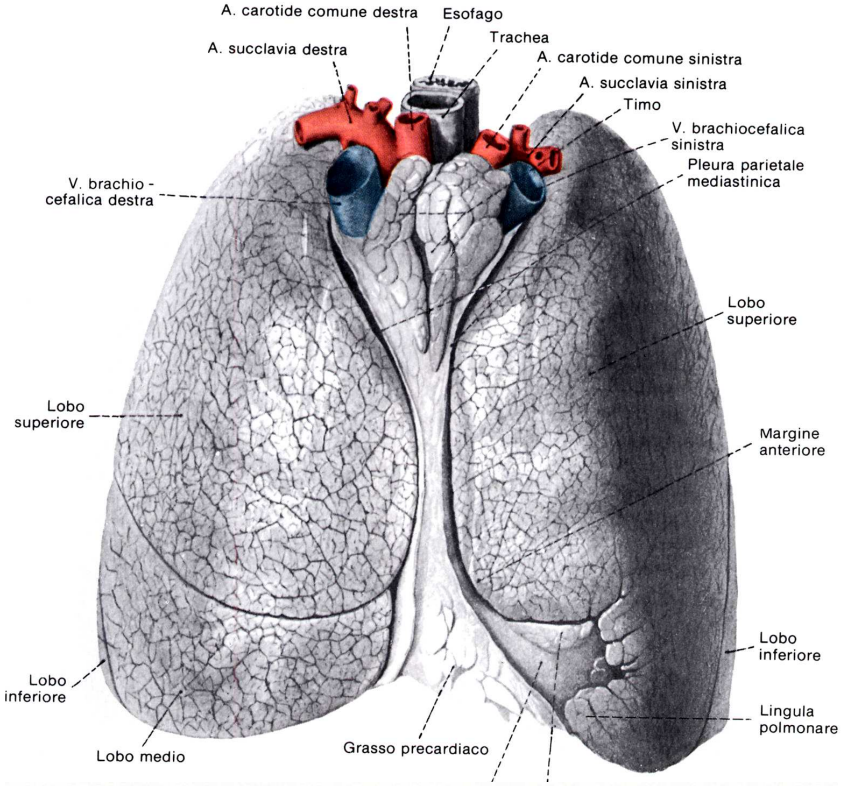
Forma dei polmoni

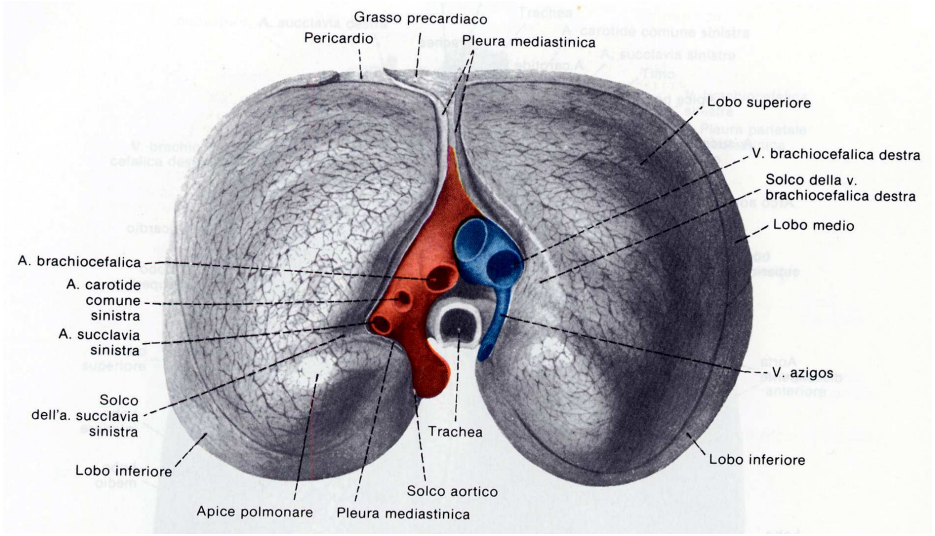
Forma di cono sezionato
Base (o faccia diaframmatica)
Apice
Faccia laterale o costo-vertebrale
Faccia mediale o mediastinica
Tre margini
anteriore, posteriore e inferiore

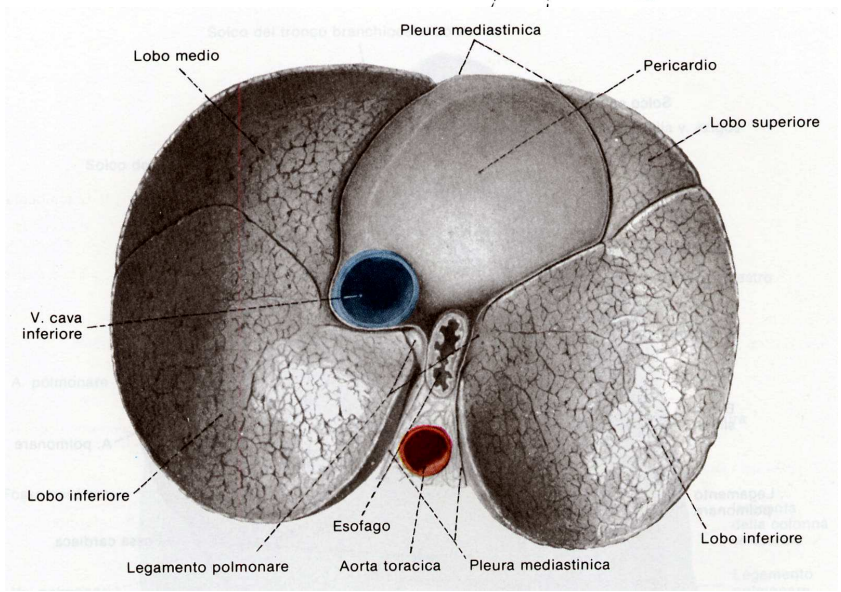
Forma dei polmoni

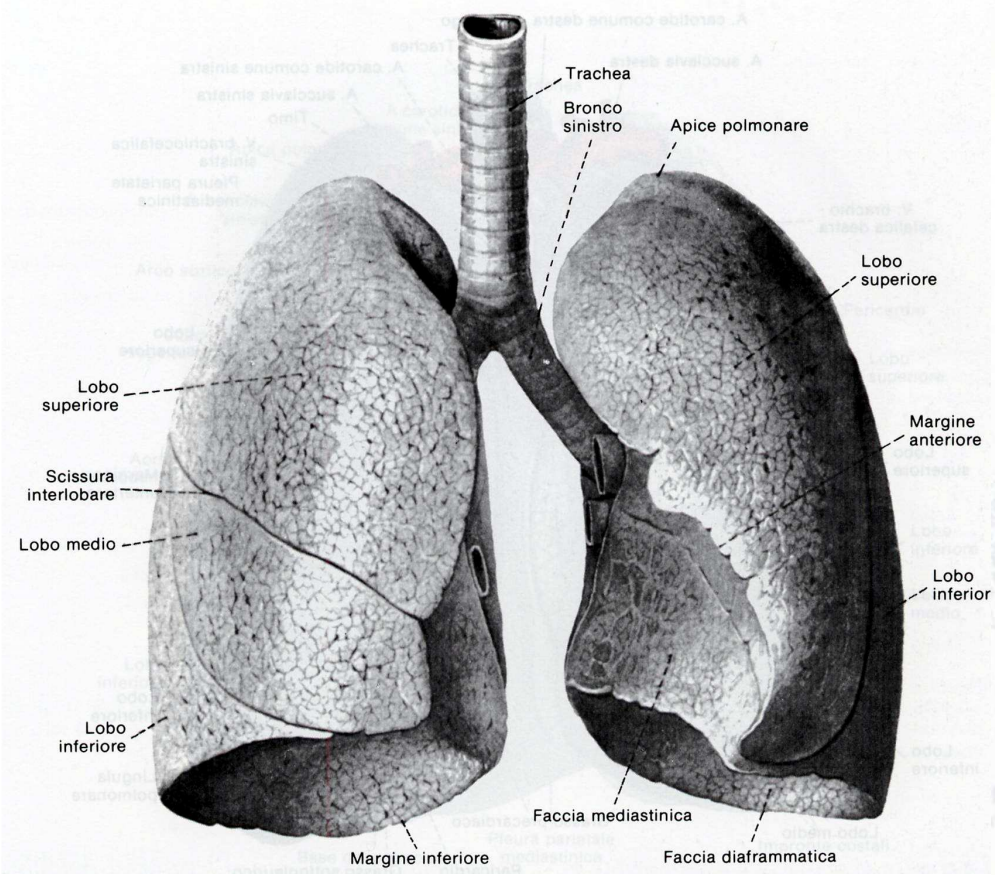


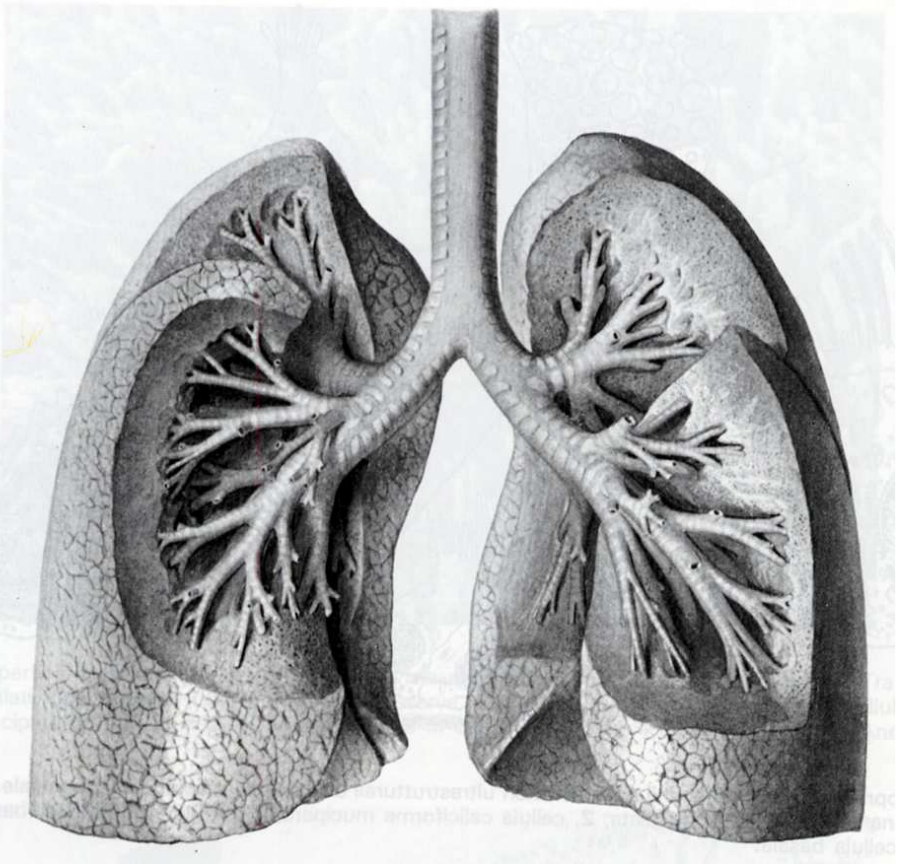

Trachea
A.carotide comune sinistra
Vena azigos
Apice polmonare
A. succlavia sinistra
Arco aortico
Lobo superiore
Pericardio
Lobo superiore
Aorta discendente
Lobo inferiore
Lobo medio
Lobo inferiore
Base del polmone
Pleura parietale mediastinica
Impronte costali


A. carotide comune destra
Esofago
A. succlavia destra
Trachea
A. carotide comune sinistra
A. succlavia sinistra
Timo
V. brachiocefalica sinistra
Pleura parietale mediastinica
V. brachio - cefalica destra
Lobo superiore
Lobo superiore
Margine anteriore
Lobo inferiore
Lobo inferiore
Lingula polmonare
Lobo medio
Grasso precardiaco

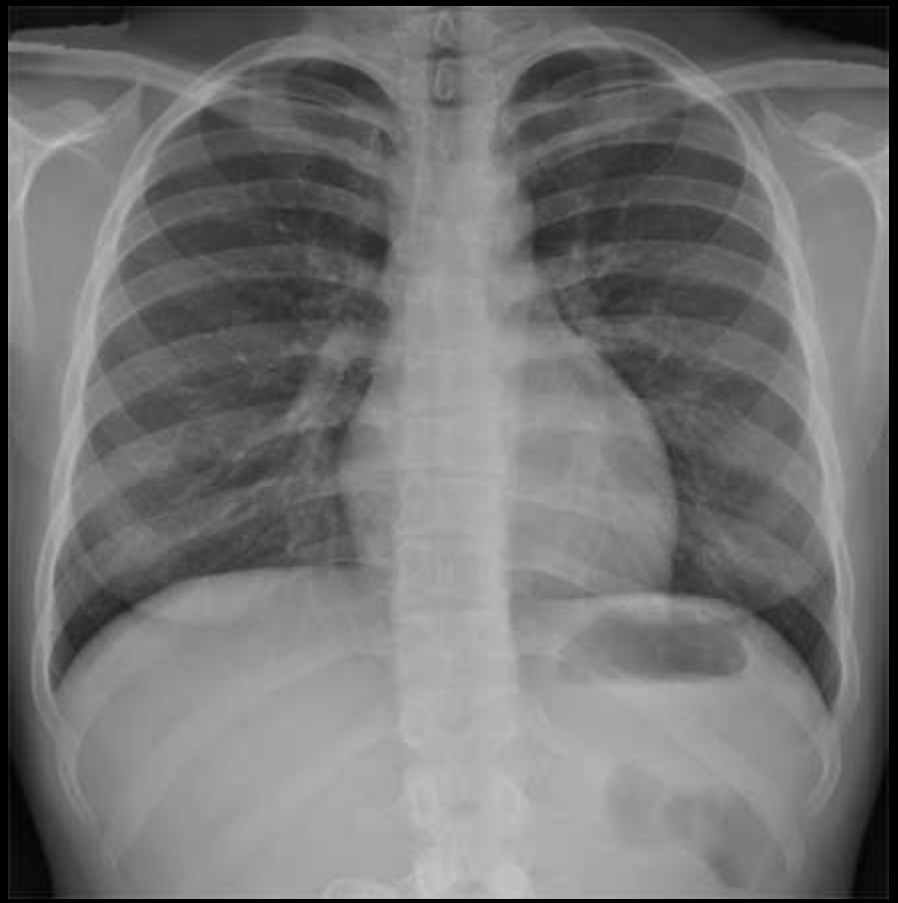

Grasso precardiaco
Pericardio
Pleura mediastinica
Lobo superiore
V. brachiocefalica destra
Solco della v. brachiocefalica destra
Lobo medio
A. brachiocefalica
A. carotide comune sinistra
A. succlavia sinistra
V. azigos
Solco dell'a. succlavia sinistra
Trachea
Lobo inferiore
Lobo inferiore
Solco aortico
Apice polmonare
Pleura mediastinica


Pleura mediastinica
Lobo medio
Pericardio
Lobo superiore
V. cava inferiore
Lobo inferiore
Esofago
Lobo inferiore
Legamento polmonare
Aorta toracica
Pleura mediastinica


Trachea
Bronco sinistro
Apice polmonare
Lobo superiore
Lobo superiore
Margine anteriore
Scissura interlobare
Lobo medio
Lobo inferior
Lobo inferiore
Faccia mediastinica
Margine inferiore
Faccia diaframmatica



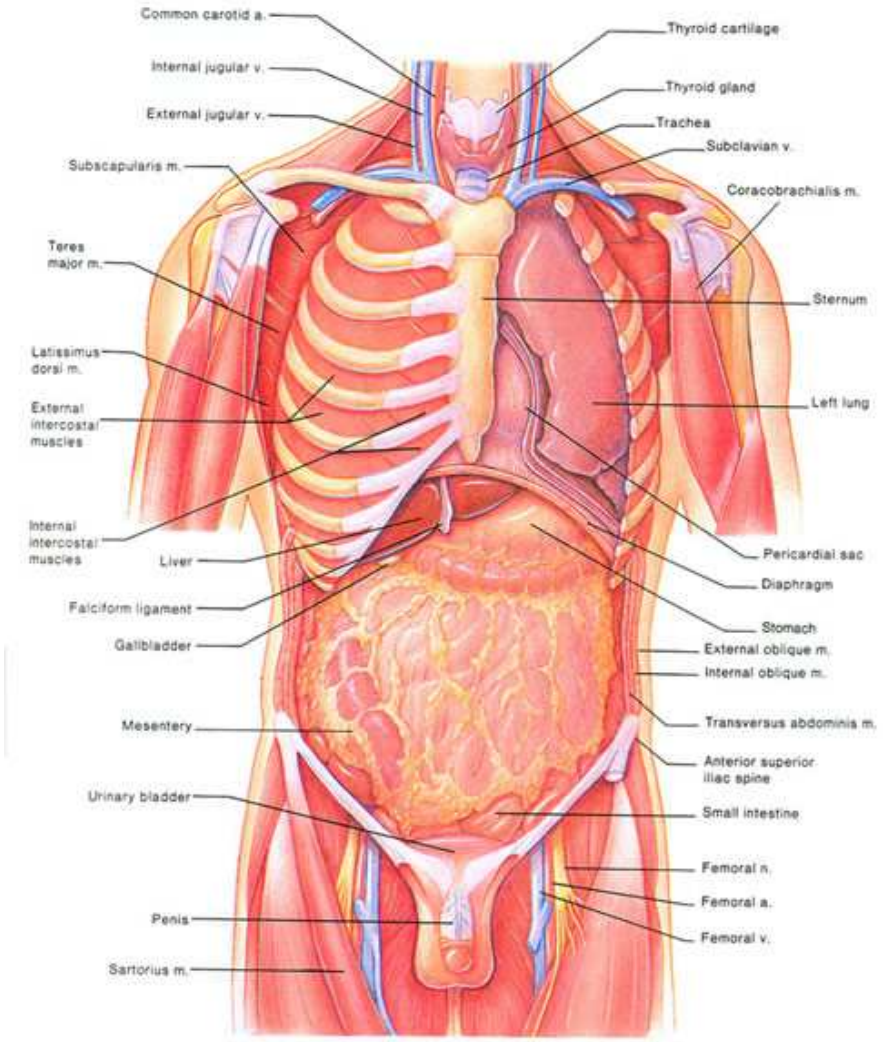
Chest x rays

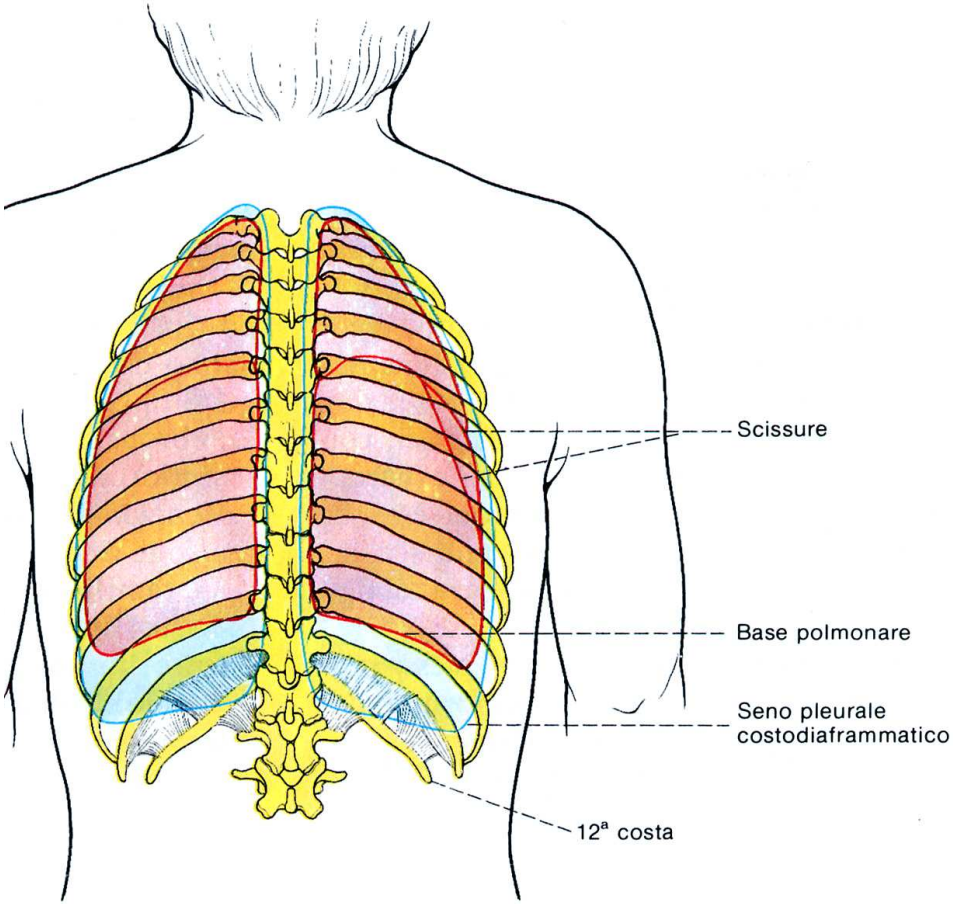


Normal female

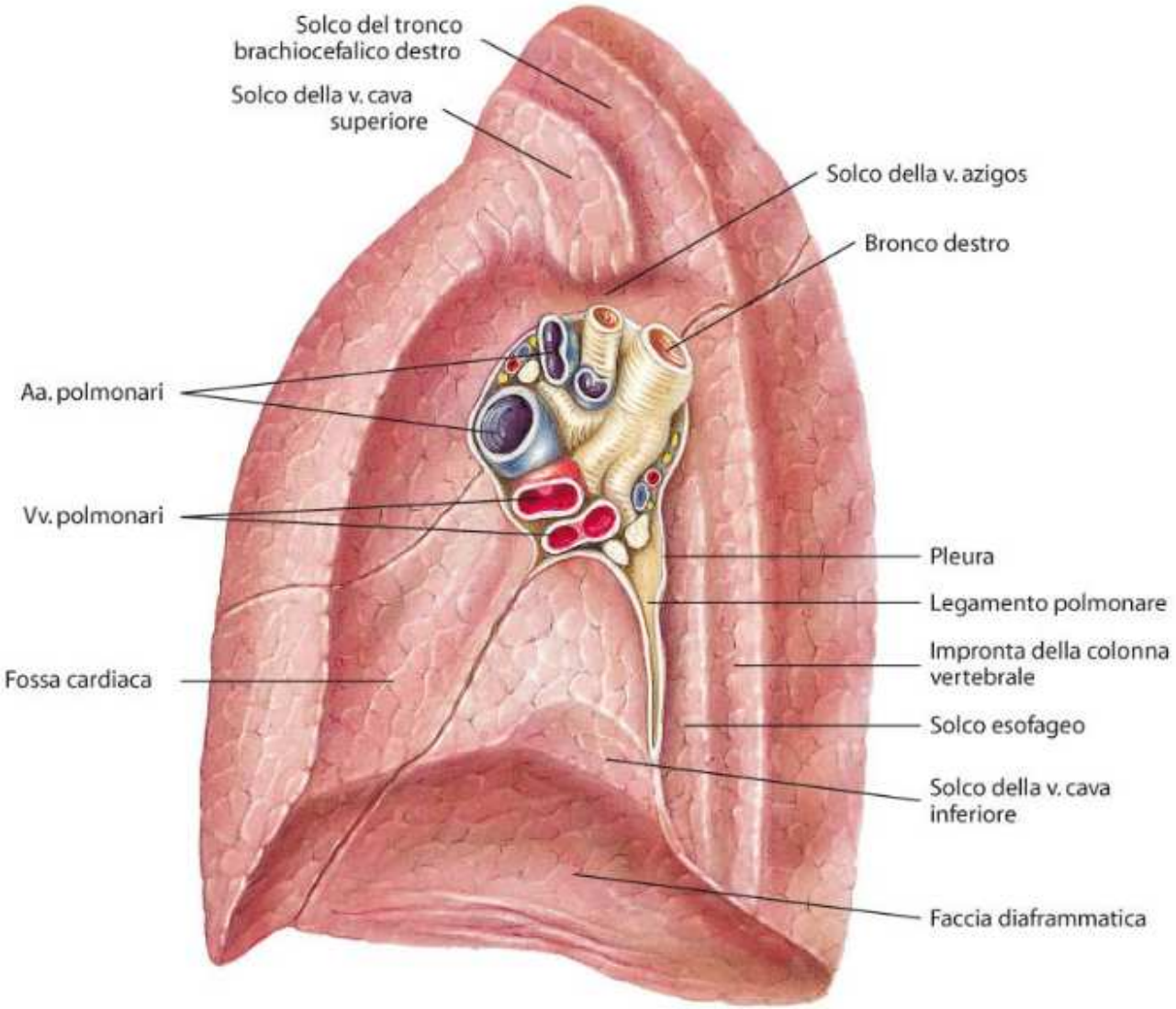
Lateral (male)

Rapporti anatomici dei polmoni

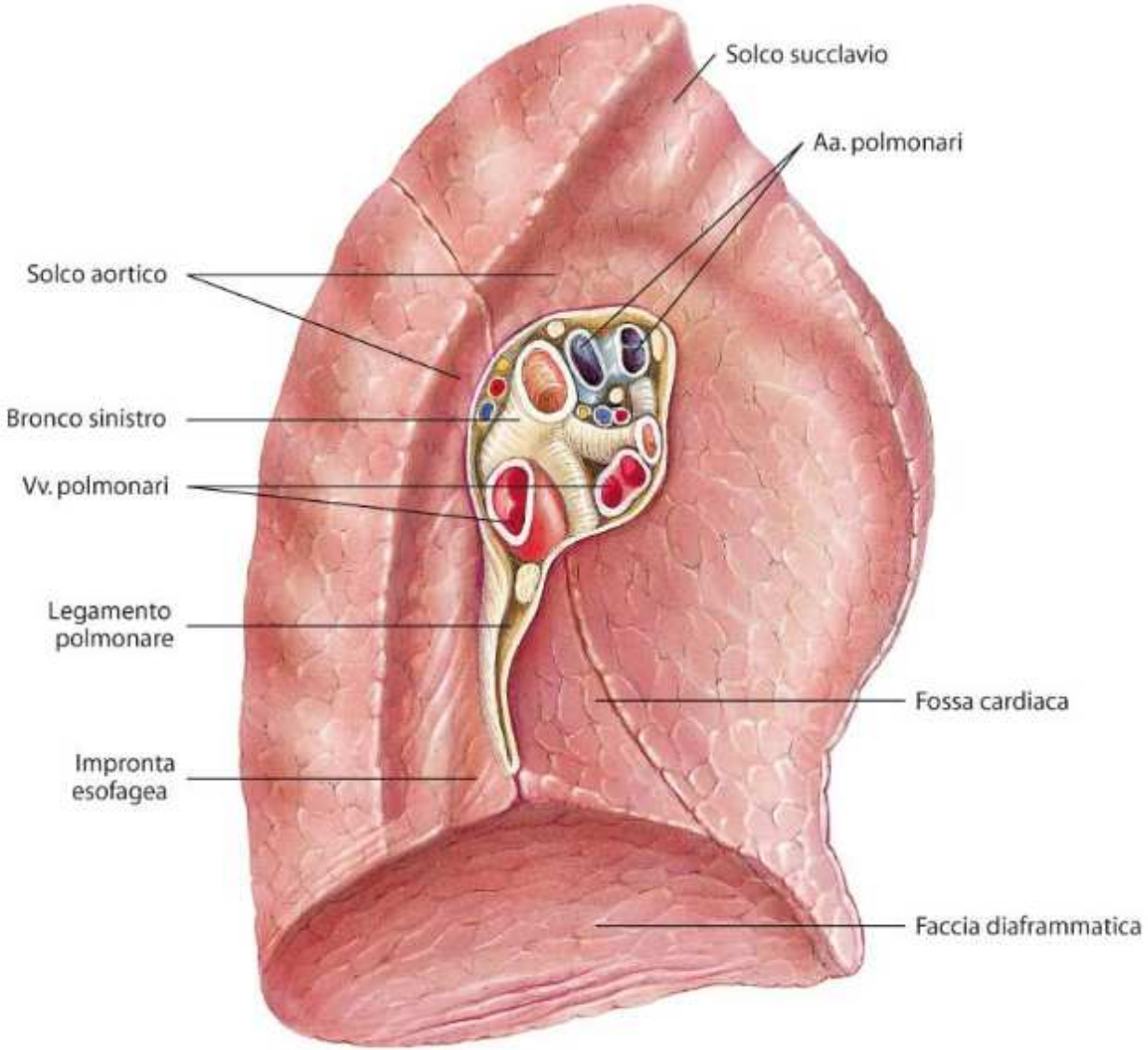


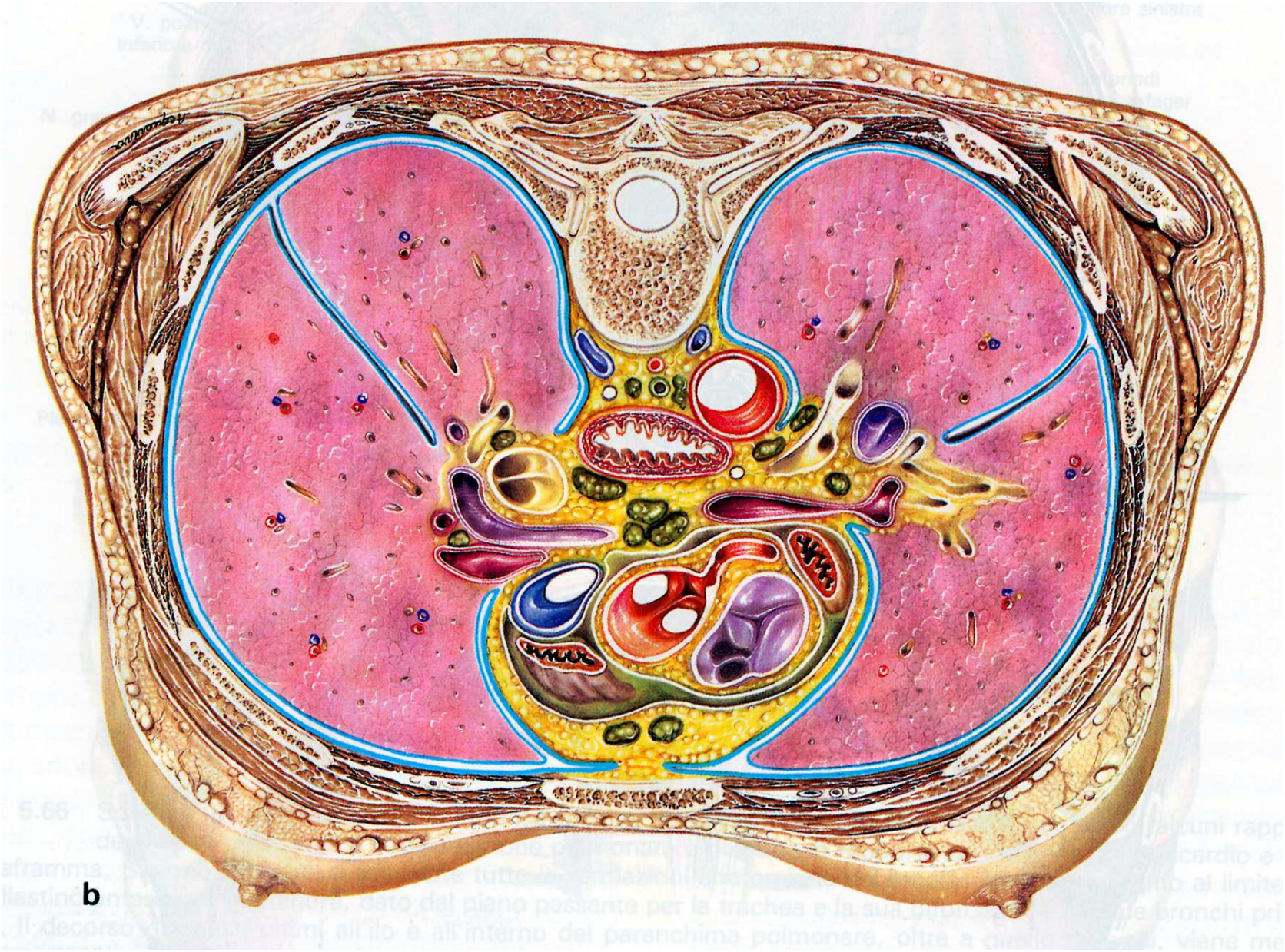


Rapporti anatomici del polmone DX



Rapporti anatomici del polmone SX

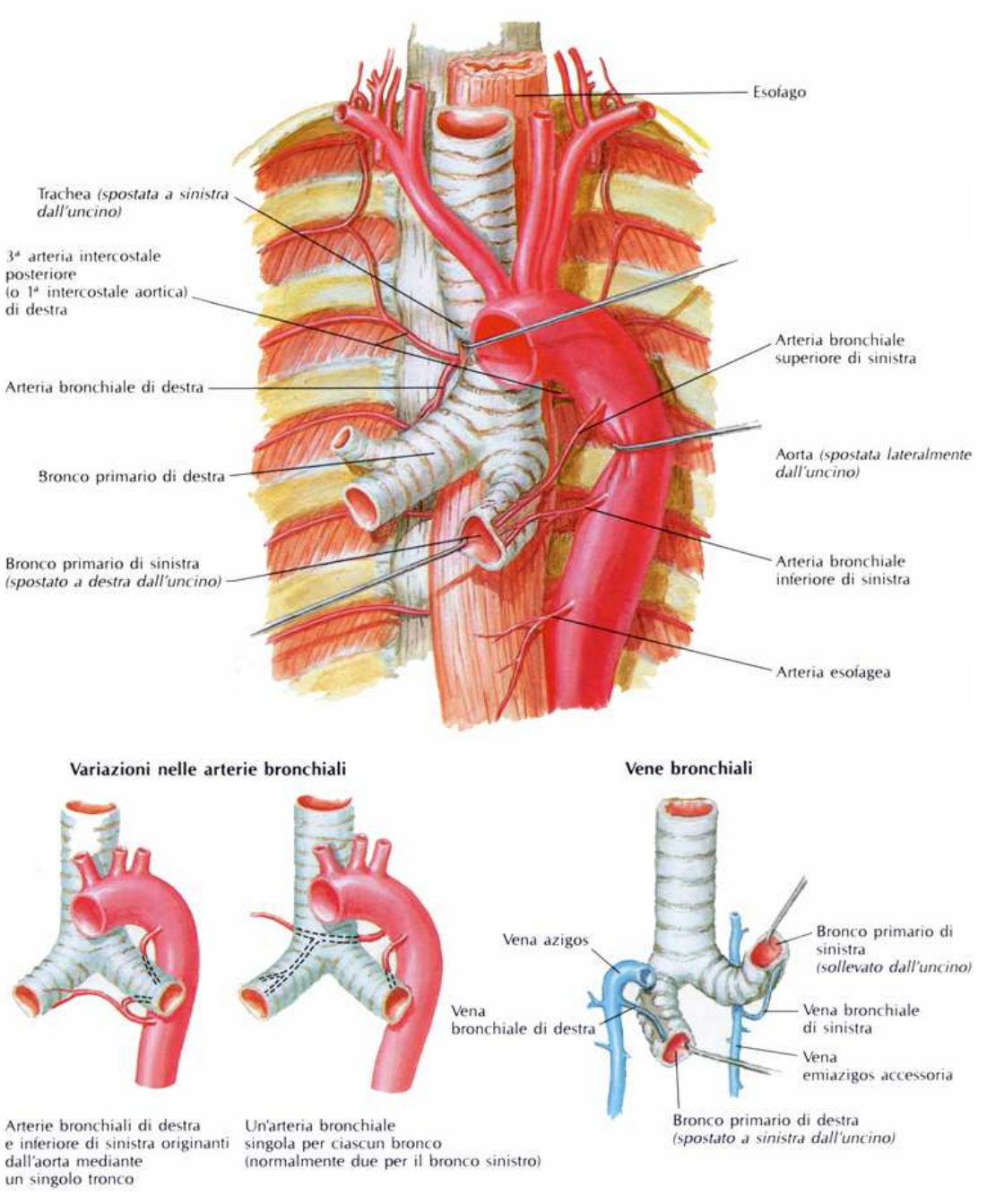



b

Vascolarizzazione dei polmoni

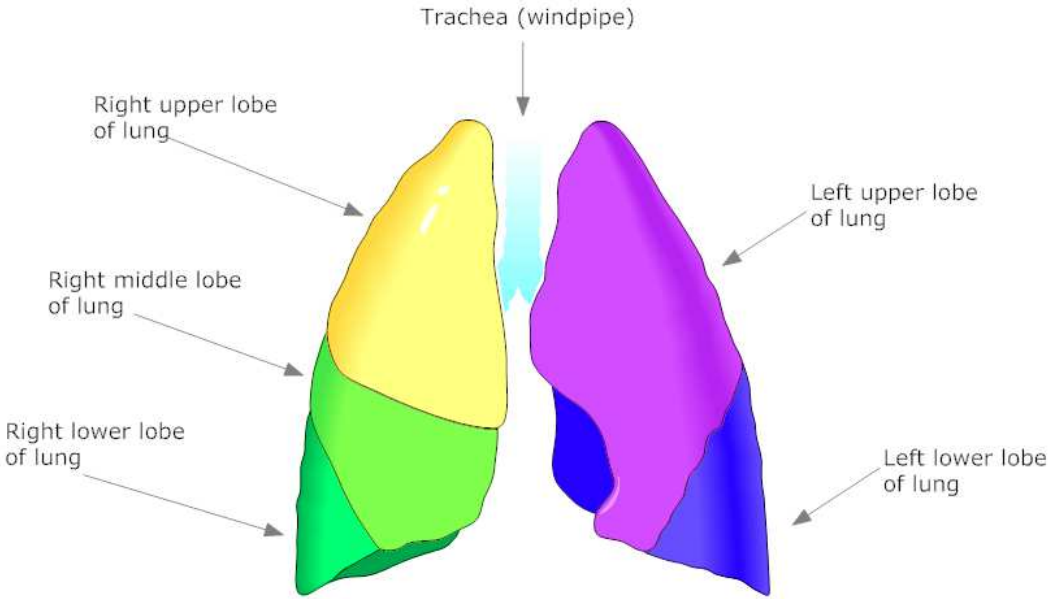
Sistema dei vasi polmonari

Sistema dei vasi bronchiali
Arterie bronchiali
una a dx
due a sx



Superficie dei polmoni

Scissure:
- due a destra
  - lobo superiore
  - lobo medio
  - lobo inferiore
- una a sinistra
  - lobo superiore
  - lobo inferiore



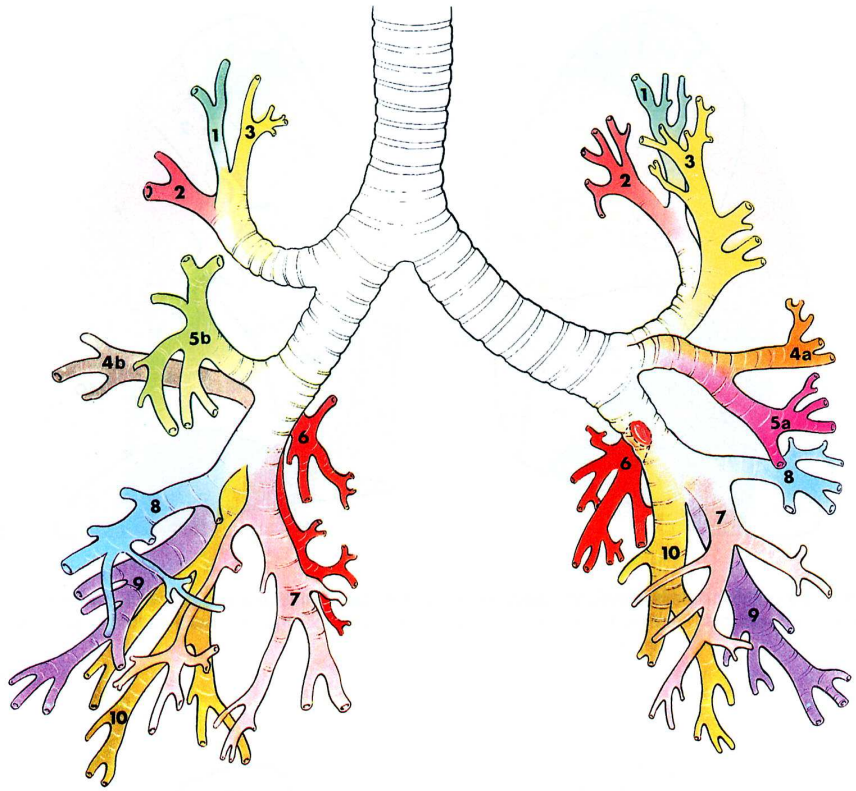
Lobi
- indipendenza anatomica e funzionale
  - zone polmonari (zona indipendente)
    - lobuli polmonari

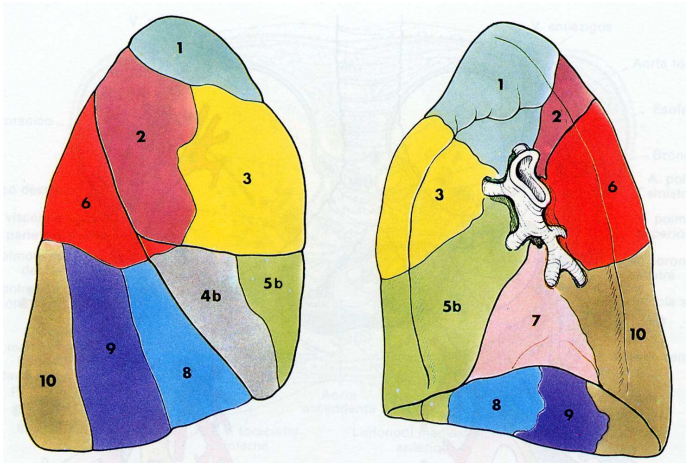
POLMONE SINISTRO

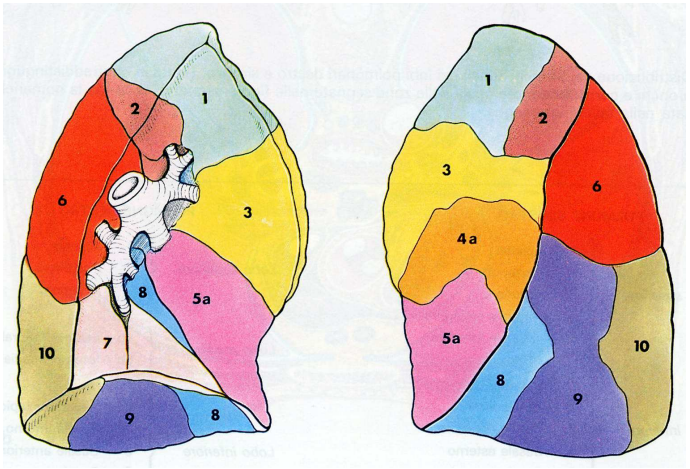
Lobo superiore	1	Apicale
	2	Posteriore
	3	Anteriore
	4a	Linguale superiore
	5a	Linguale inferiore
Lobo inferiore	6	Superiore (apicale)
	7	Basale interno
	8	Basale anteriore
	9	Basale esterno
	10	Basale posteriore

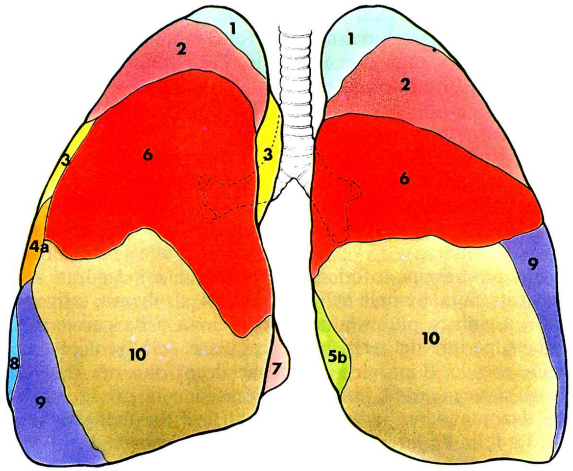
POLMONE DESTRO

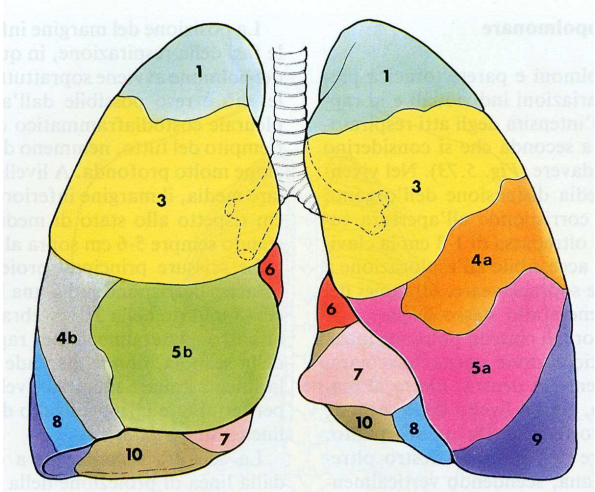
Lobo superiore	1	Apicale
	2	Posteriore
	3	Anteriore
Lobo medio	4b	Esterno (laterale)
	5b	Interno (mediale)
Lobo inferiore	6	Superiore (apicale)
	7	Basale interno
	8	Basale anteriore
	9	Basale esterno
	10	Basale posteriore


1
3
2
5b
4b
6
8
9
7
10
1
3
2
4a
5a
6
8
7
10
9

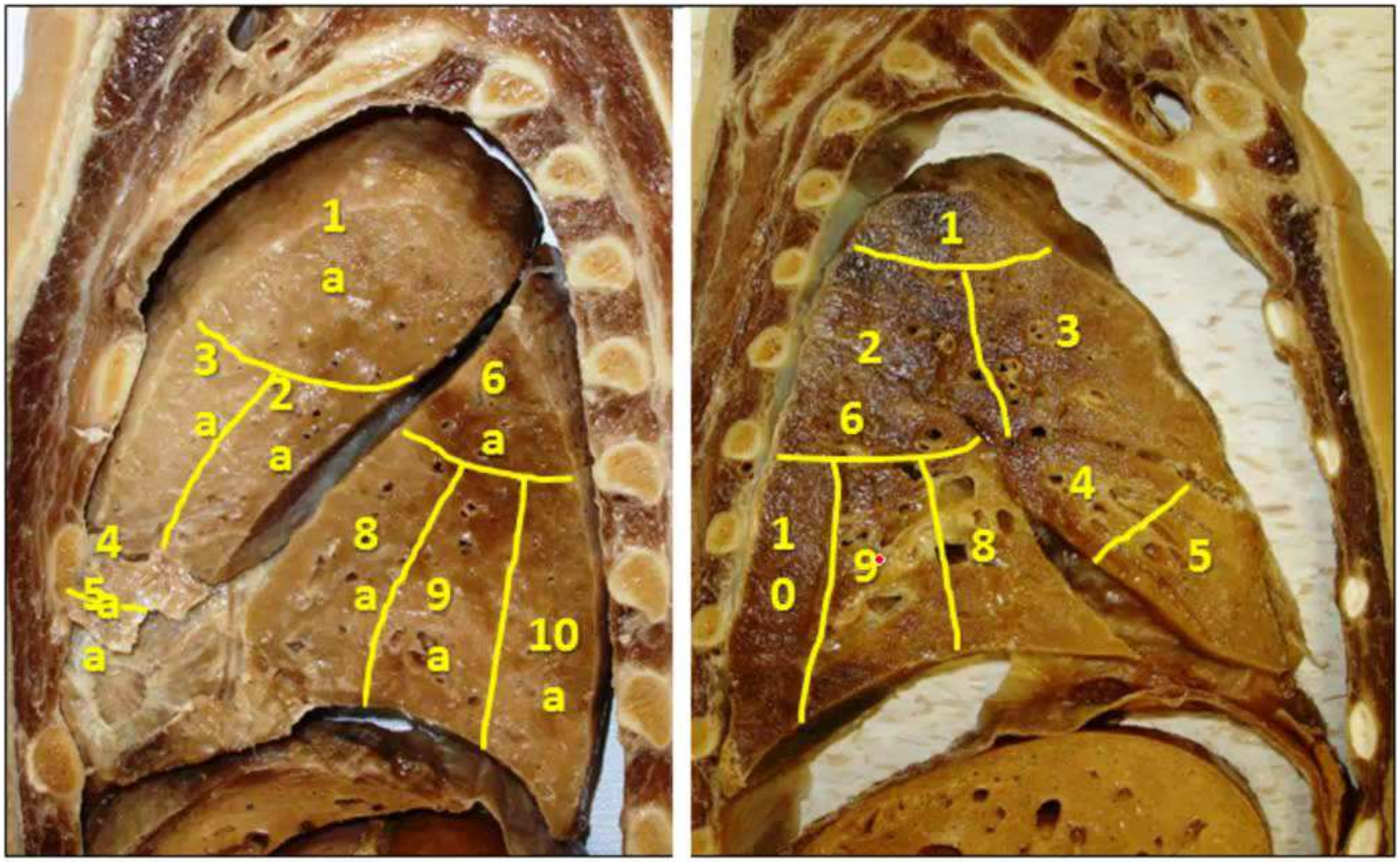

1
2
3
6
4b
5b
9
8
10
1
2
3
6
5b
7
10
8
9


2
1
6
3
8
5a
10
7
9
8
1
2
3
6
4a
5a
8
10
9


1
2
3
6
3
4a
9
10
8
7
9
1
2
6
10
5b


1
1
3
3
4a
6
6
4b
5b
5a
7
8
10
8
9

Akram Jaffar

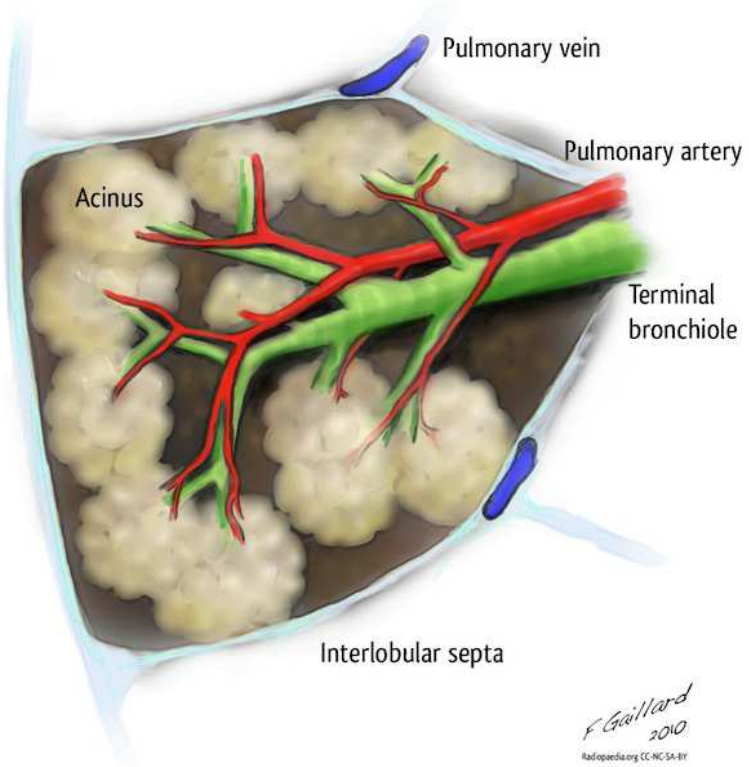


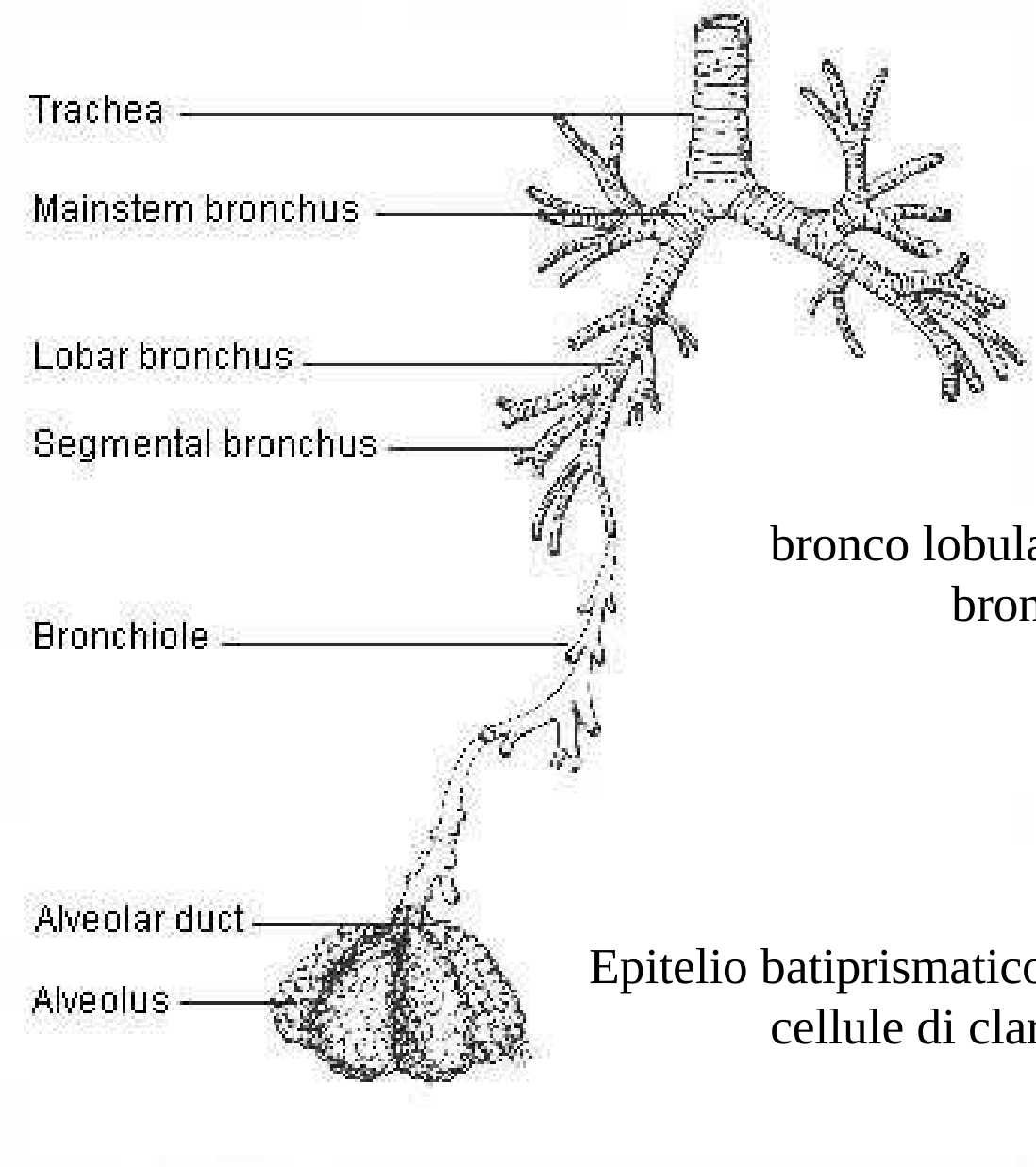
Conformazione interna

Lobi
Zone
Lobuli

disegni poligonali
acini 15-20
alveoli

Bronchi di primo ordine
Bronchi di secondo ordine
Bronchi lobulari





Parenchima polmonare

bronco lobulare

bronco intralobulare

bronchioli terminali

acini

bronchiolo respiratori

condotti alveolari

alveoli

Epitelio batiprismatico pseudostratificato

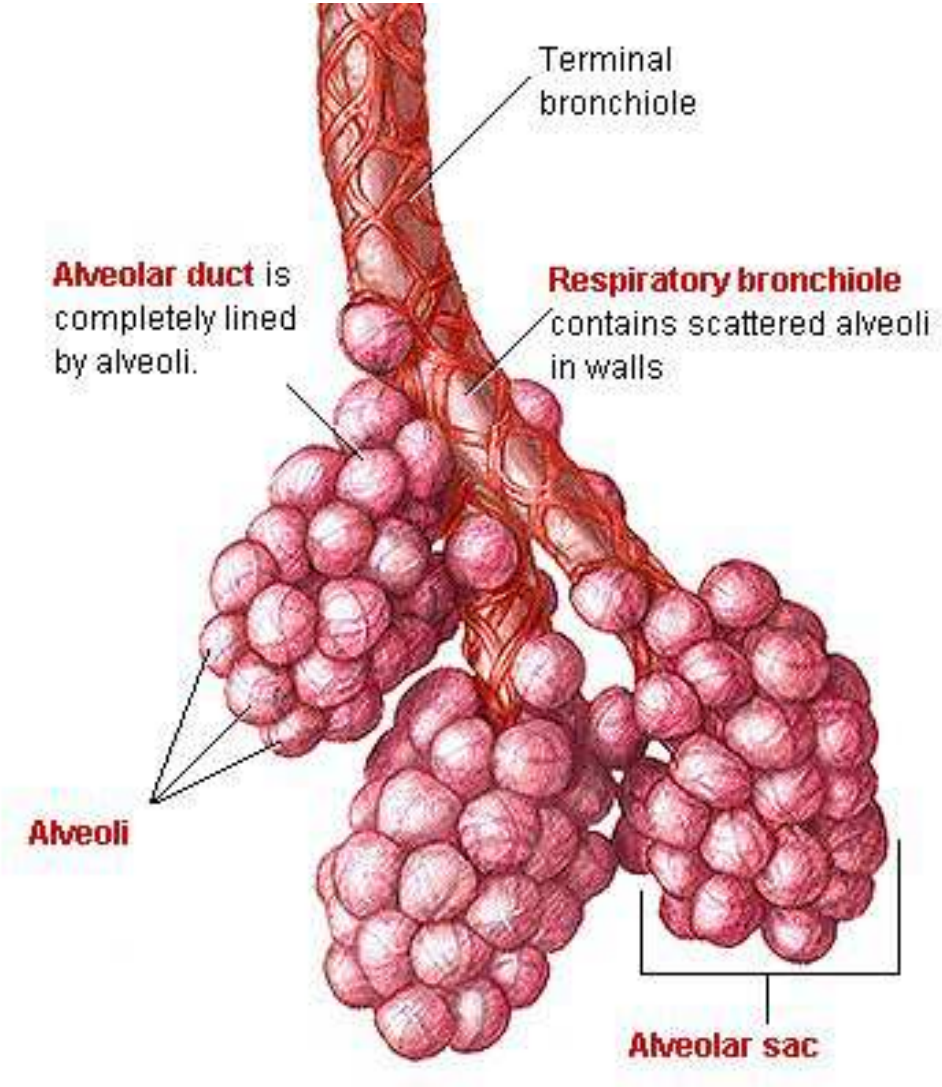
cellule di clara

Struttura delle vie aeree:
La zona respiratoria

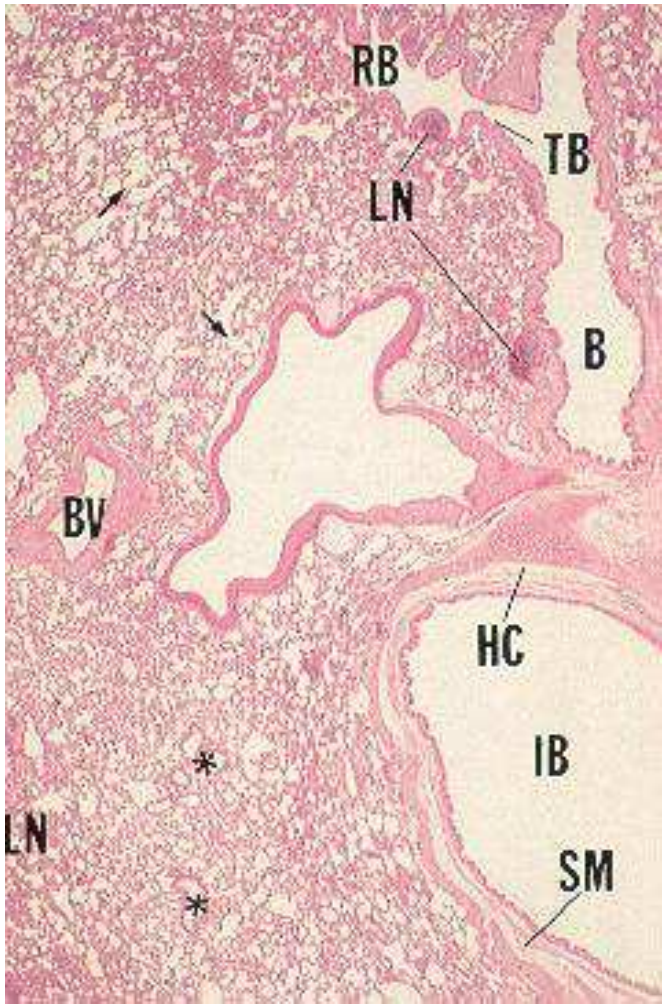
RESPIRATORY ZONE

The **respiratory zone** contains alveoli, tiny thin-walled sacs where gas exchange occurs.

Alveolar ducts end in clusters of alveoli called alveolar sacs.

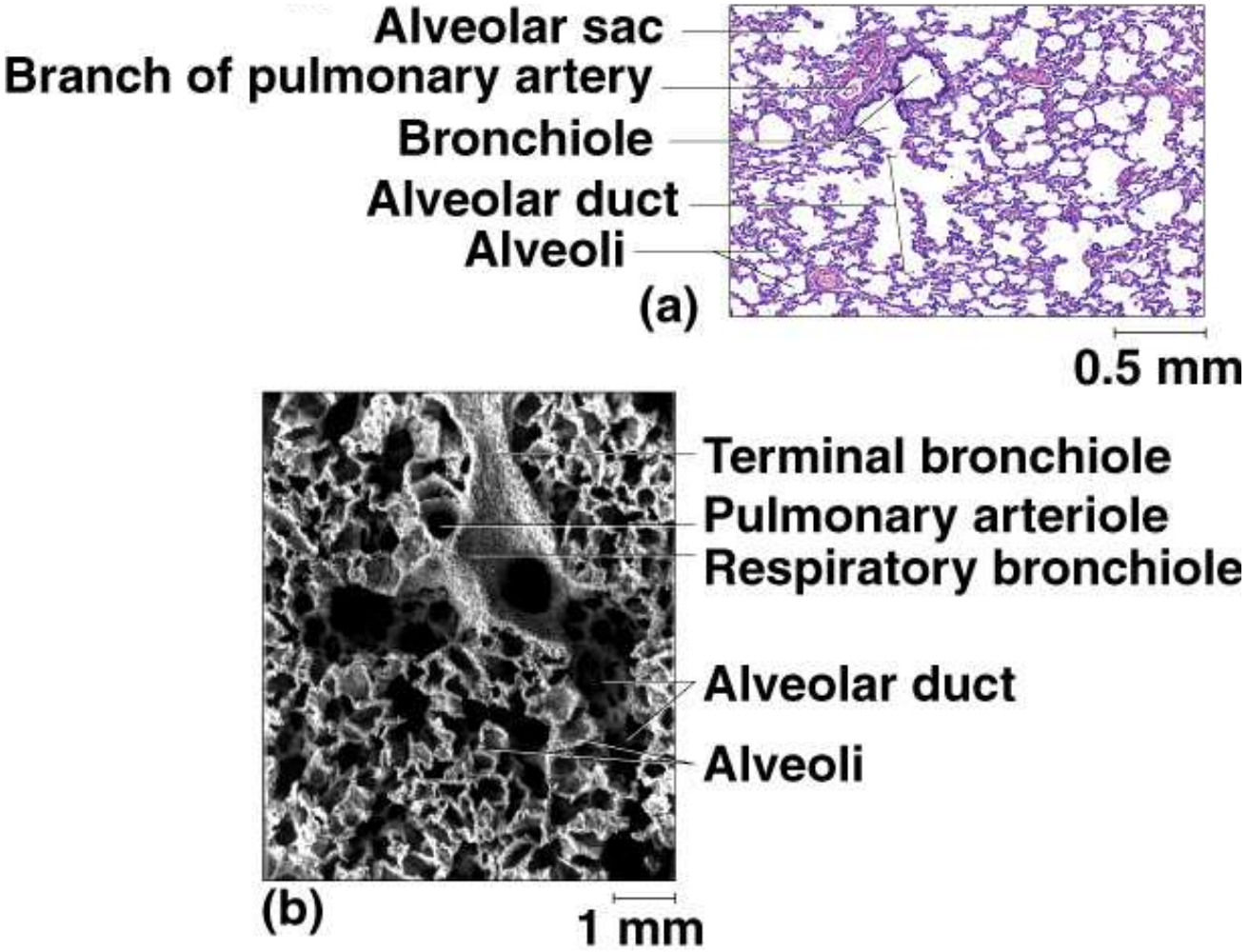


Intrapulmonary bronchus



Bronchus and bronchiole

Parenchima polmonare



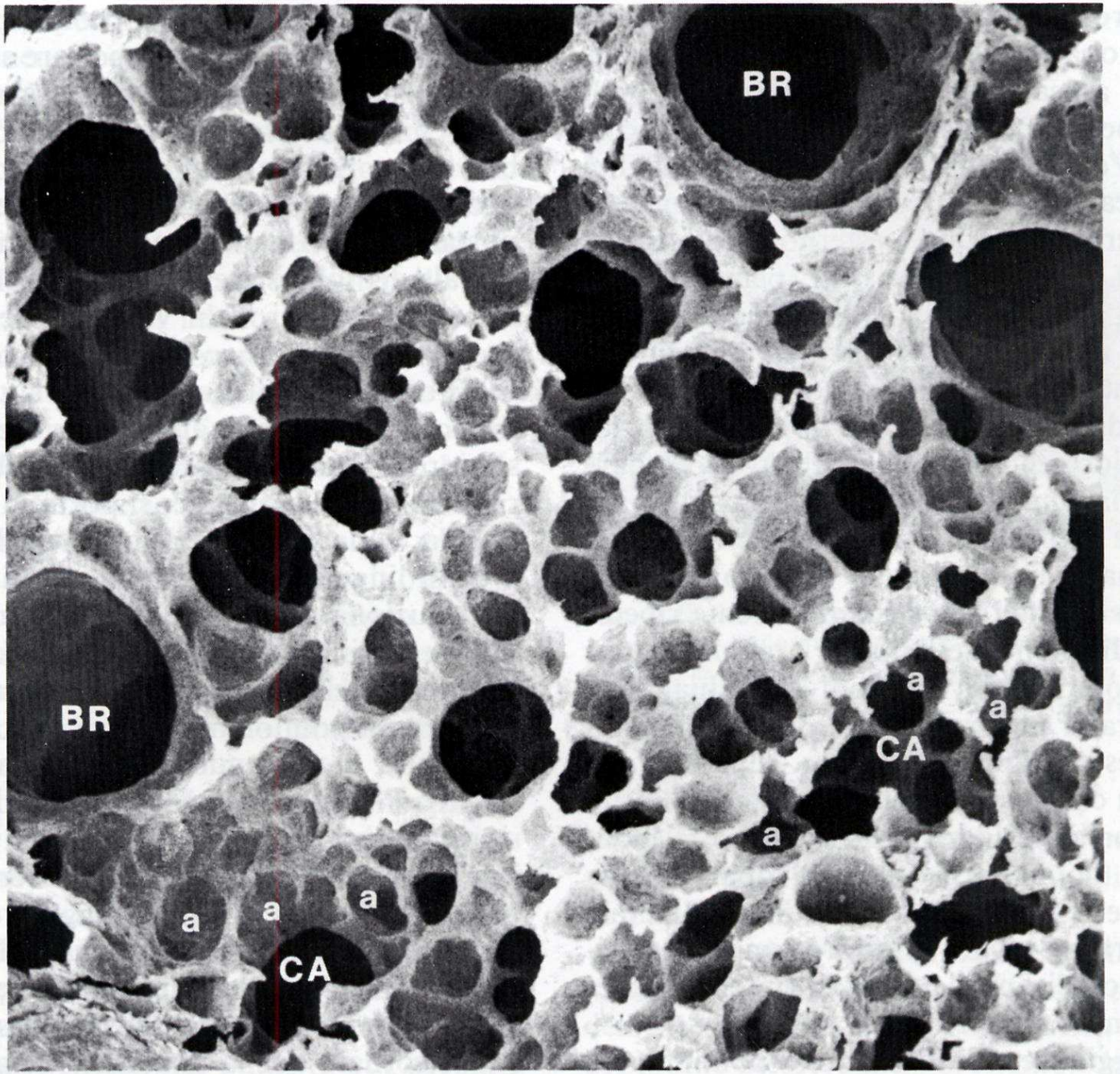
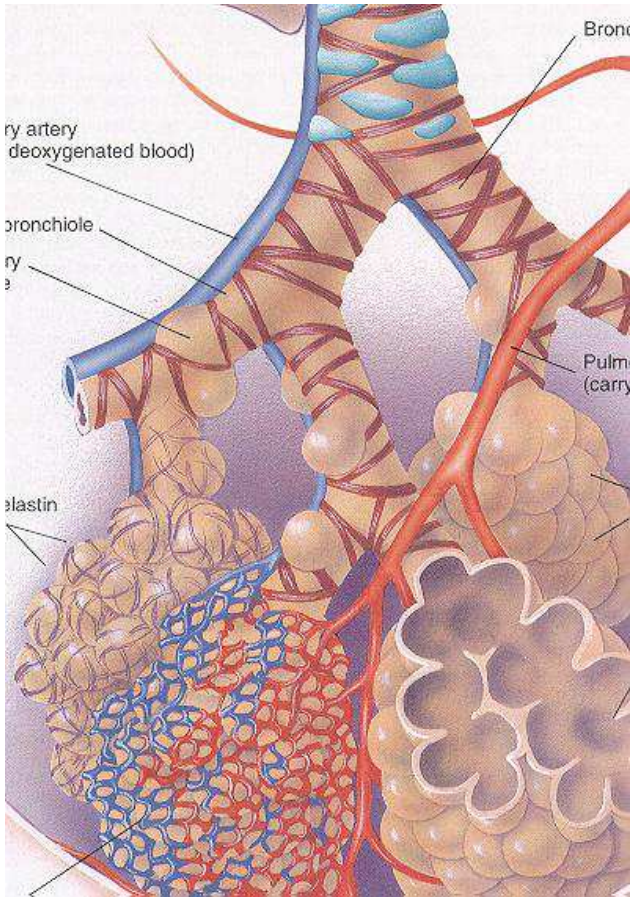
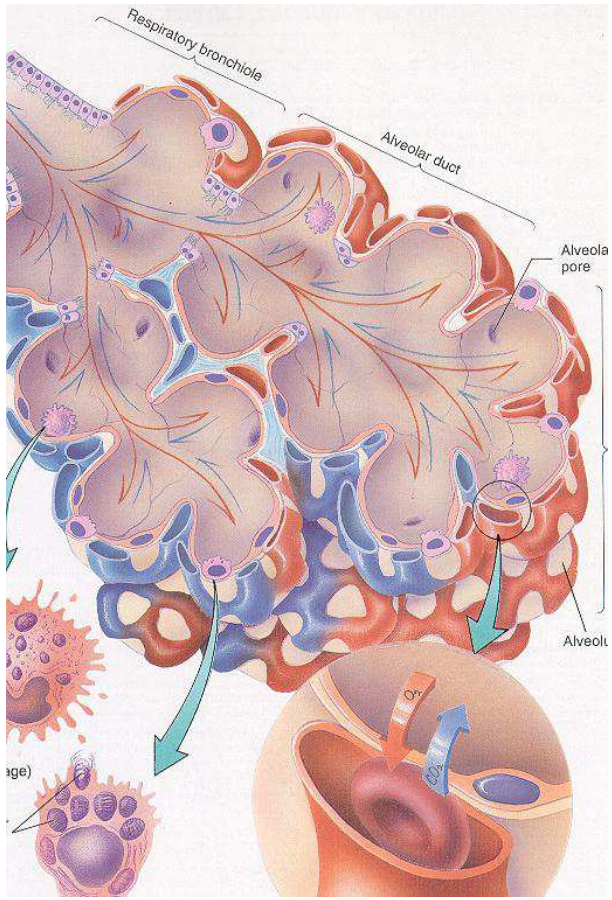
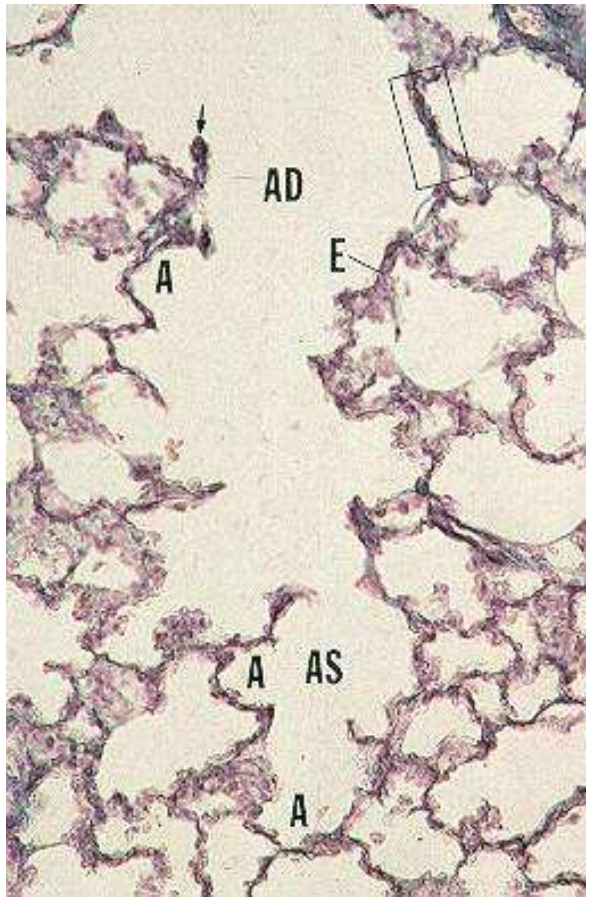

BR
BR
a
a
CA
a
a
a
a
CA

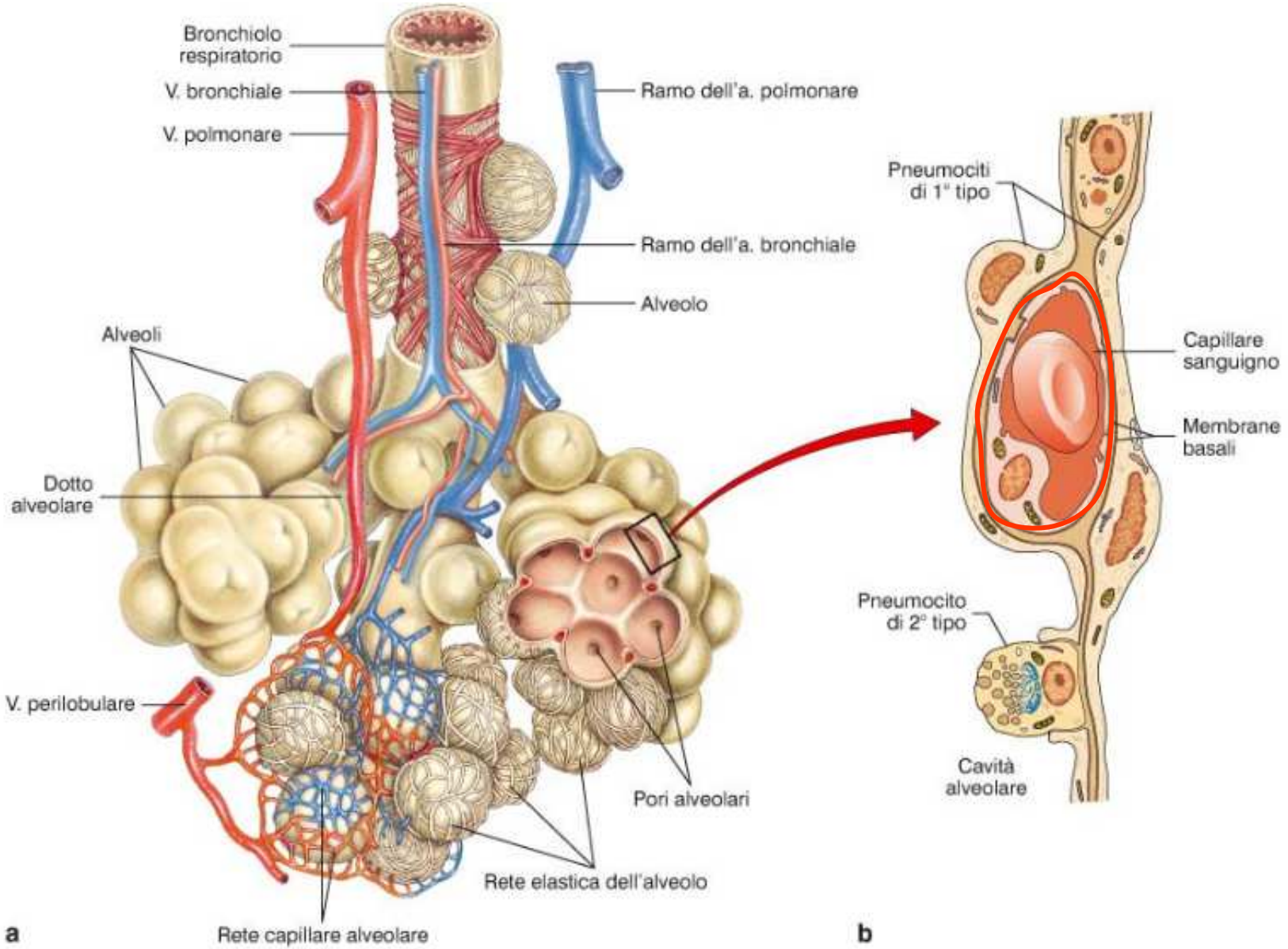
Fig. 5.75 L'epitelio bronchiale è batiprismatico semplice fino ai bronchi intralobulari e risulta formato in prevalenza da cellule cigliate fra le quali sono intercalate cellule caliciformi mucipare (**freccia**).

Alveolar duct & alveolar sac





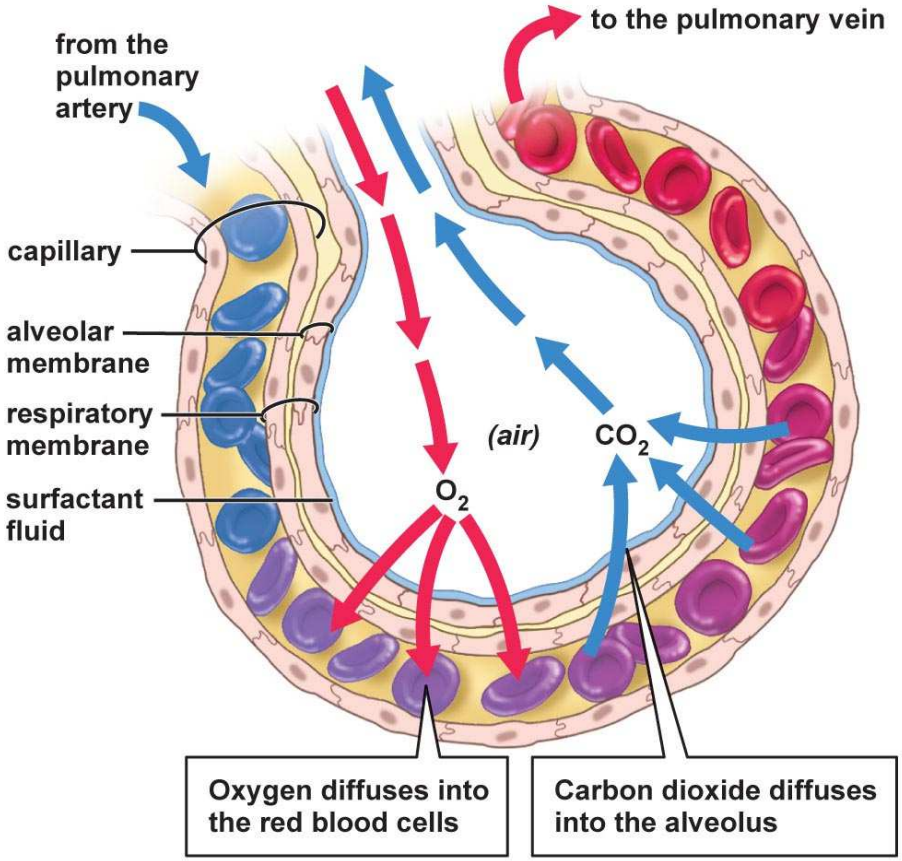


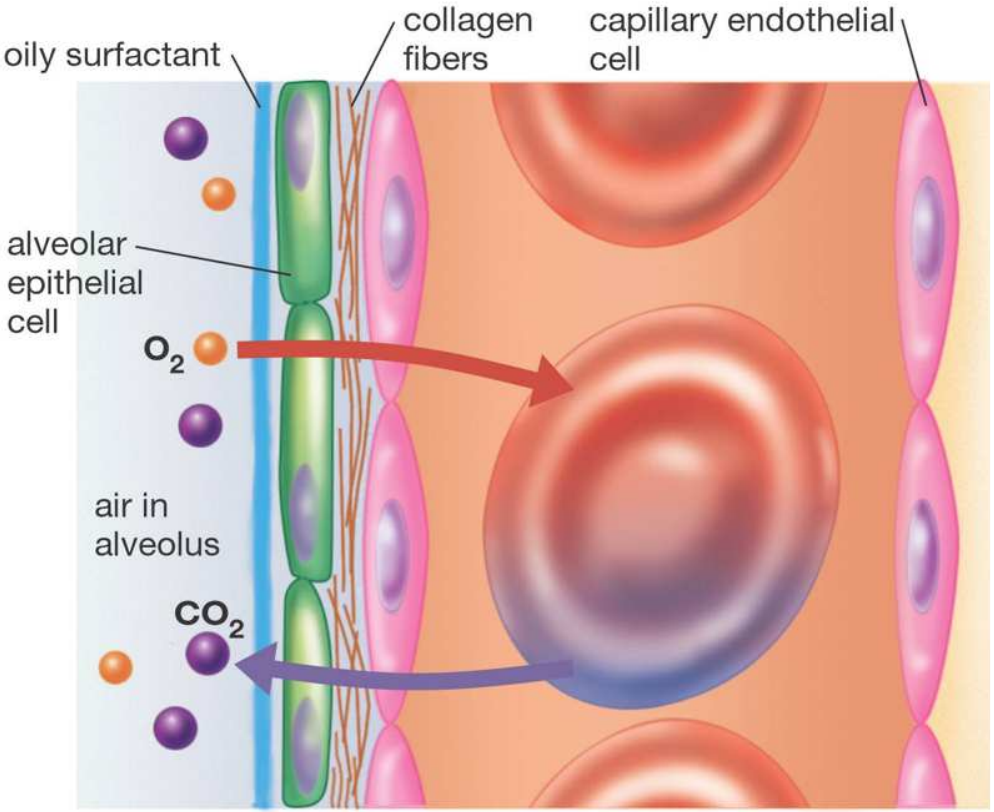

Bronchiolo respiratorio
V. bronchiale
V. polmonare
Ramo dell'a. polmonare
Ramo dell'a. bronchiale
Alveolo
Alveoli
Dotto alveolare
V. perilobulare
Pori alveolari
Rete elastica dell'alveolo
Rete capillare alveolare
a
Pneumociti di 1° tipo
Capillare sanguigno
Membrane basali
Pneumocito di 2° tipo
Cavità alveolare
b

Epitelio alveolare

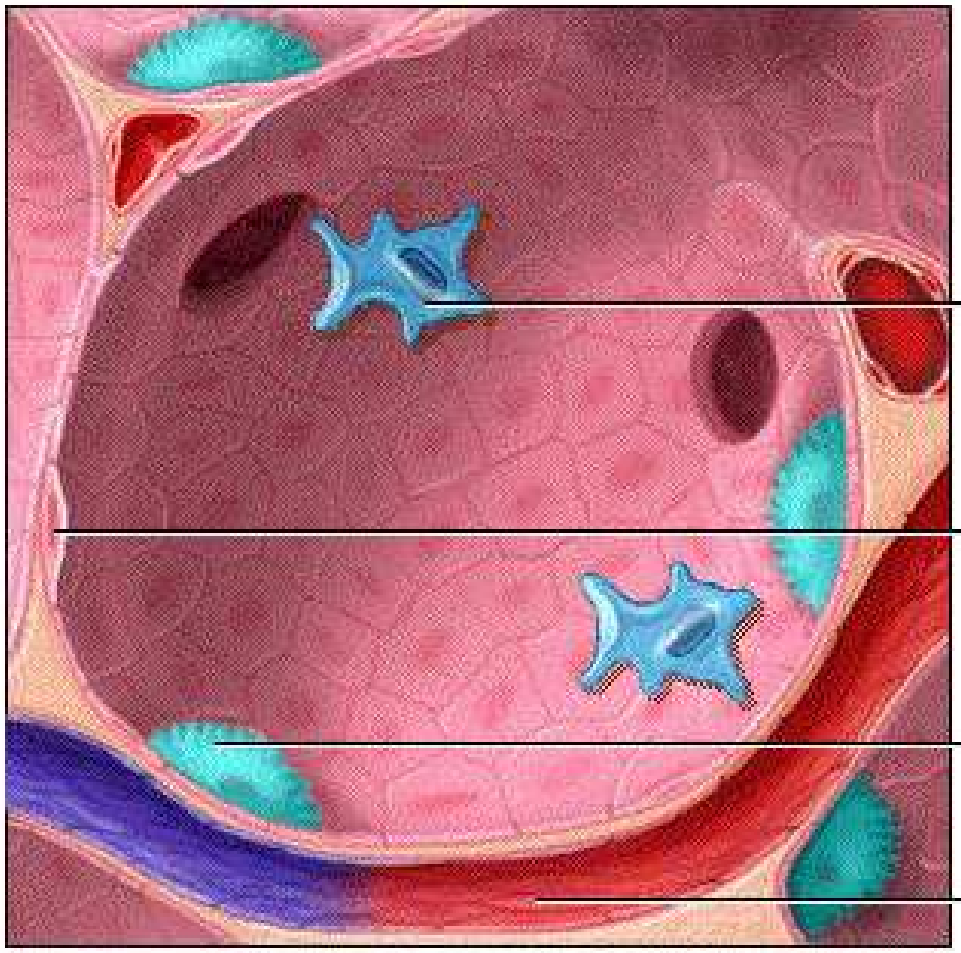
Pneumociti di primo tipo
Pneumociti di secondo tipo
producono il surfattante
Macrofagi alveolari
Migranti

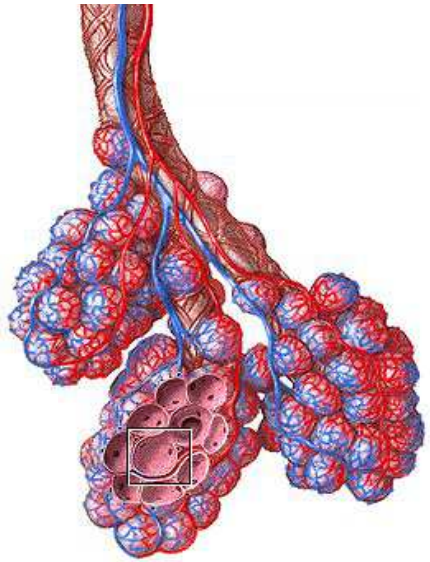
Lamina basale
Lamina basale dell'endotelio





Struttura delle vie aeree:
l'alveolo e le sue cellule





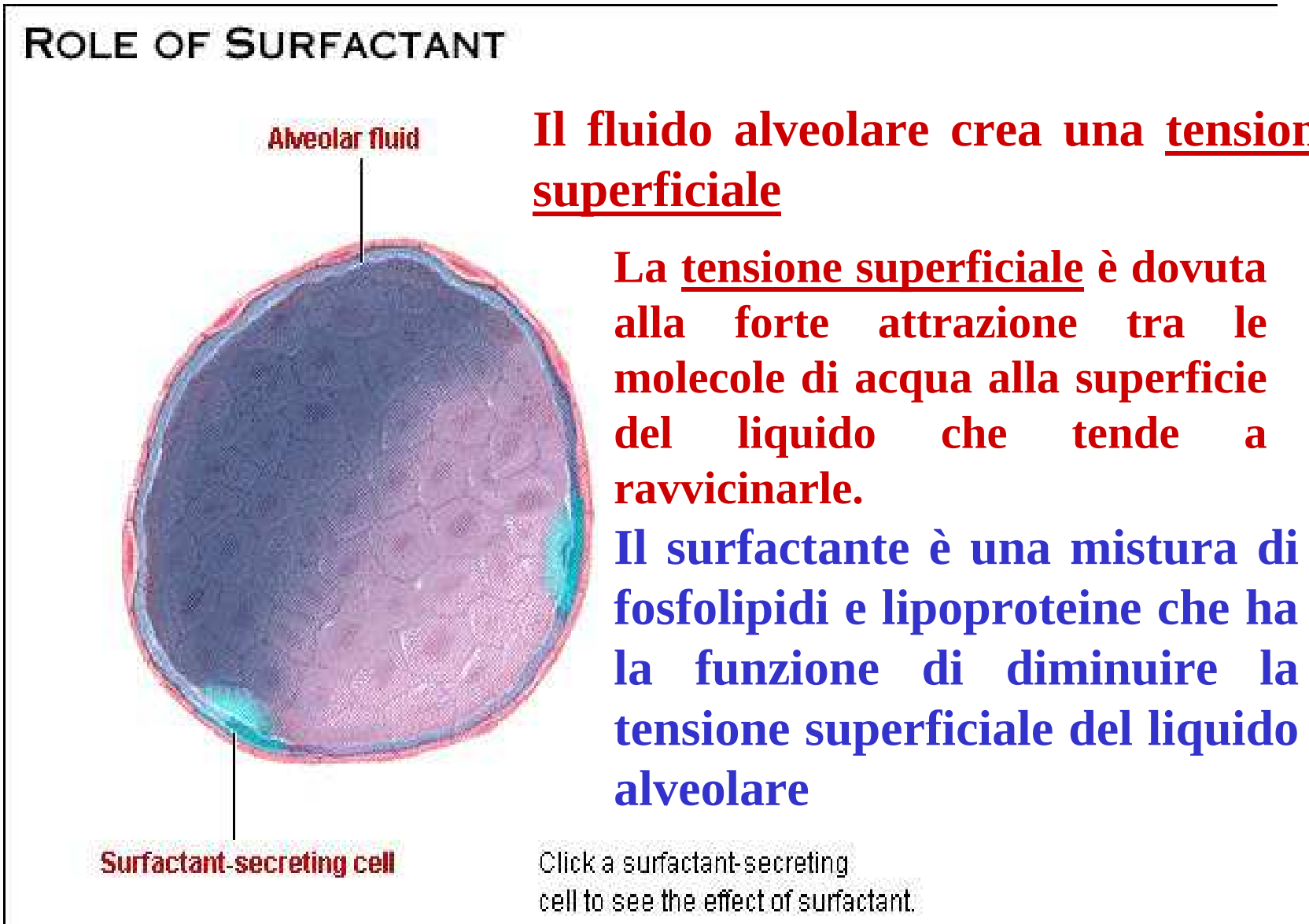
Macrofagi Alveolari

Cellule di tipo I (epiteliali)

Cellule di tipo II (Secernenti surfactante)

Capillare

Struttura delle vie aeree:

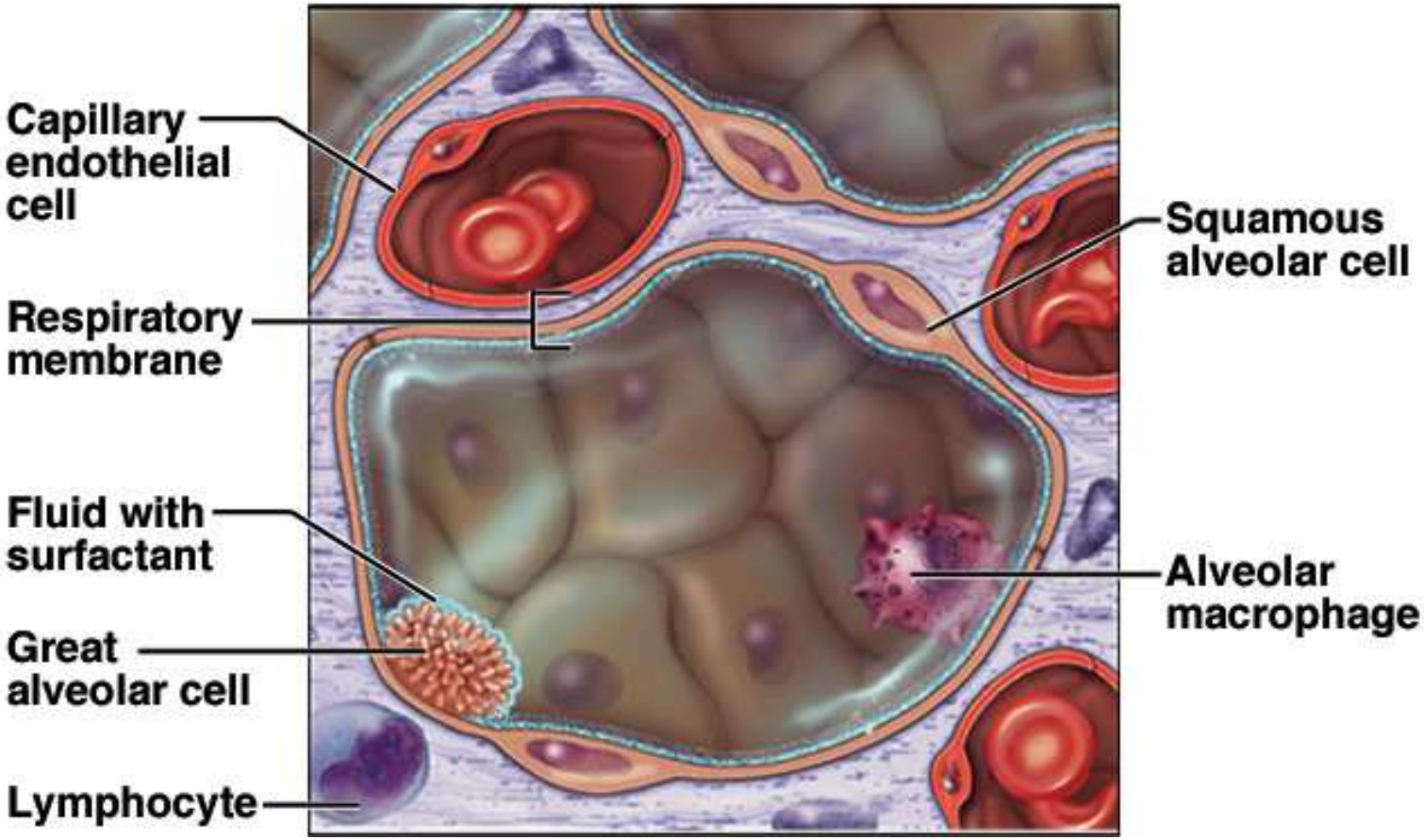


Il fluido alveolare crea una tensione superficiale

La tensione superficiale è dovuta alla forte attrazione tra le molecole di acqua alla superficie del liquido che tende a ravvicinarle.

Il surfactante è una mistura di fosfolipidi e lipoproteine che ha la funzione di diminuire la tensione superficiale del liquido alveolare

Struttura di un alveolo

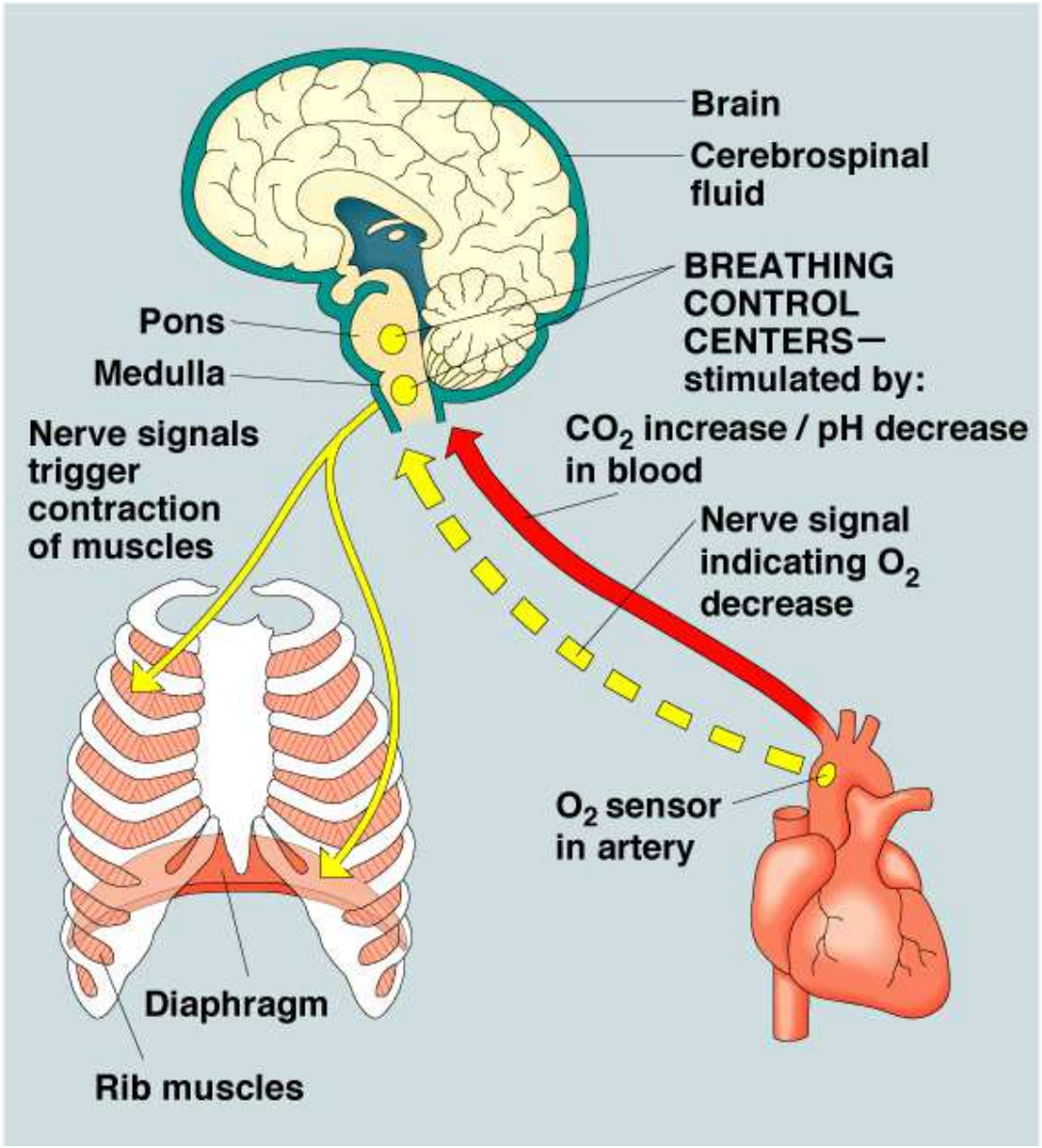


Legge di Fick

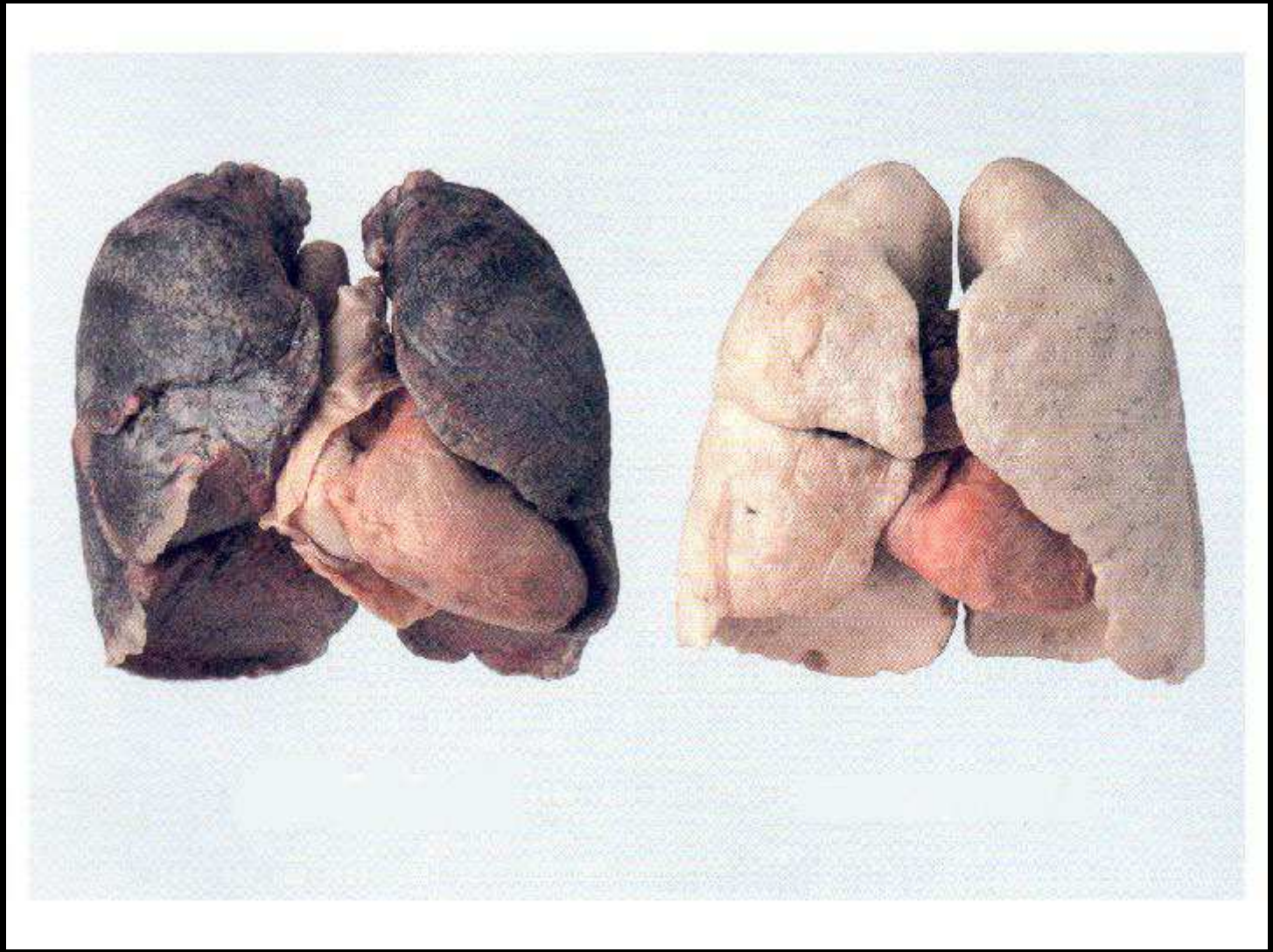
Il volume di gas scambiato attraverso una superficie è:

- Proporzionale alla superficie di scambio ed alla pressione parziale del gas;
- Inversamente proporzionale allo spessore del setto da attraversare.

La respirazione umana é controllata automaticamente



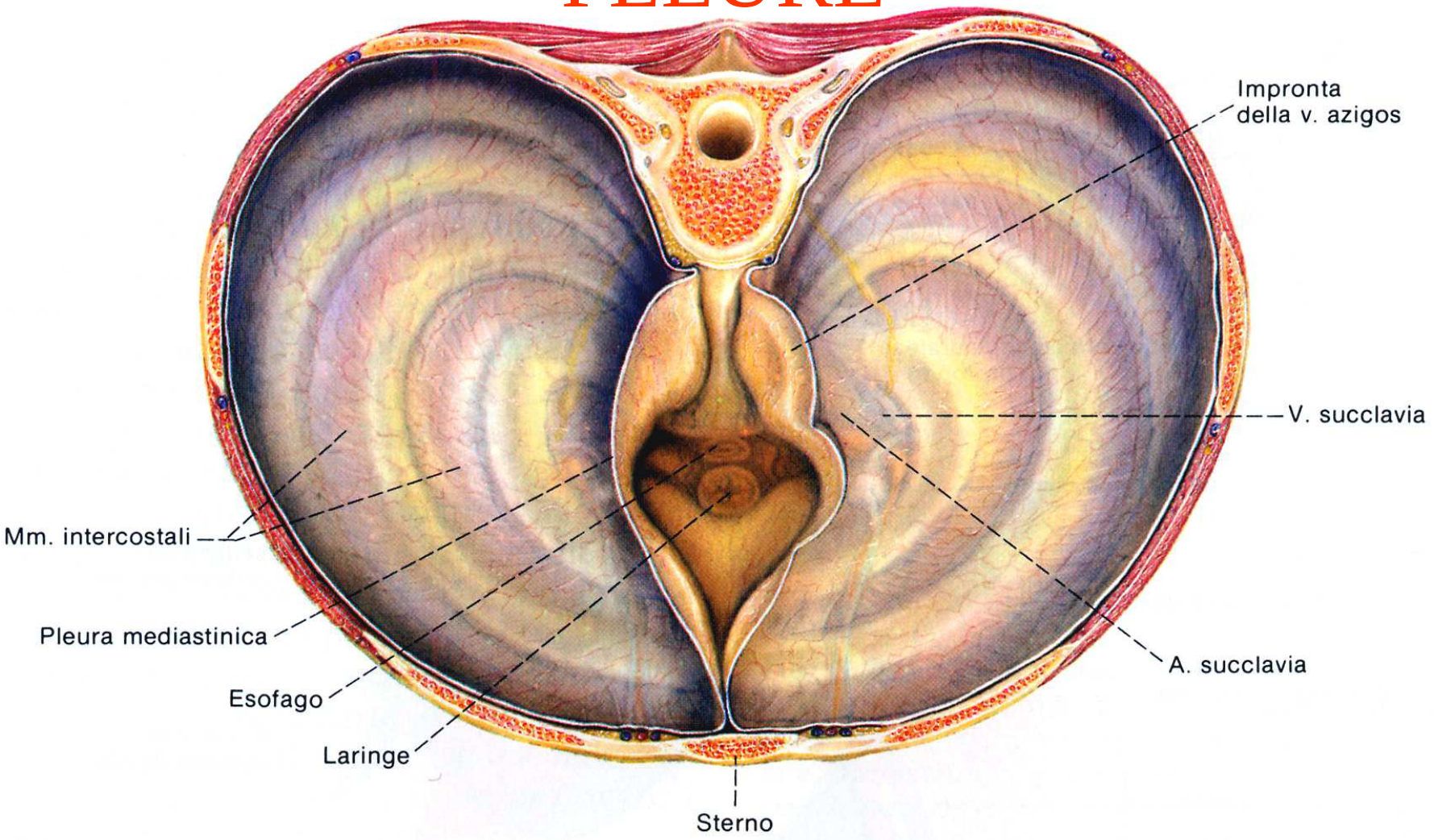
you might want to think twice about smoking….



PLEURE

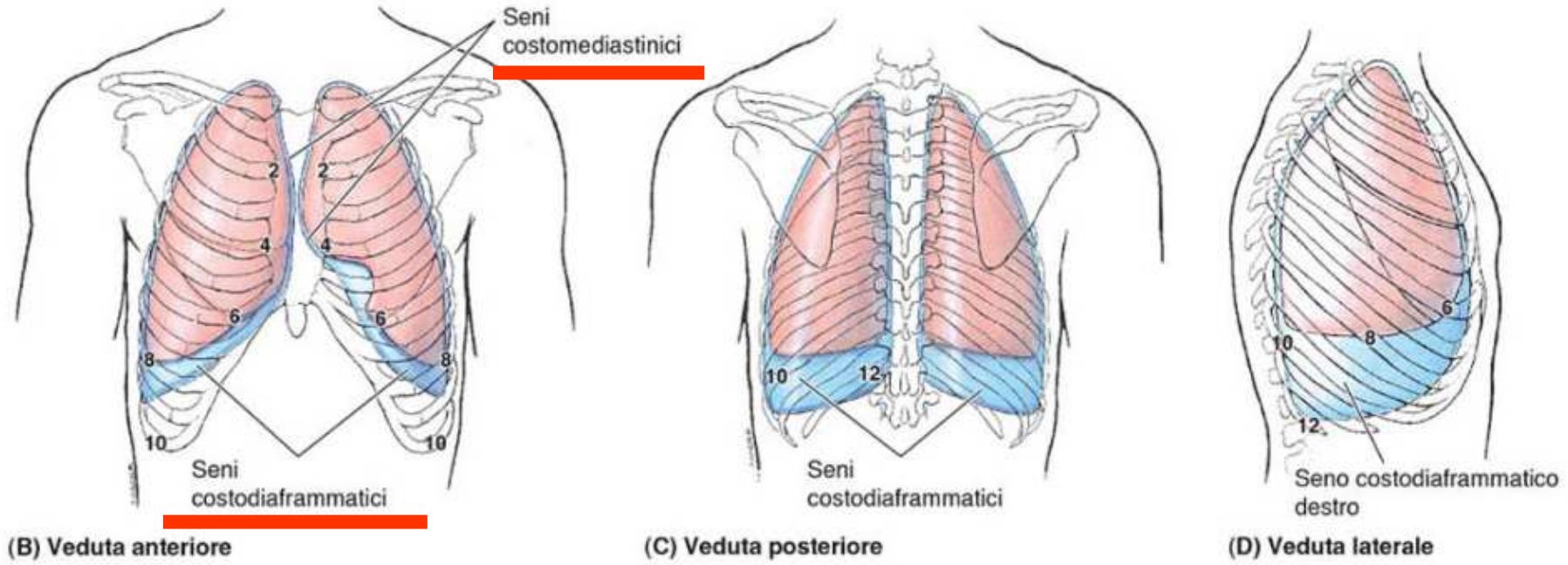
Pleura viscerale
Pleura parietale
- costale
  - Apparato sospensore della pleura
    - Leg vertebropleurale
    - Leg costopleurale
    - Leg scalenopleurale
- diaframmatica
- mediastinica

PLEURE

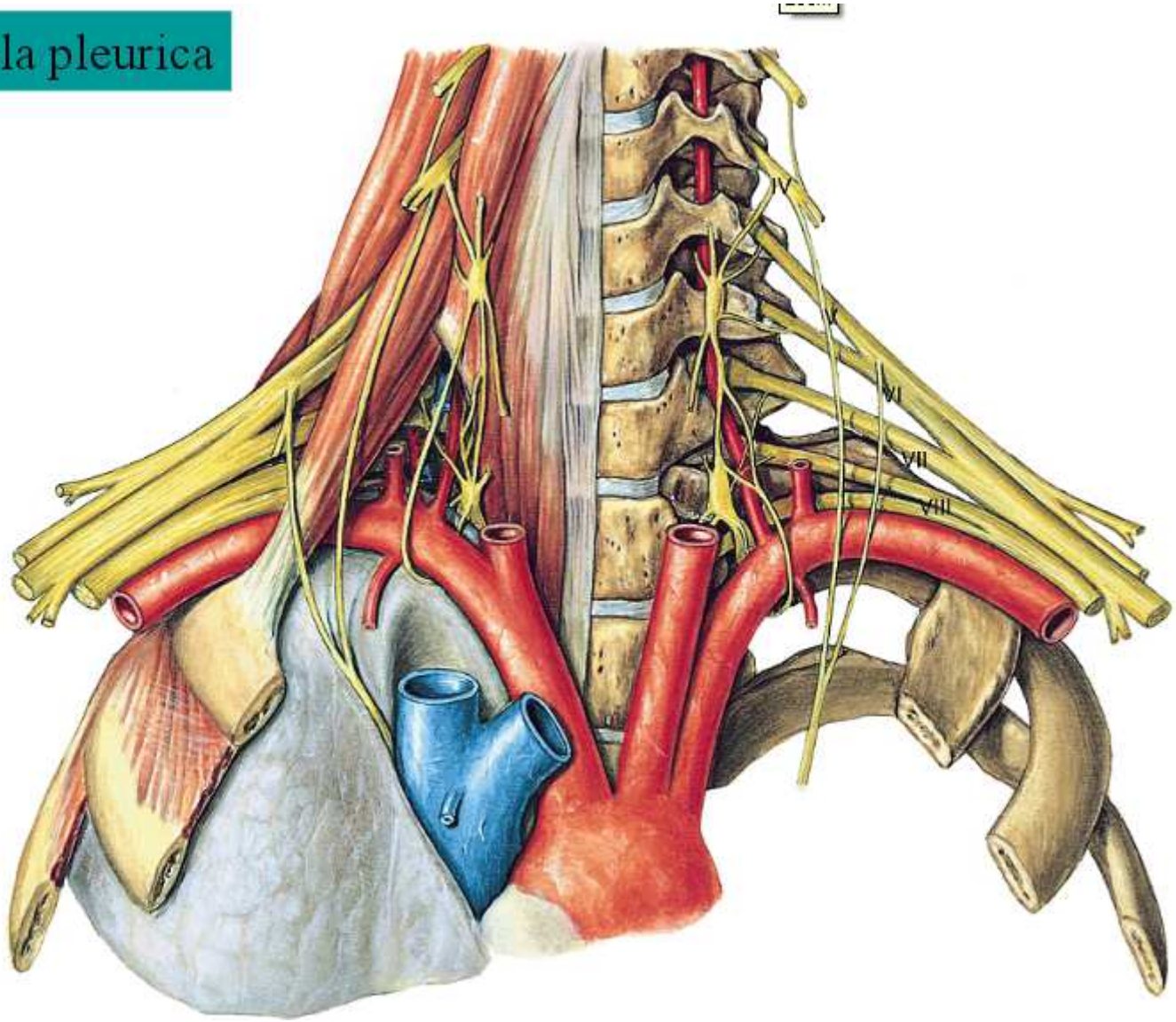

Impronta
della v. azigos
V. succlavia
Mm. intercostali
Pleura mediastinica
Esofago
Laringe
A. succlavia
Sterno

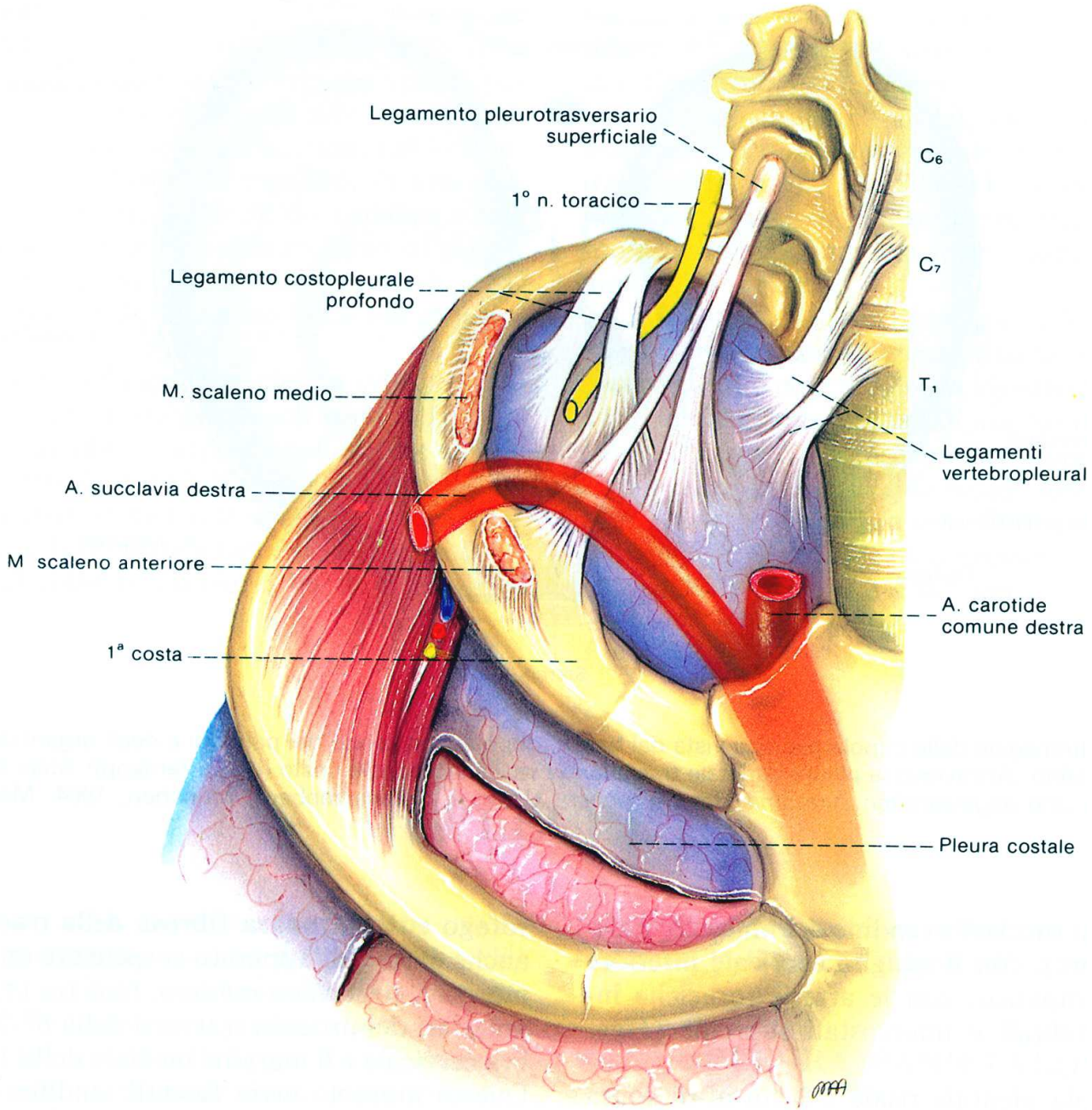
Seni pleurici

Seno costodiaframmatico
Seno costomediastinico



Cupola pleurica




Legamento pleurotrasversario superficiale
1° n. toracico
Legamento costopleurale profondo
M. scaleno medio
A. succlavia destra
M scaleno anteriore
1ª costa
C6
C7
T1
Legamenti vertebropleural
A. carotide comune destra
Pleura costale

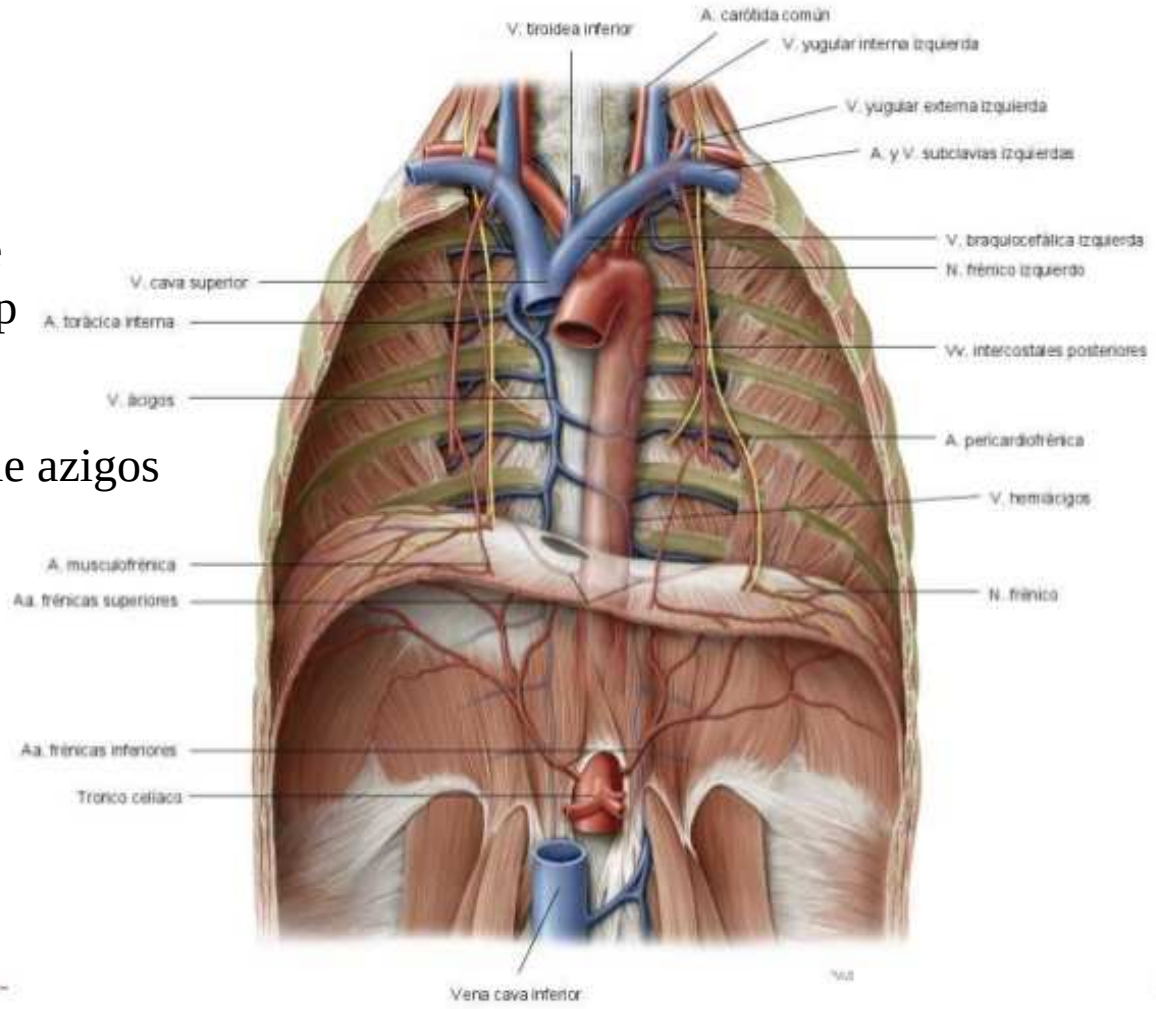
Vasi

Arterie derivazione:

- Art bronchiale
- Art intercostale
- Art freniche sup
- Mediastiniche

Vene:

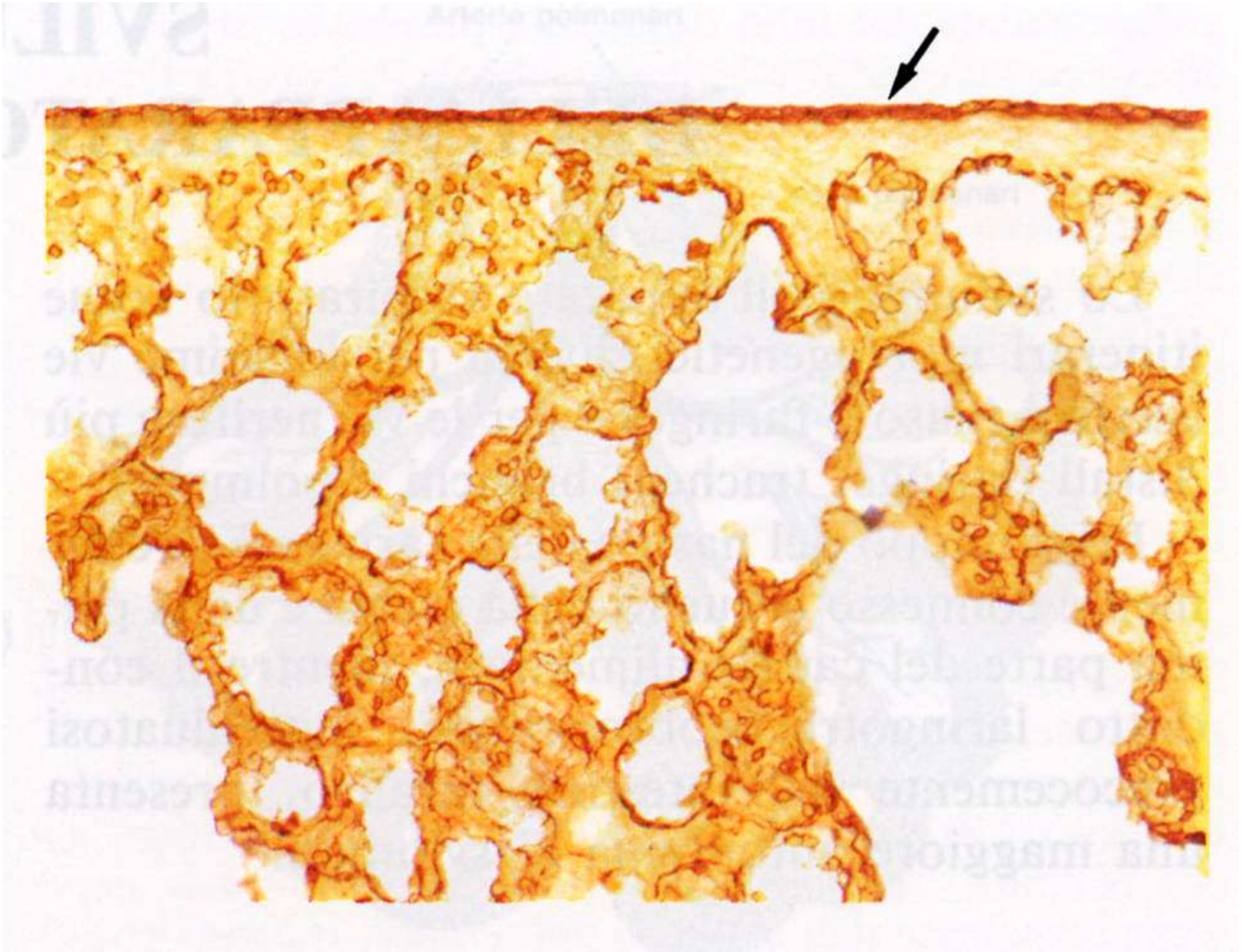
- nel sistema delle azigos



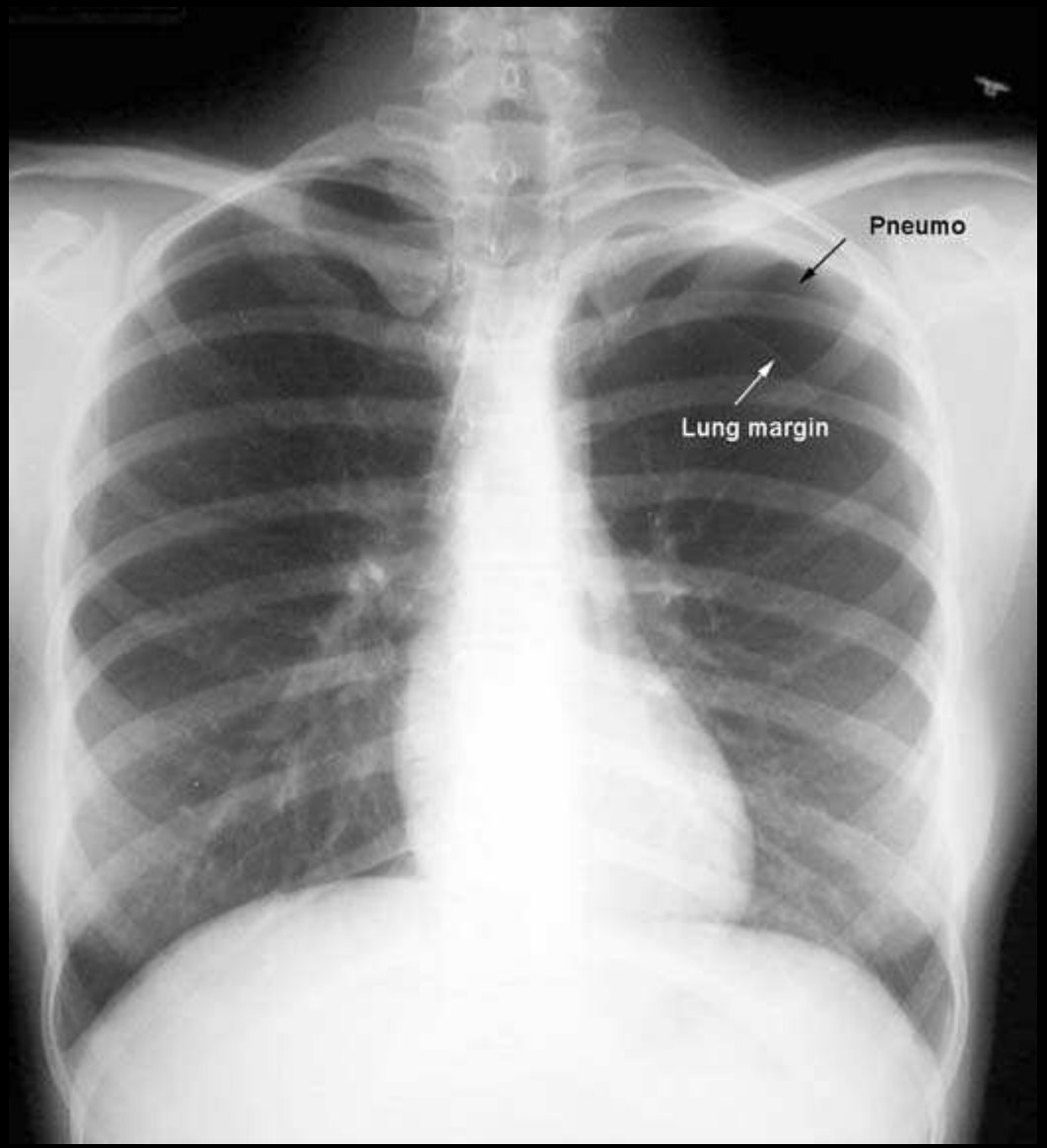
Struttura della pleura

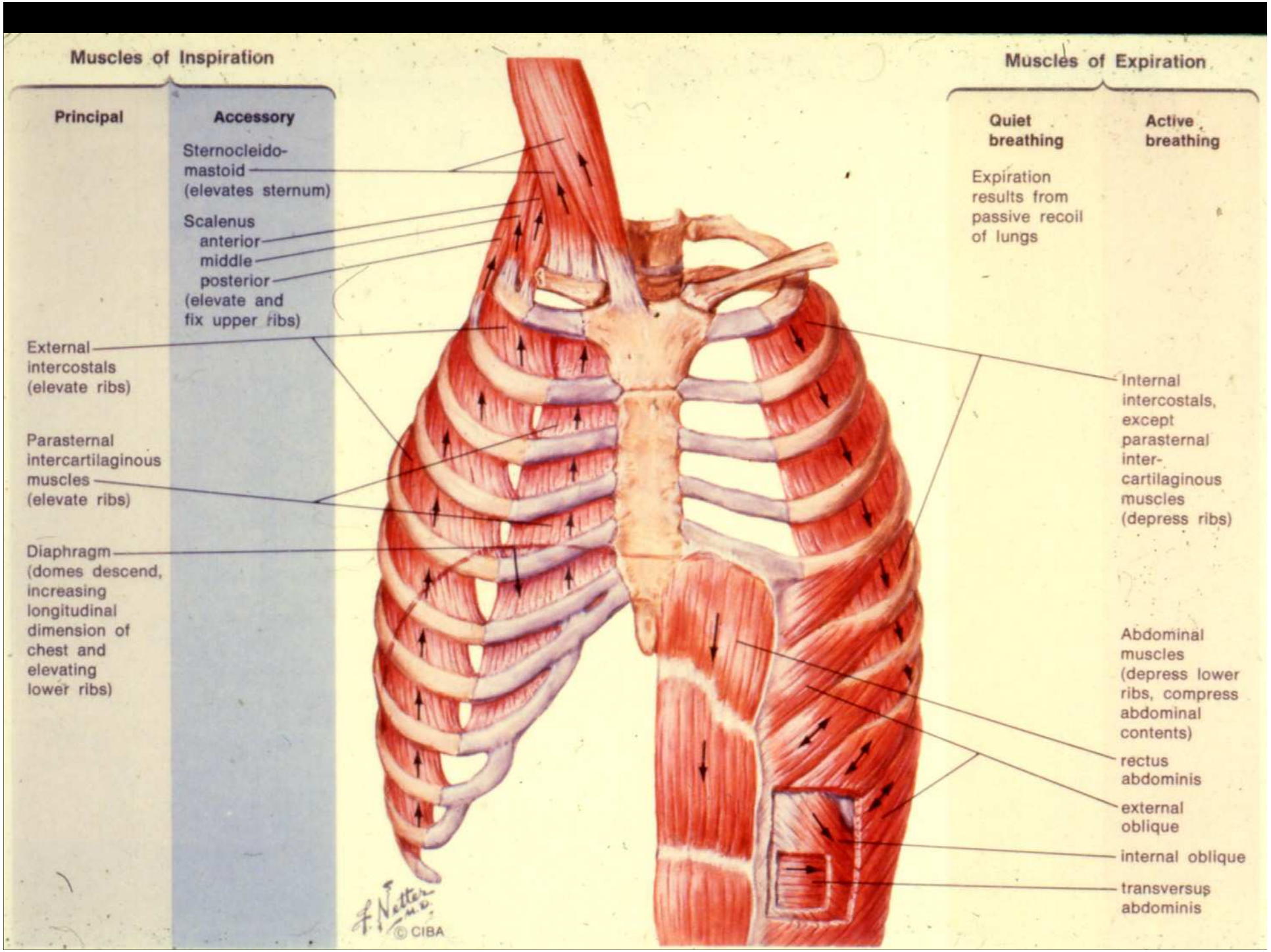
Strato 1: Mesotelio di cellule appiattite
Strato 2: Sottomesoteliale
strato superficiale (ricco di collagene)
strato profondo (ricco di f. elastiche)
Strato 3: sottosieroso (ricco di connettivo lasso)
Strato 4: fibroelastico

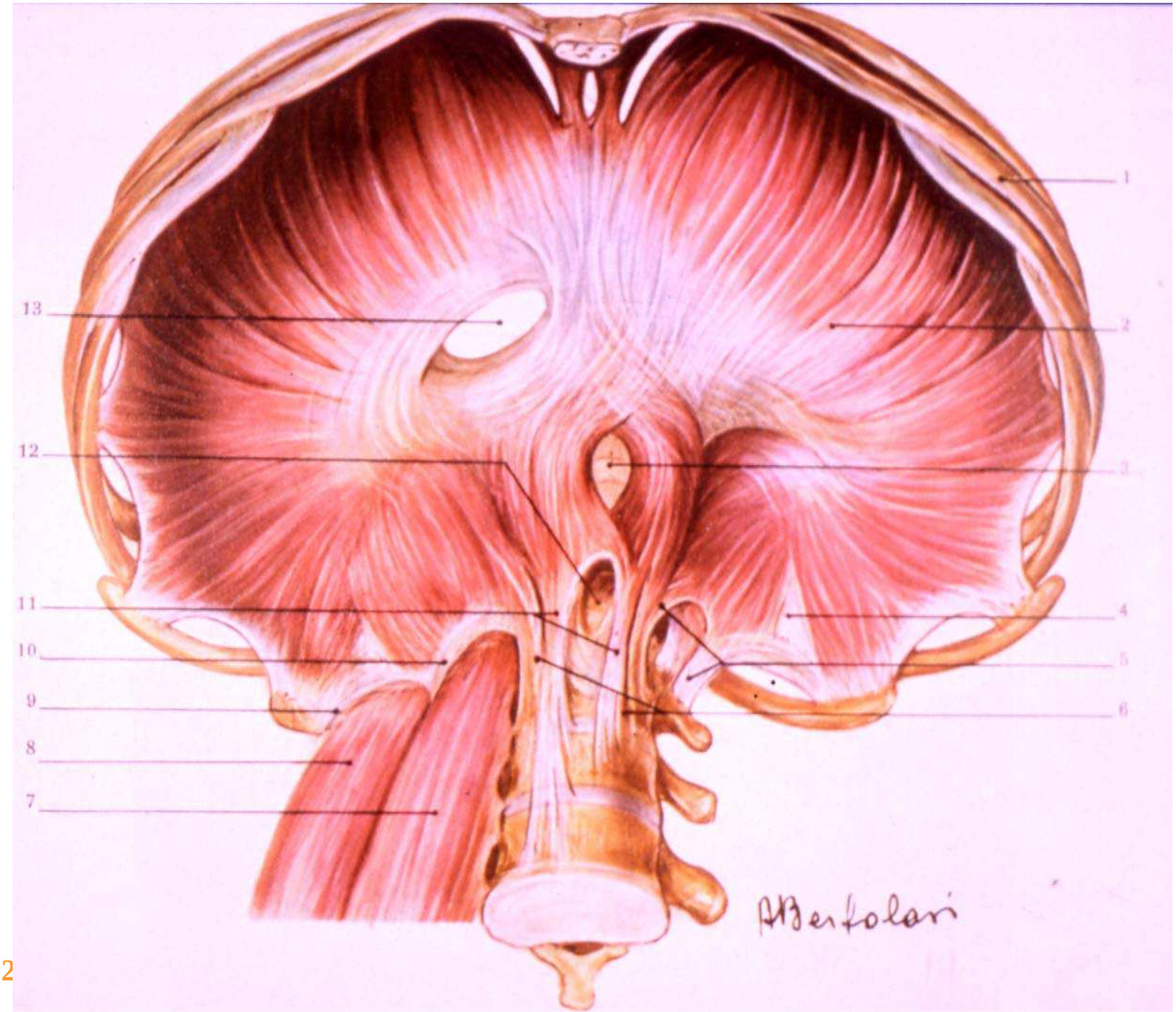
POLMONE o STRUTTURE PARIETALI



Pneumothorax




Muscles of Inspiration
Principal
Accessory
Sternocleido-mastoid (elevates sternum)
Scalenus anterior middle posterior (elevate and fix upper ribs)
External intercostals (elevate ribs)
Parasternal intercartilaginous muscles (elevate ribs)
Diaphragm (domes descend, increasing longitudinal dimension of chest and elevating lower ribs)
Muscles of Expiration
Quiet breathing
Active breathing
Expiration results from passive recoil of lungs
Internal intercostals, except parasternal inter-cartilaginous muscles (depress ribs)
Abdominal muscles (depress lower ribs, compress abdominal contents)
rectus abdominis
external oblique
internal oblique
transversus abdominis
F. Netter M.D.
© CIBA


1
2
3
4
5
6
7
8
9
10
11
12
13
A Bertolari

MOVIMENTI DELLE COSTE

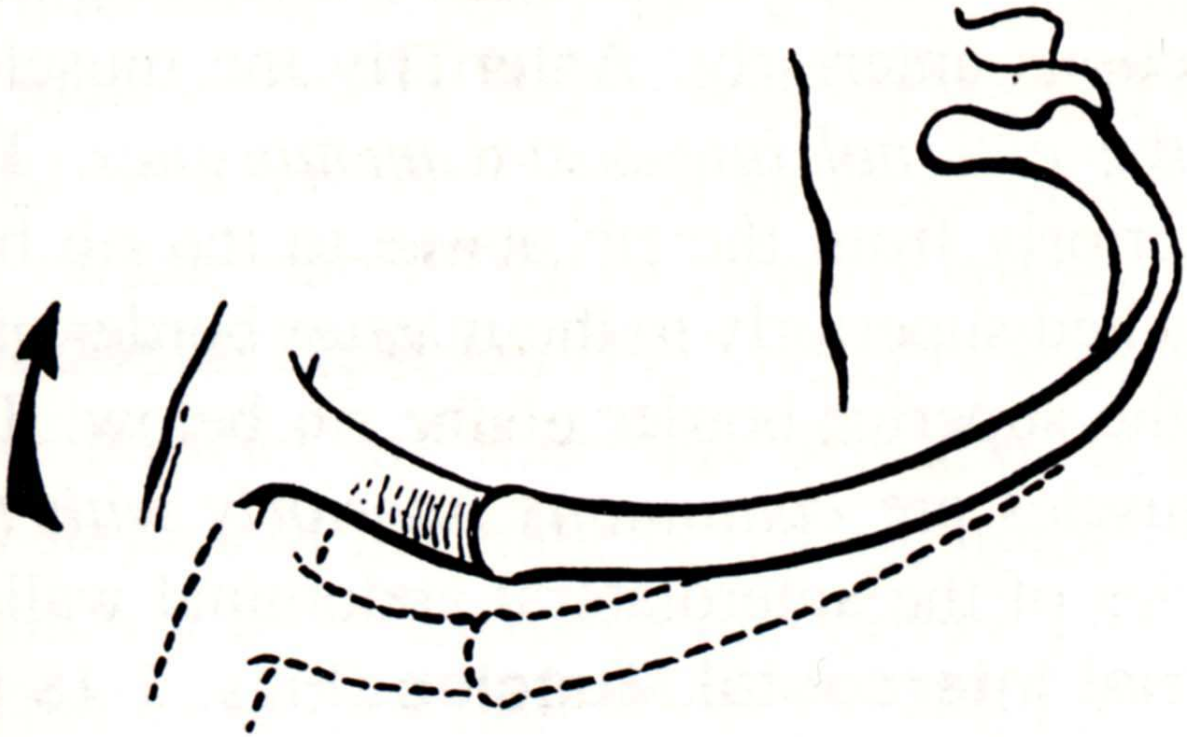


Figure 1-16. The ‘‘pump-handle’’ inspiratory movement. Anterior parts of the ribs move anteriorly like a pump handle. This action moves the sternum up and down, increasing and decreasing the anteroposterior diameter of the thorax.

MOVIMENTI DELLE COSTE

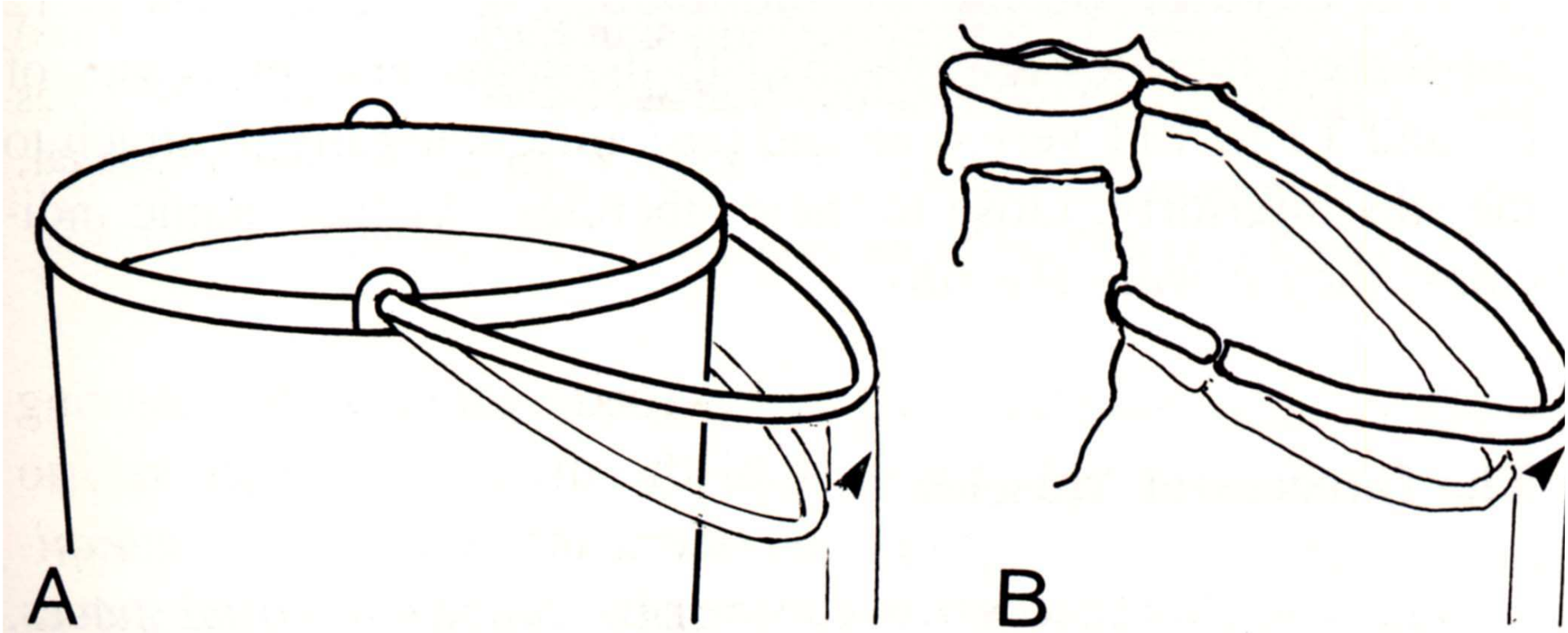
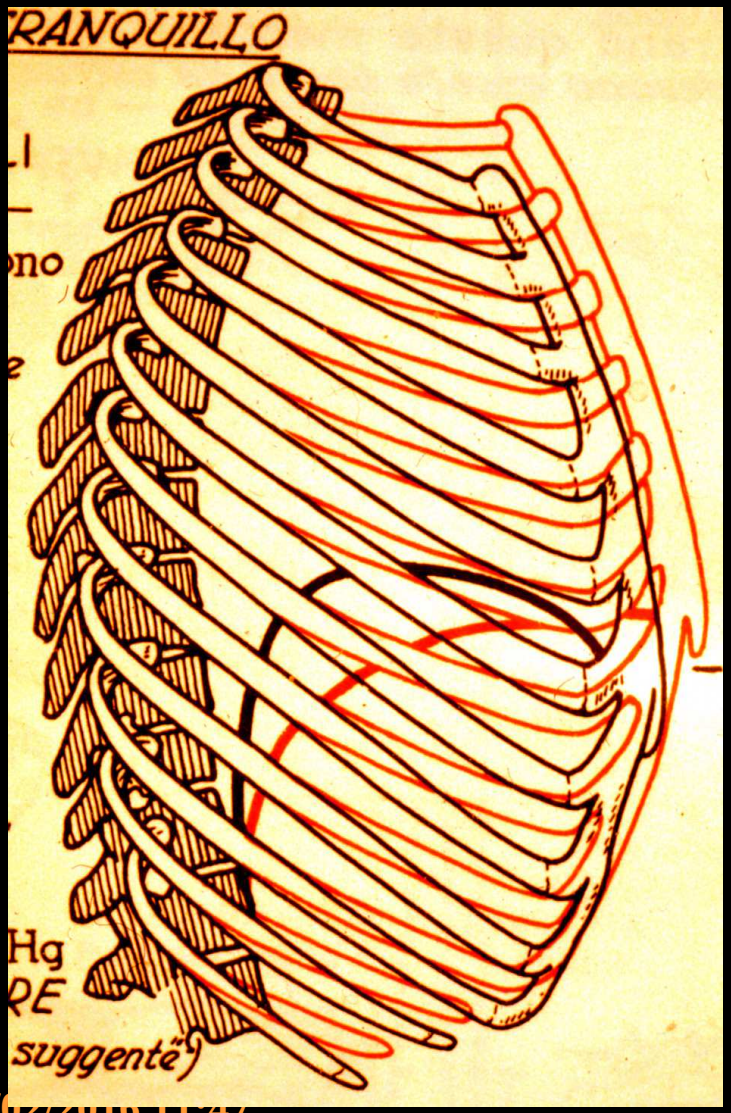
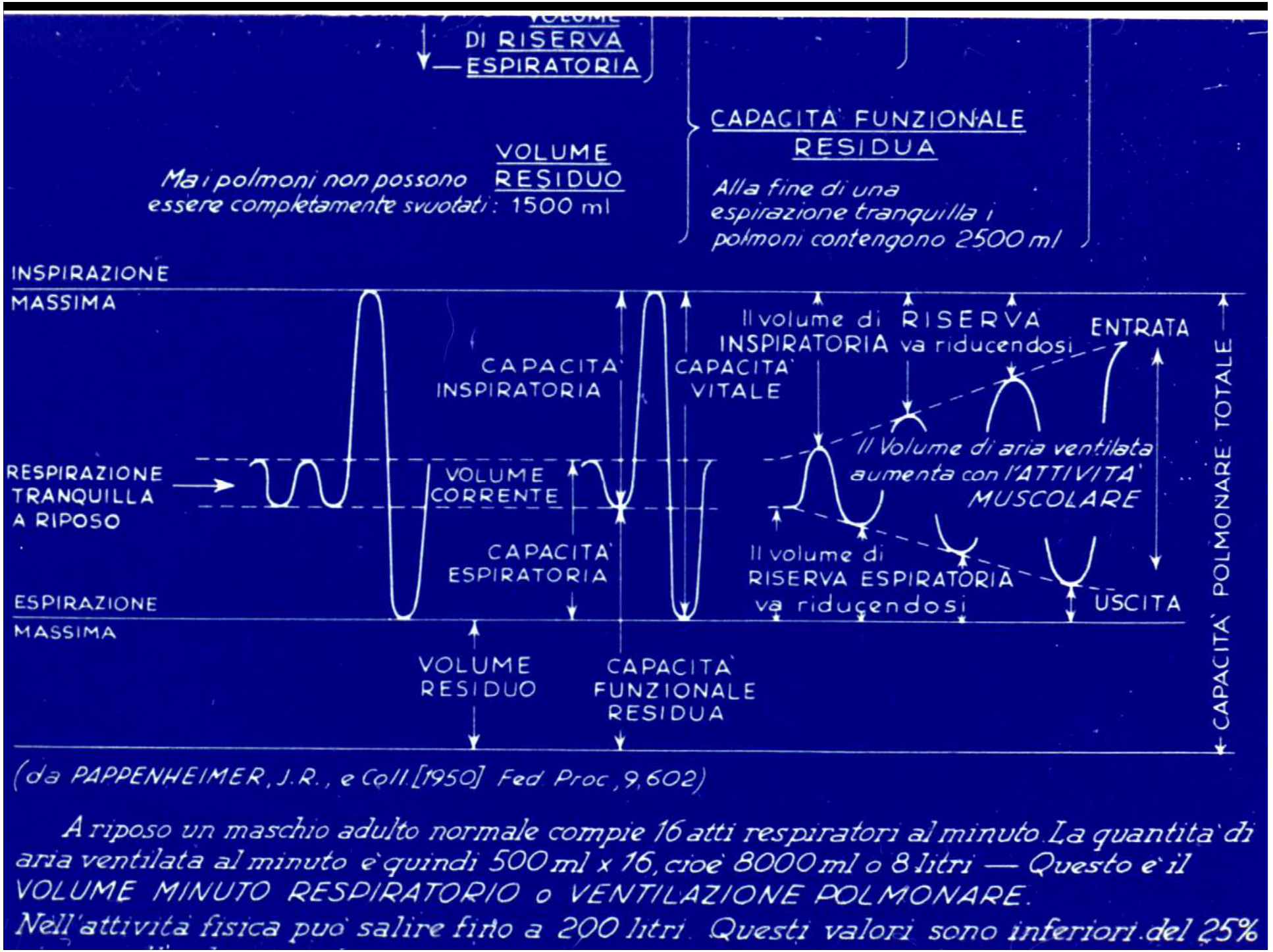


Figure 1-15. The ''bucket-handle'' inspiratory movement. *A*, when the pail handle is raised, its convexity moves laterally, away from its attachments. *B*, similarly, when the intercostal muscles contract the ribs move superolaterally, increasing the transverse diameter of the thorax.

MOVIMENTI DELLE COSTE

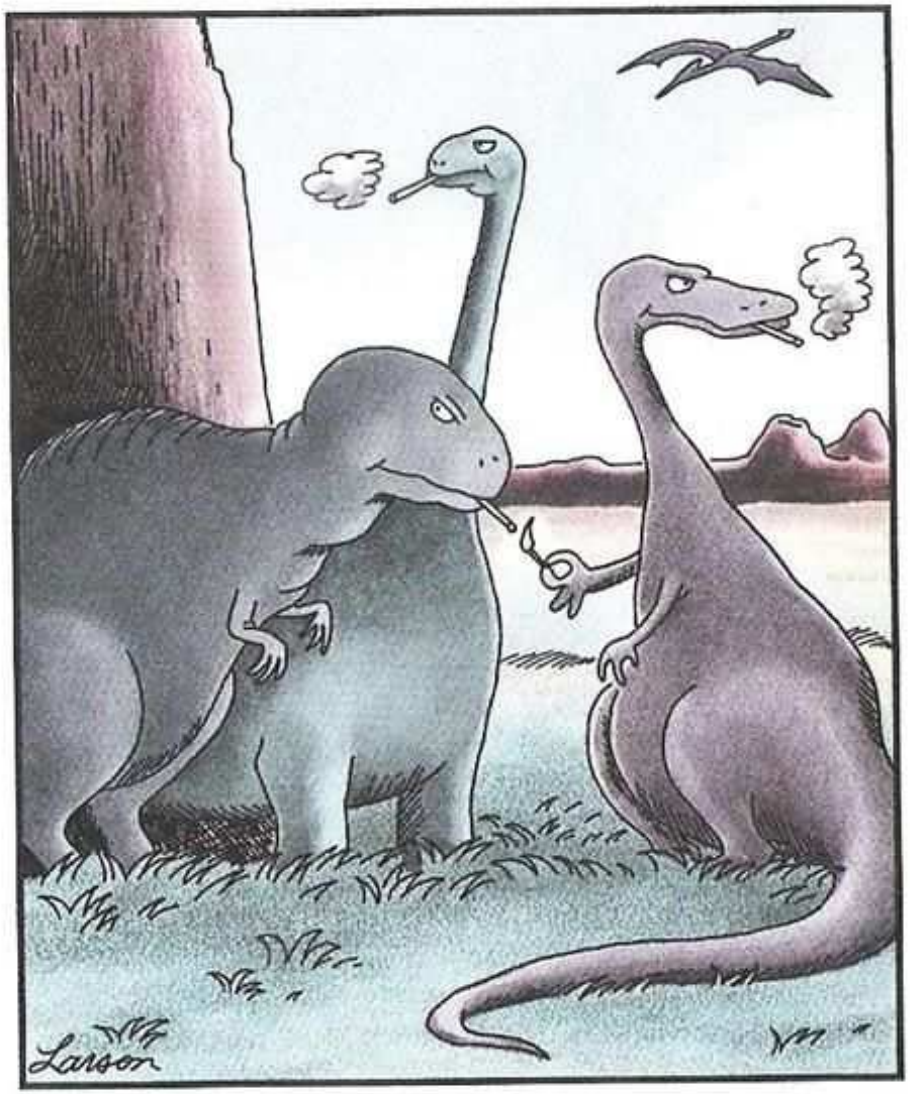


The Mechanics of Respiration
Isolated View of Diaphragm in Motion
Video Demo
www.3D-Yoga.com



(da PAPPENHEIMER, J.R., e Coll. [1950] Fed. Proc., 9, 602)

A riposo un maschio adulto normale compie 16 atti respiratori al minuto. La quantita' di aria ventilata al minuto e' quindi 500 ml x 16, cioe' 8000 ml o 8 litri — Questo e' il VOLUME MINUTO RESPIRATORIO o VENTILAZIONE POLMONARE. Nell'attivita fisica puo salire fino a 200 litri. Questi valori sono inferiori del 25%



The real reason dinosaurs became extinct