

# Desarrollo del pulmón



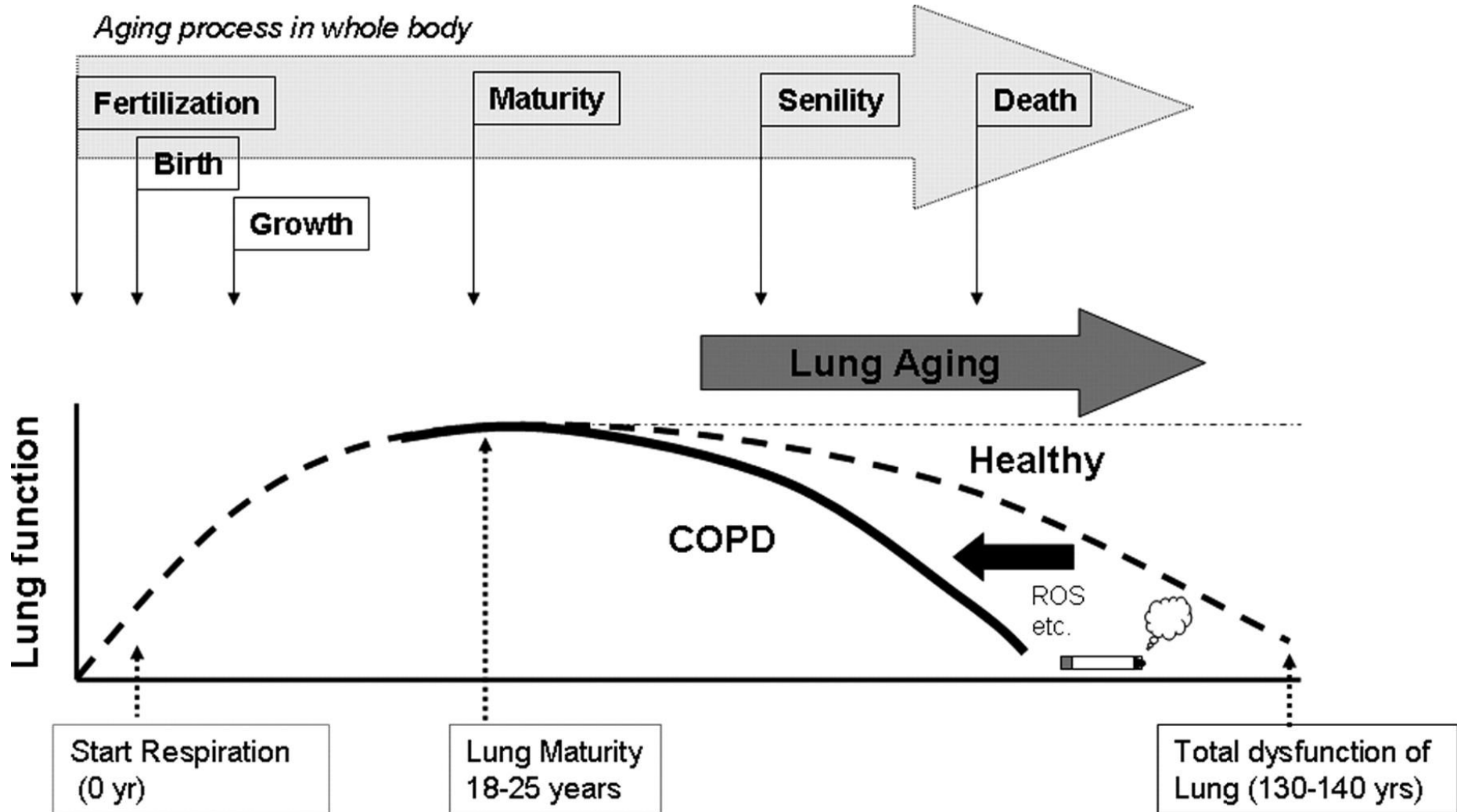
**Prof. Dr. Héctor Rodríguez.**

**DMV. MSc. DBM/PhD. Diplom (12)**

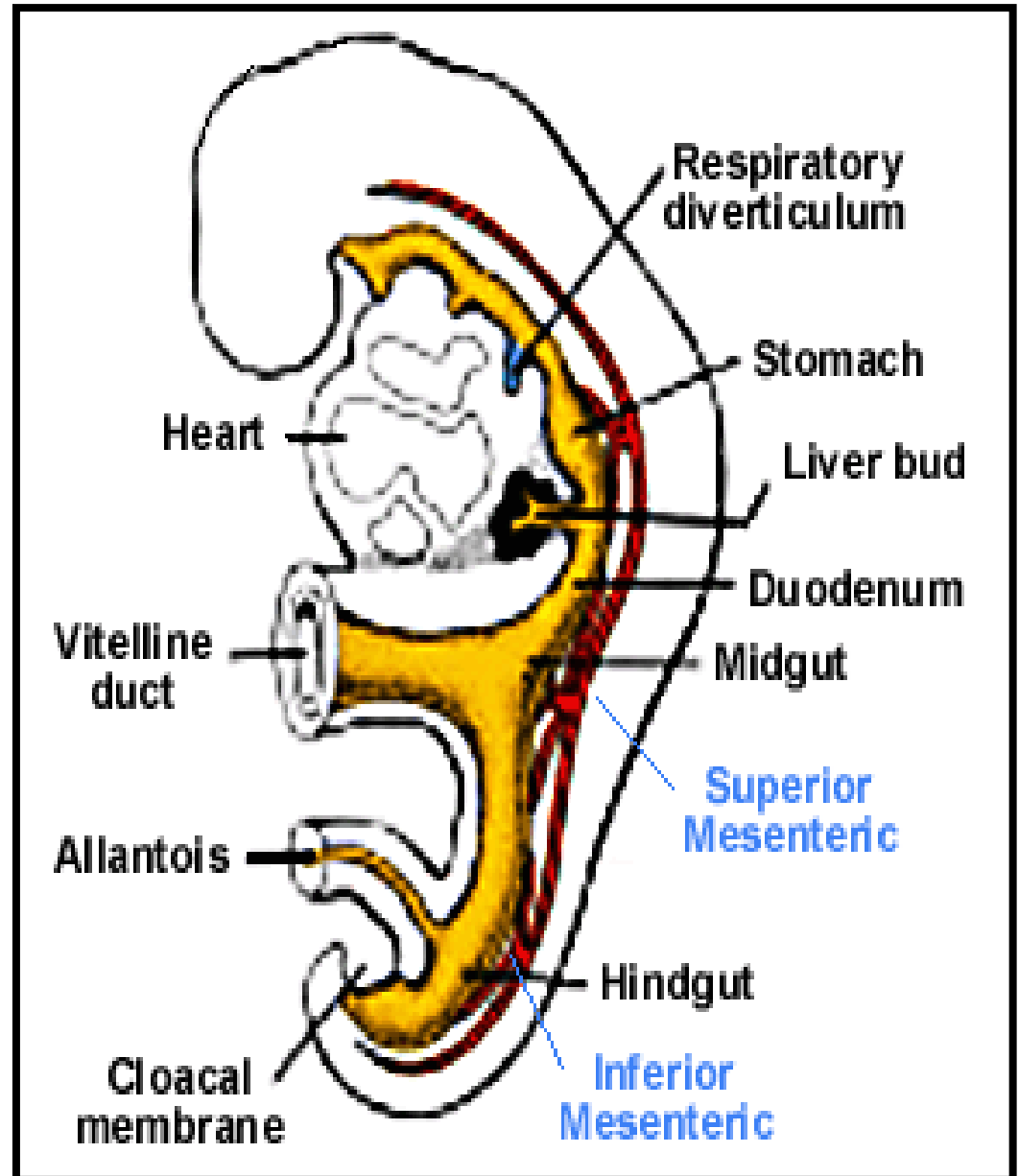
**Profesor Asociado**

**Facultad de Medicina / Universidad de Chile**

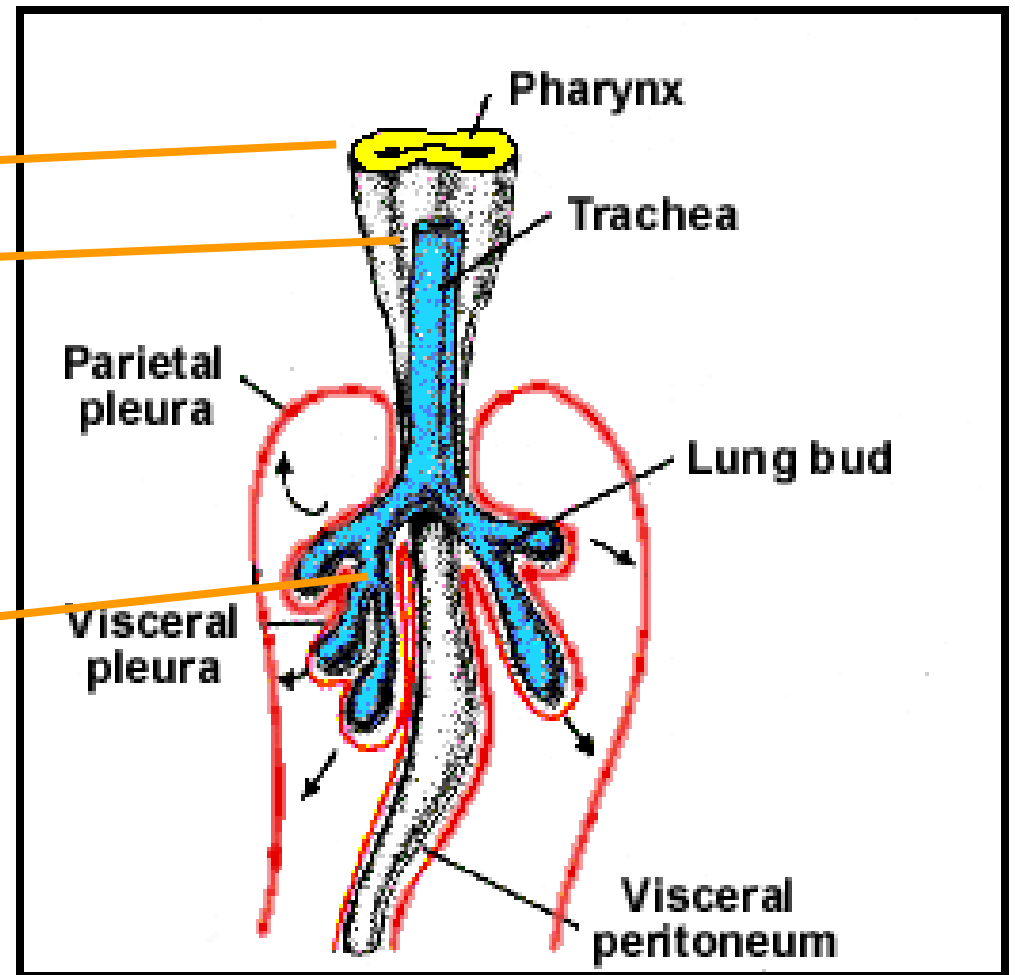
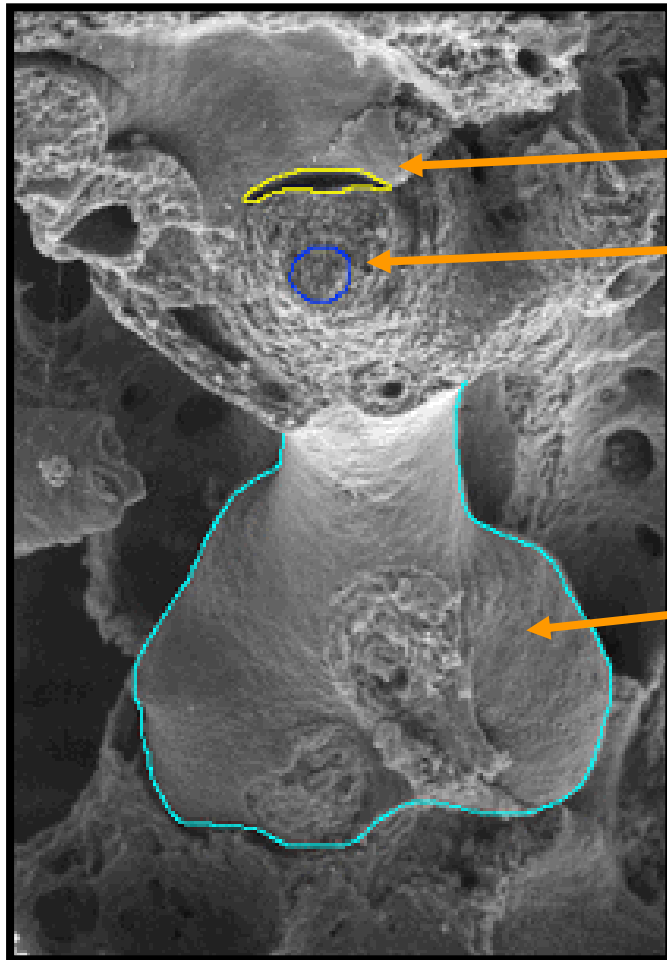
# Desarrollo, funcionamiento, y envejecimiento del pulmón



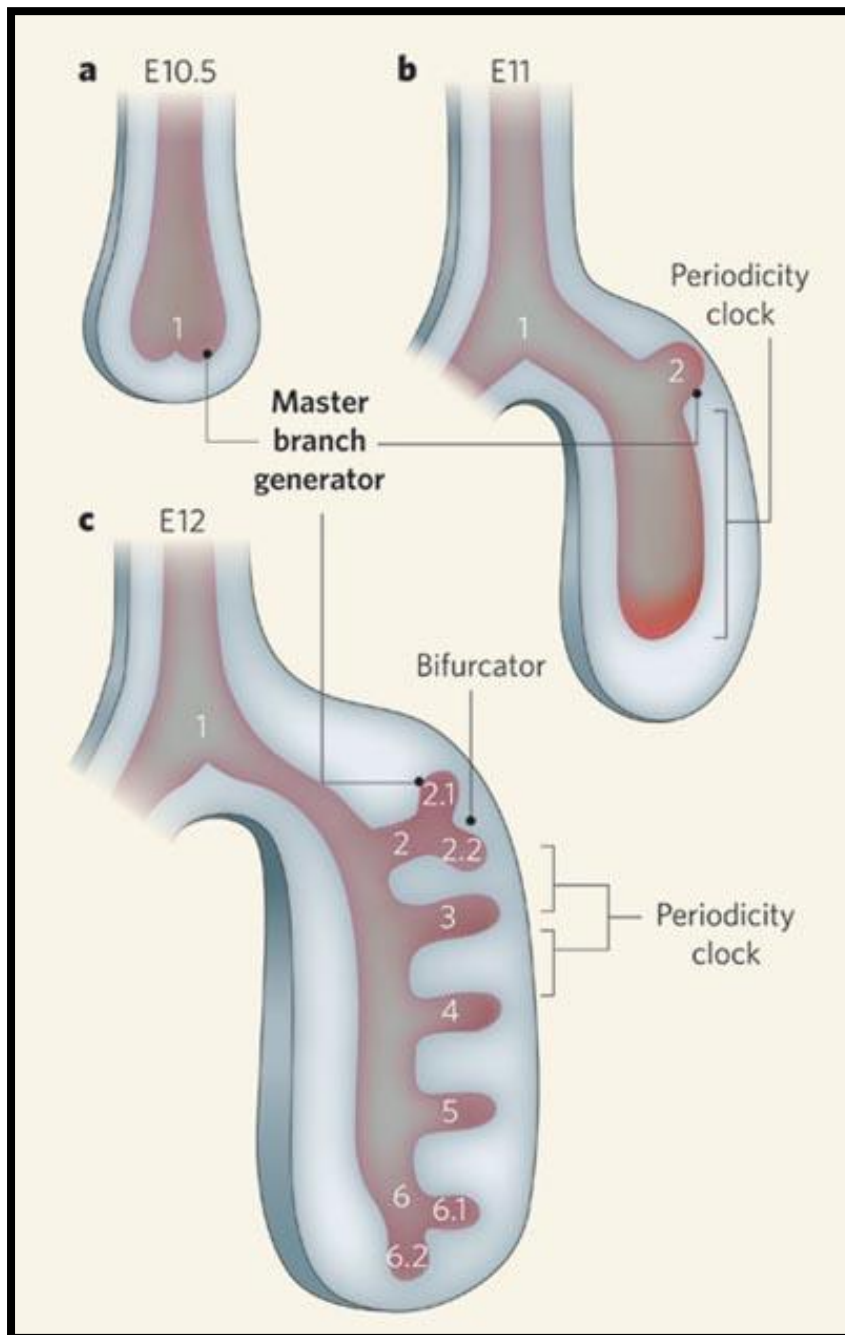
# Intestino primitivo











## Lung Development Phases: Human & Mouse



**I. Embryonic**  
Mouse: E 9–12  
Human: Wk 3–7



**II. Pseudoglandular**  
E 12–15  
Wk 5–17



**III. Canalicular**  
E 15–17  
Wk 16–26

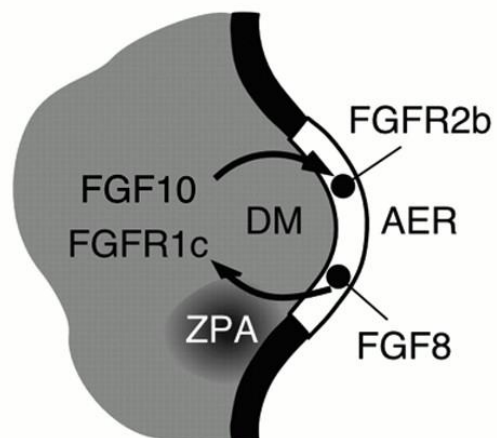
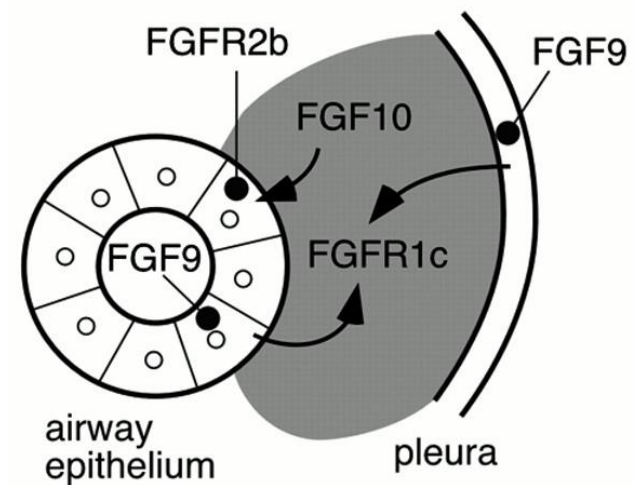


**IV. Saccular**  
E 17–Birth  
Wk 26–36

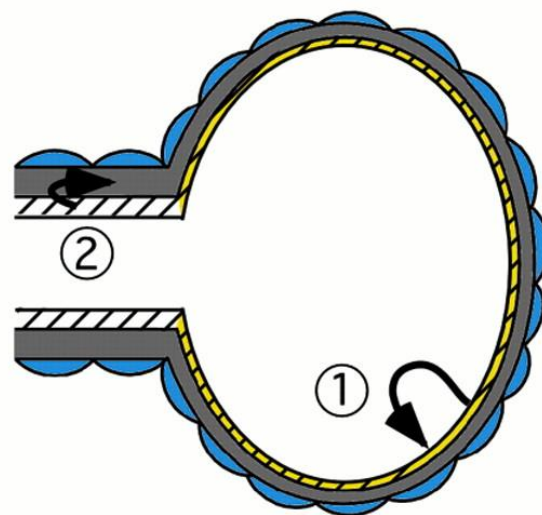
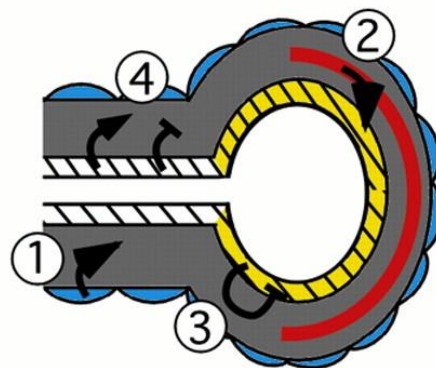
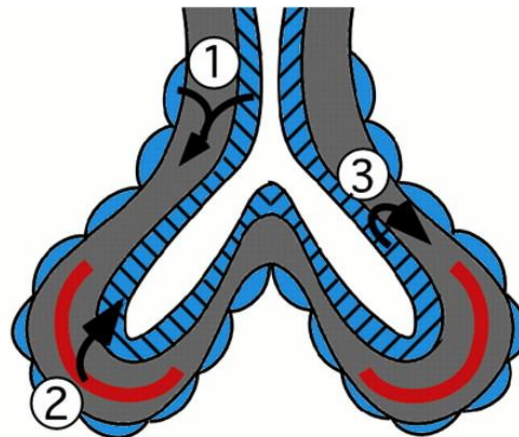


**V. Alveolar**  
Birth–PN20  
Wk 36–3 years

A



B



Etapas del Desarrollo

Seudoglandular

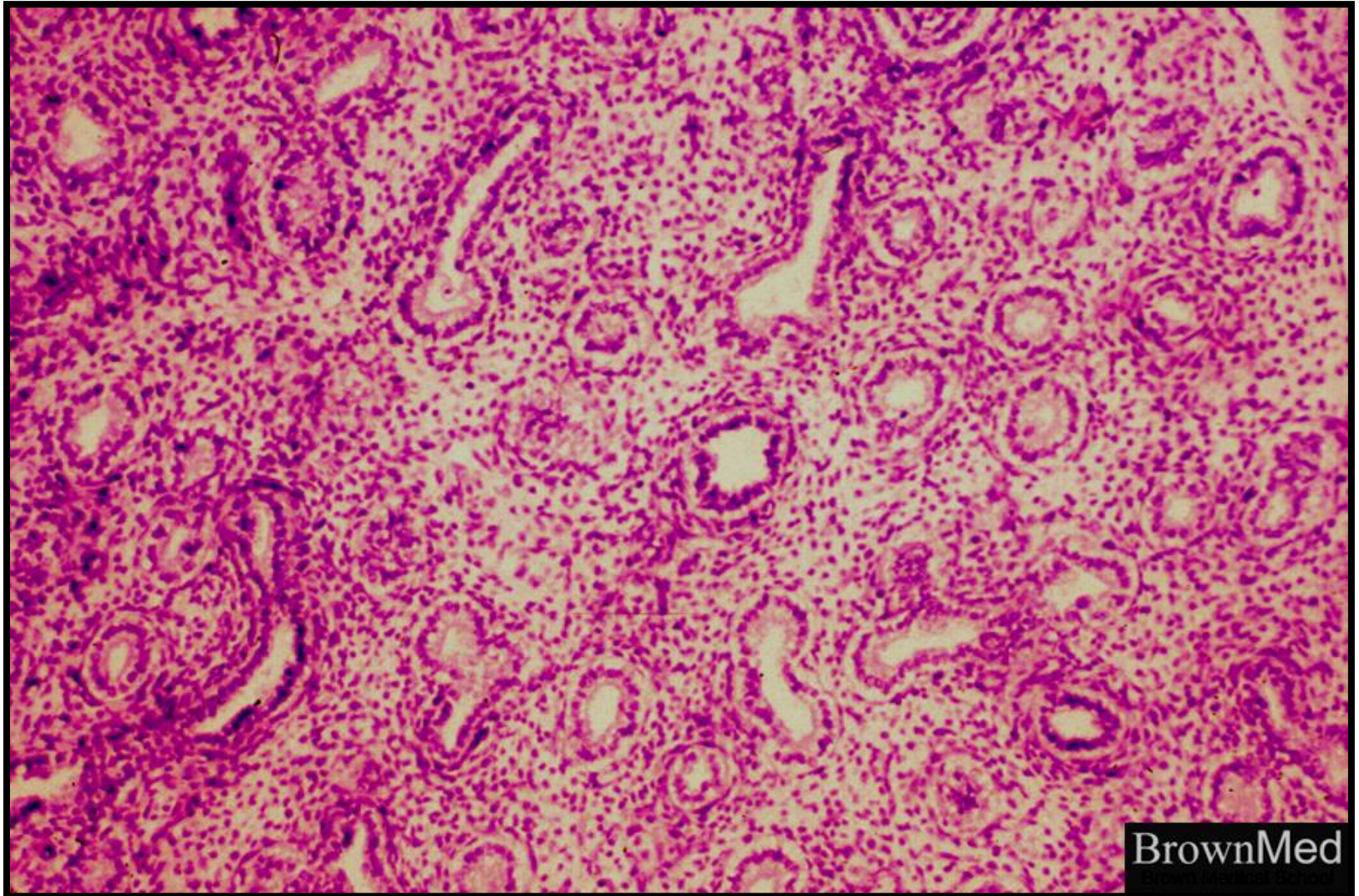
Canalicular/Tubular

Sacular/Alveolar



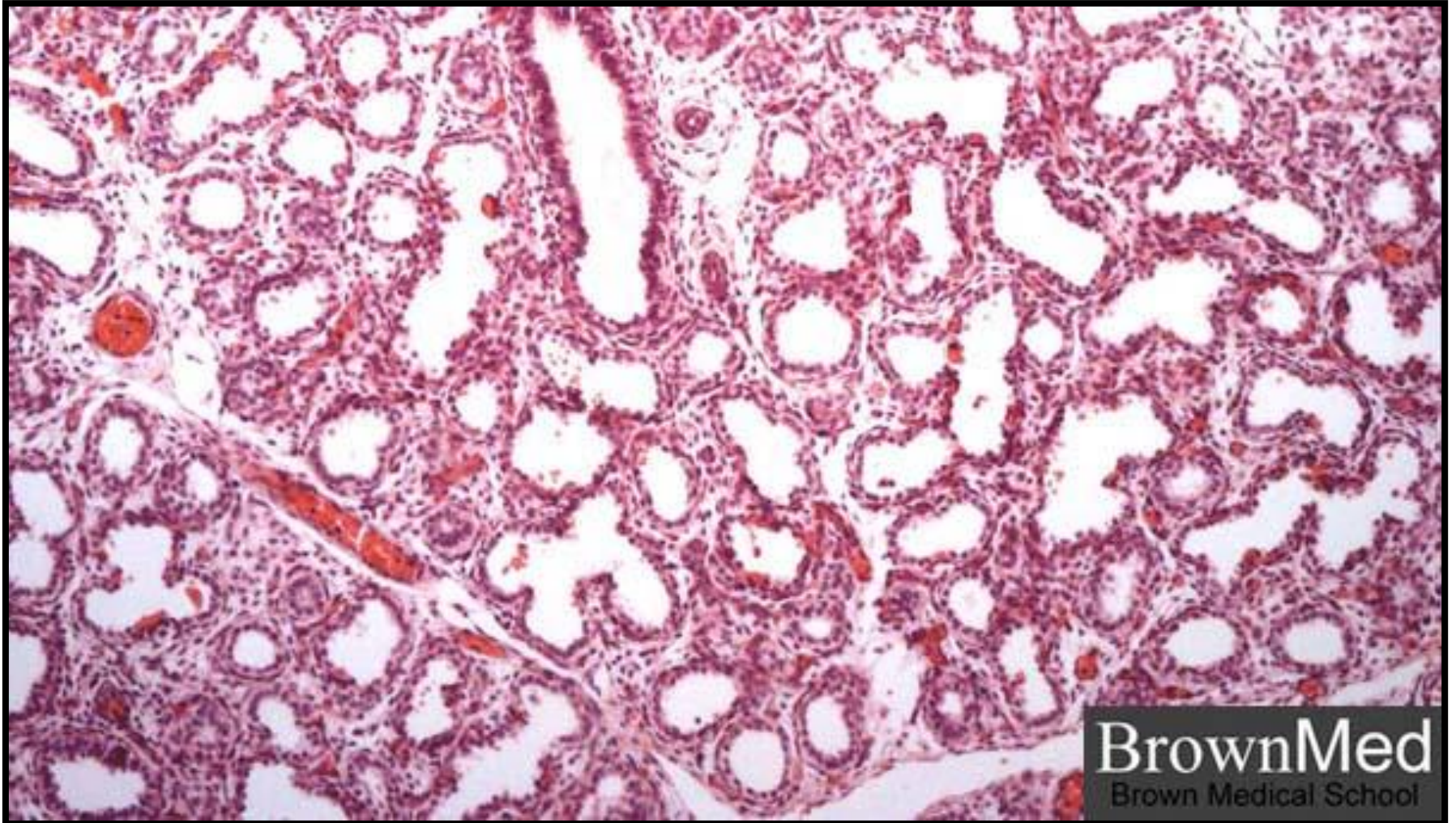
# Fase pseudoglandular:

5 a 17 semanas



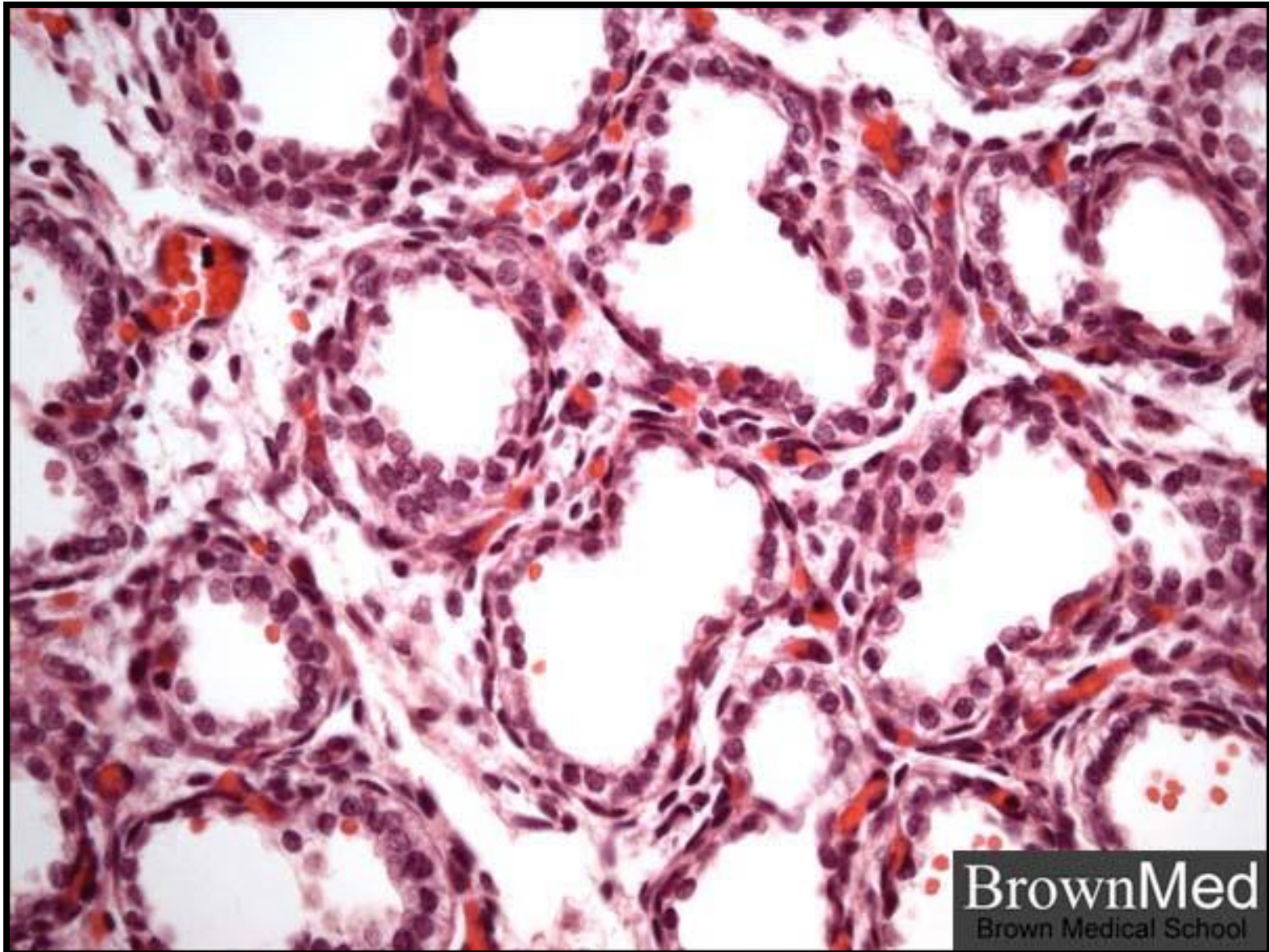


Fase canalicular:  
20 semanas



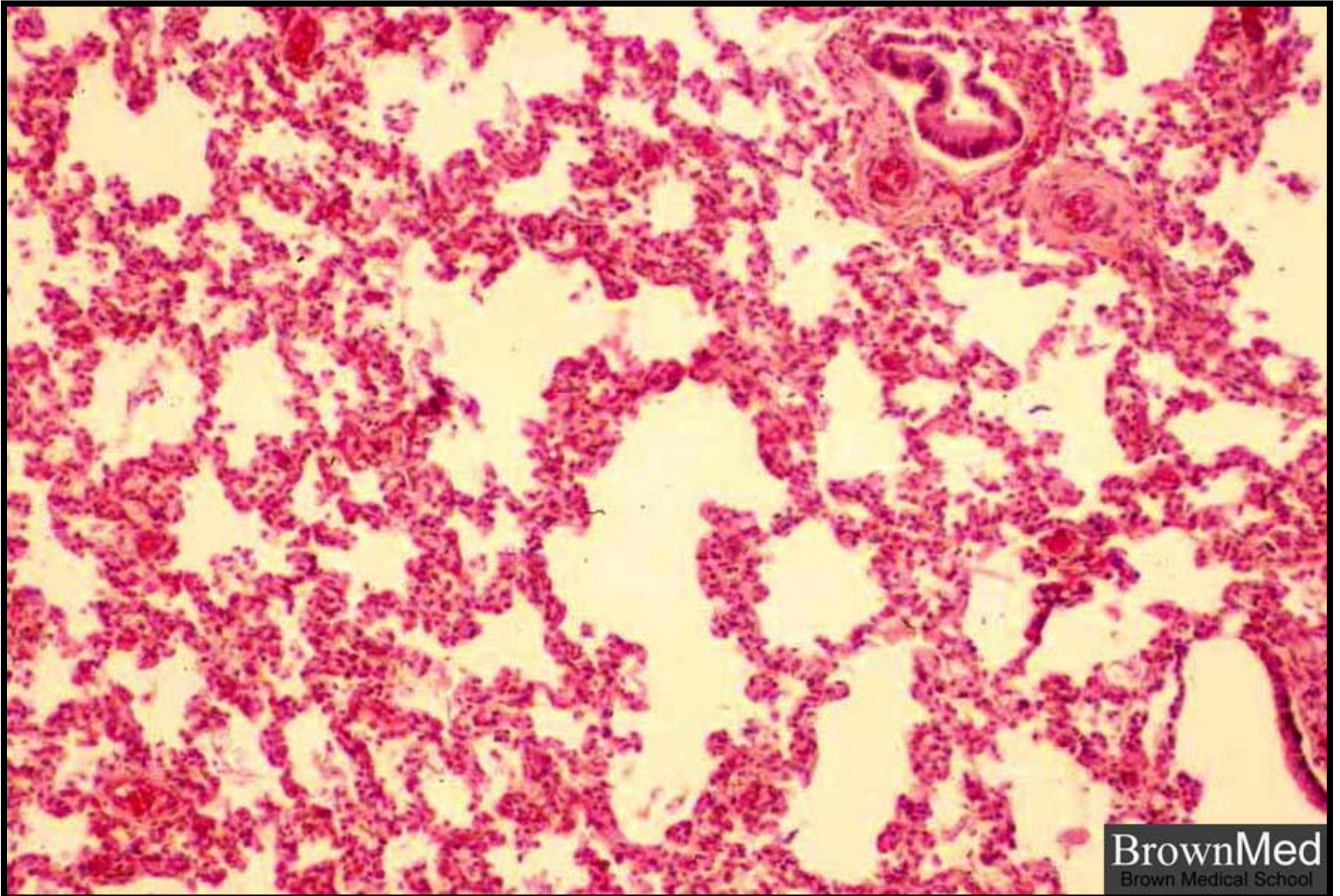


Fase canalicular: 20 semanas.  
Fase de diferenciación de neumocitos tipos I y II

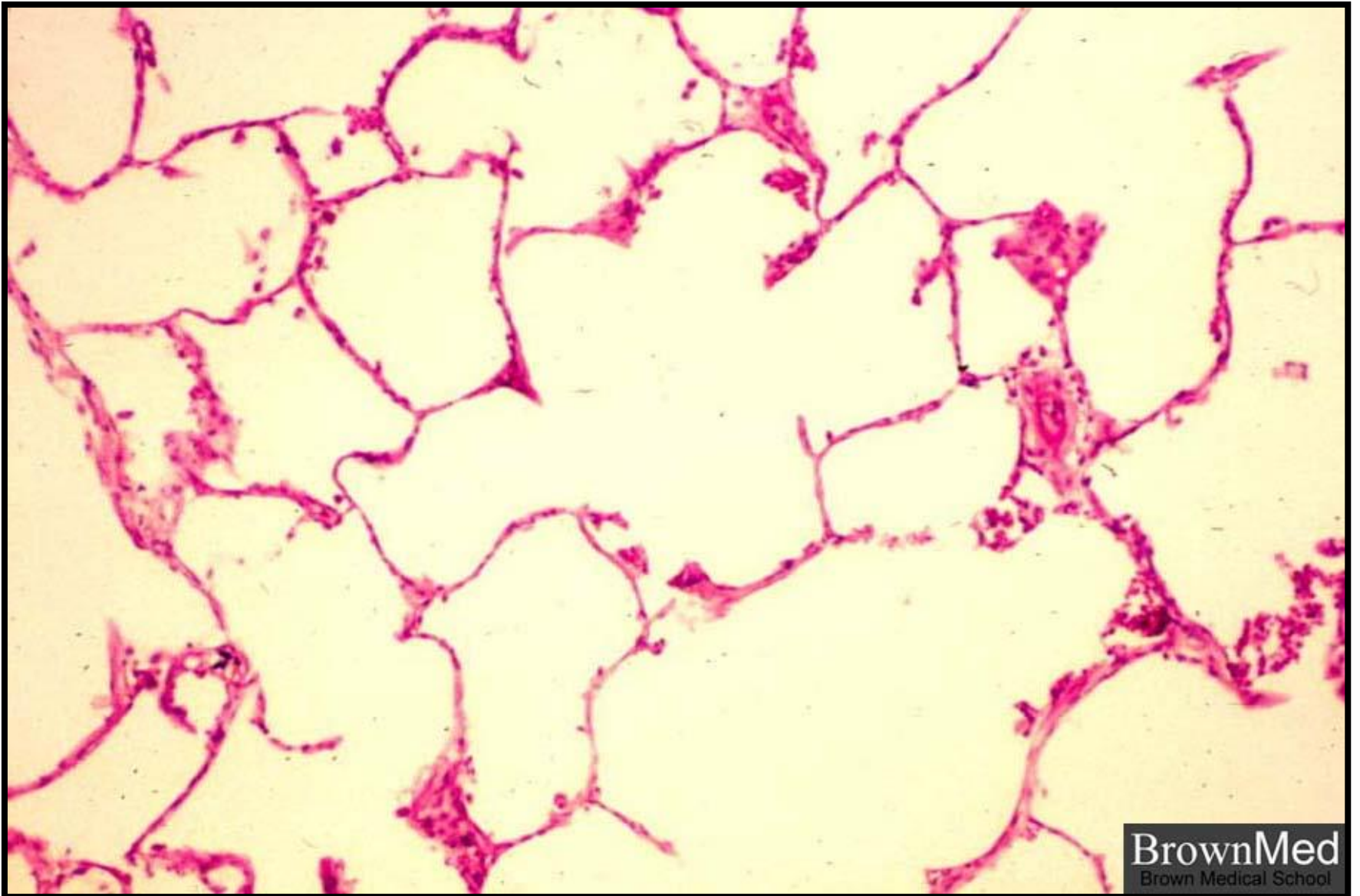




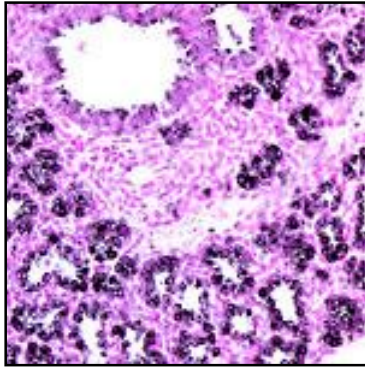
Fase sacular terminal  
Inicio a las 24 semanas



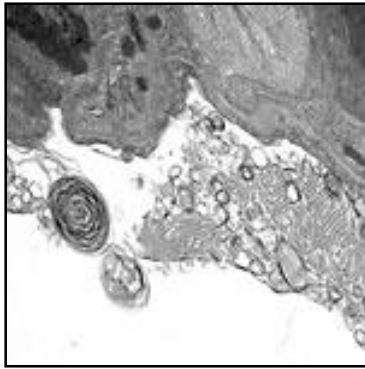
## Pulmón del adulto



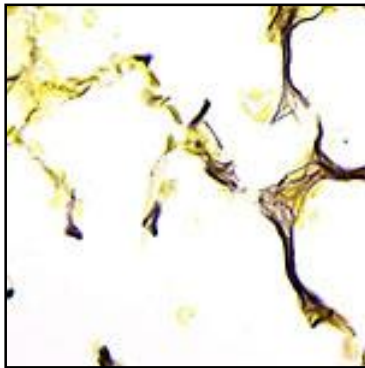




Neumocito tipo II



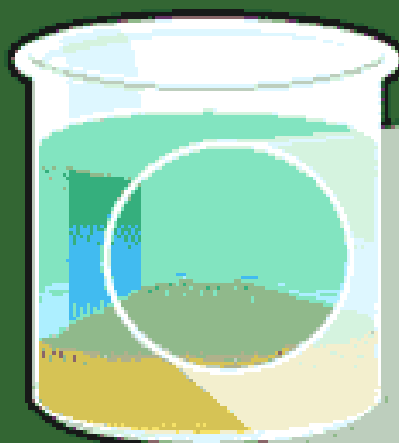
Surfactante



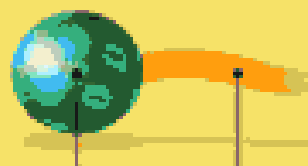
Elastina

# Como funcionam os compostos de modelagem Play-Doh surfactantes

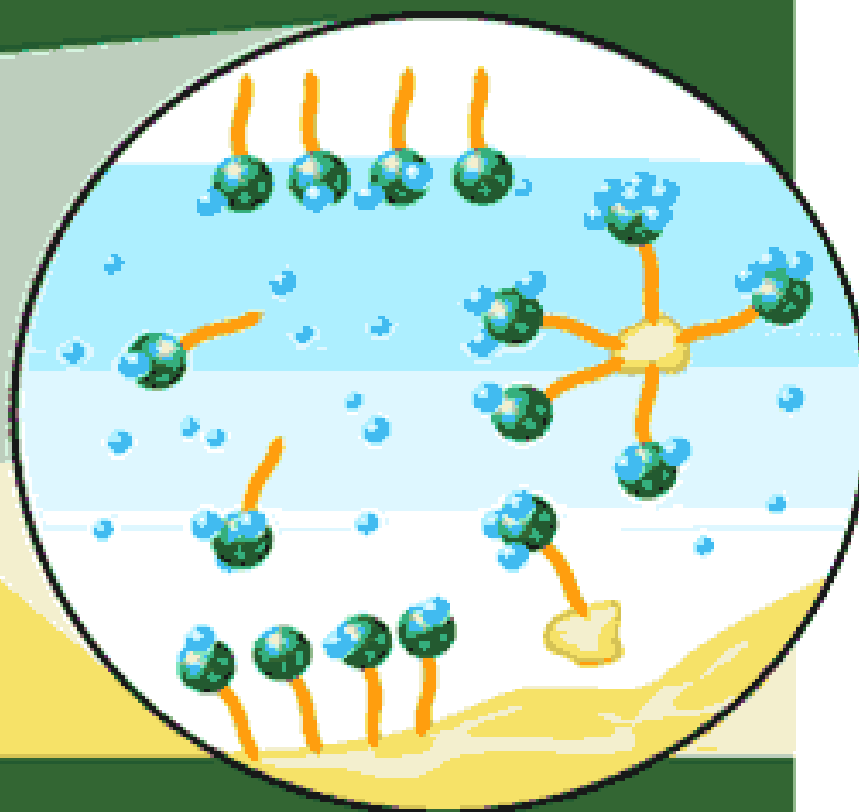
©2006 HowStuffWorks



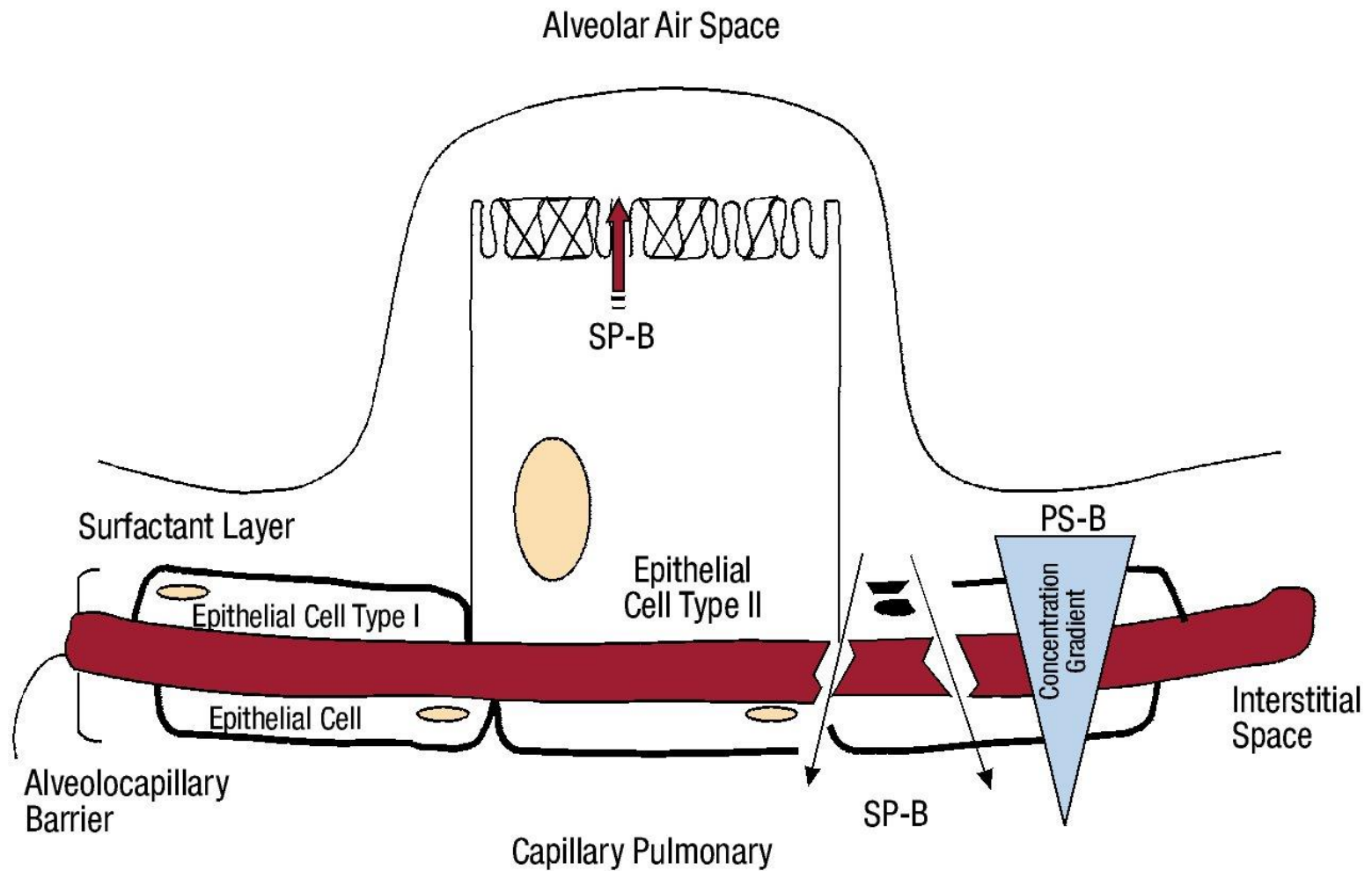
Molécula surfactante



Hidrofílico Lipofílico



# Posición del surfactante



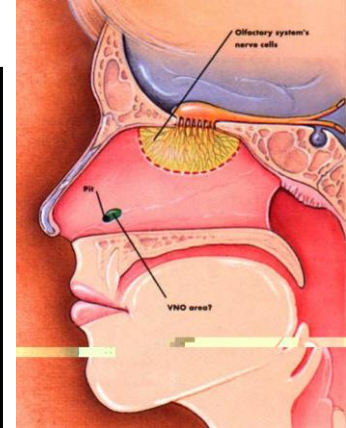
Nasal cavity

Olfactory  
epithelium

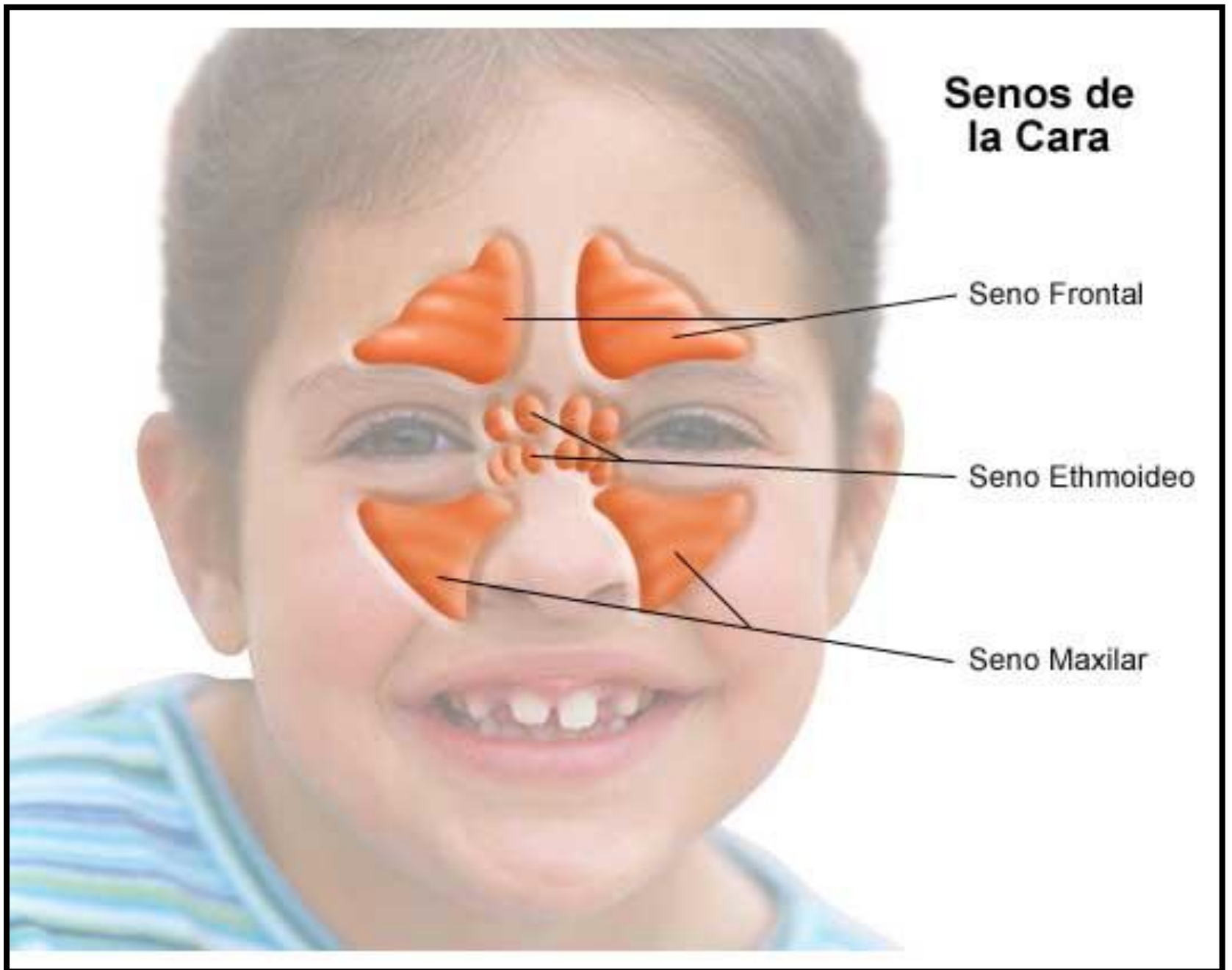
Septum

Vomer  
nasal  
organ

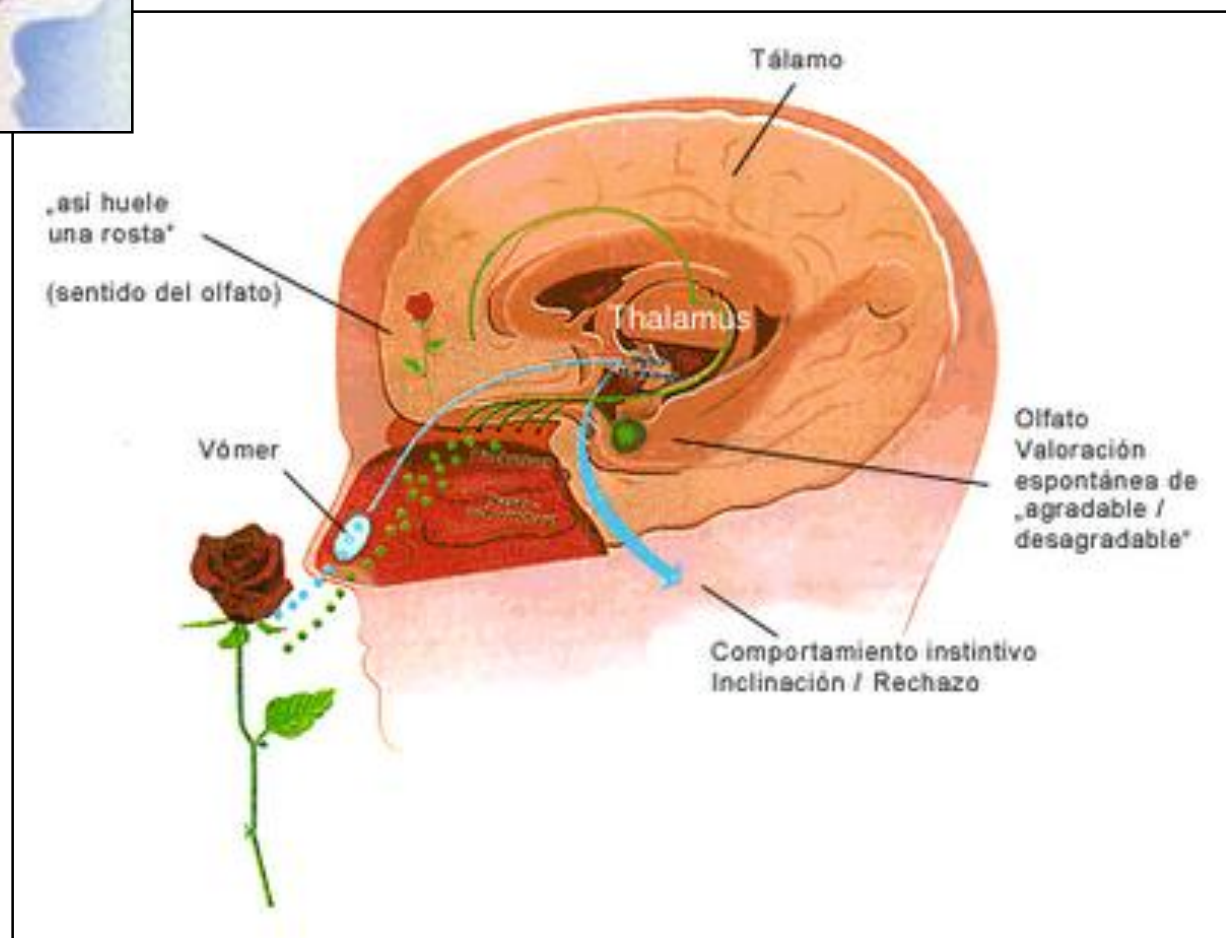
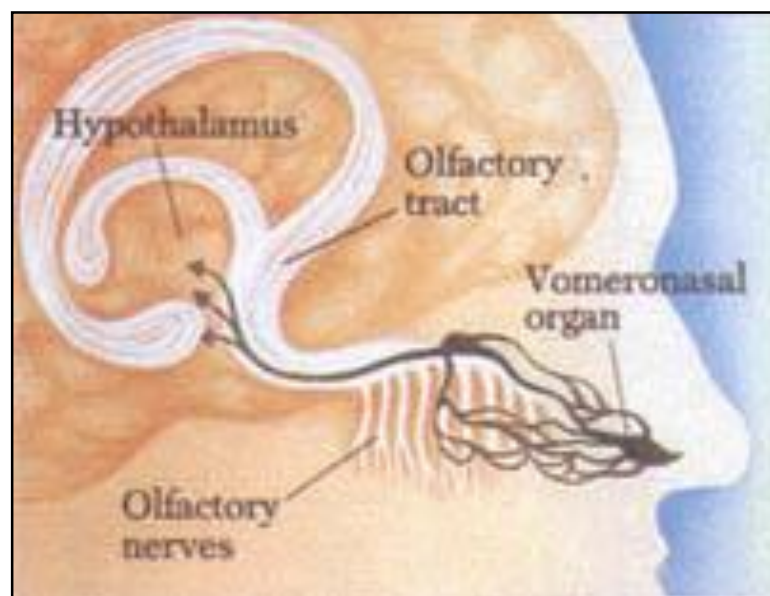
© 2001 Lippincott Williams & Wilkins

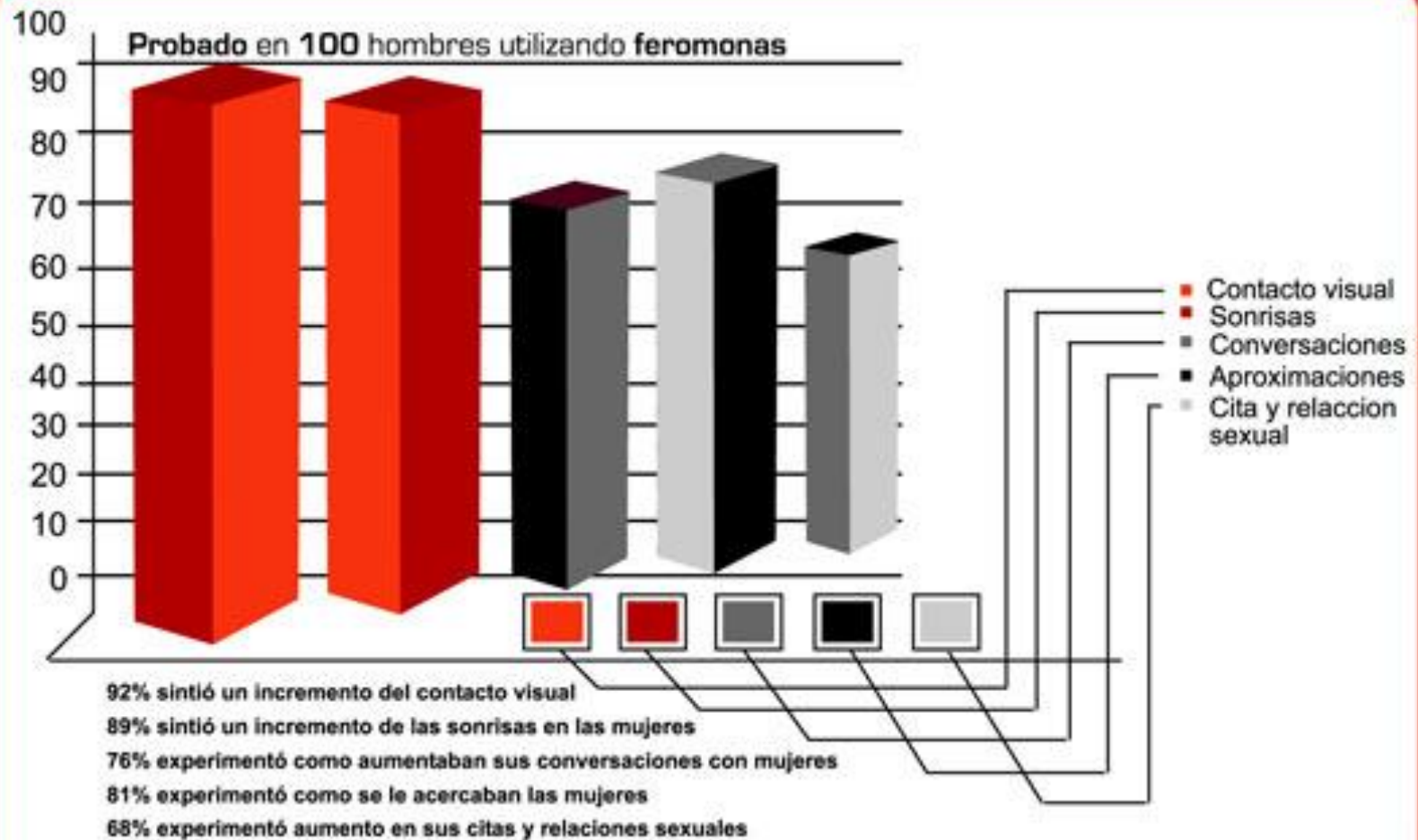


## Senos de la Cara

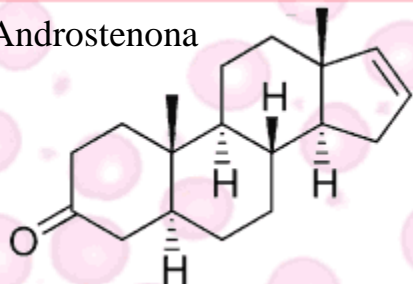




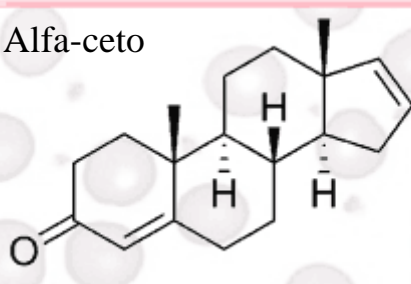




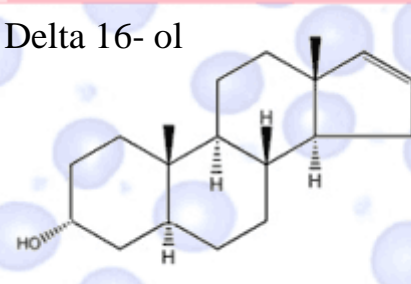
Androstenona

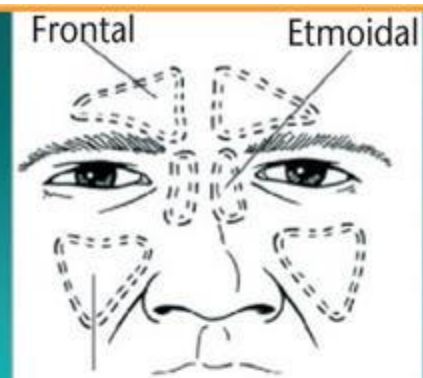
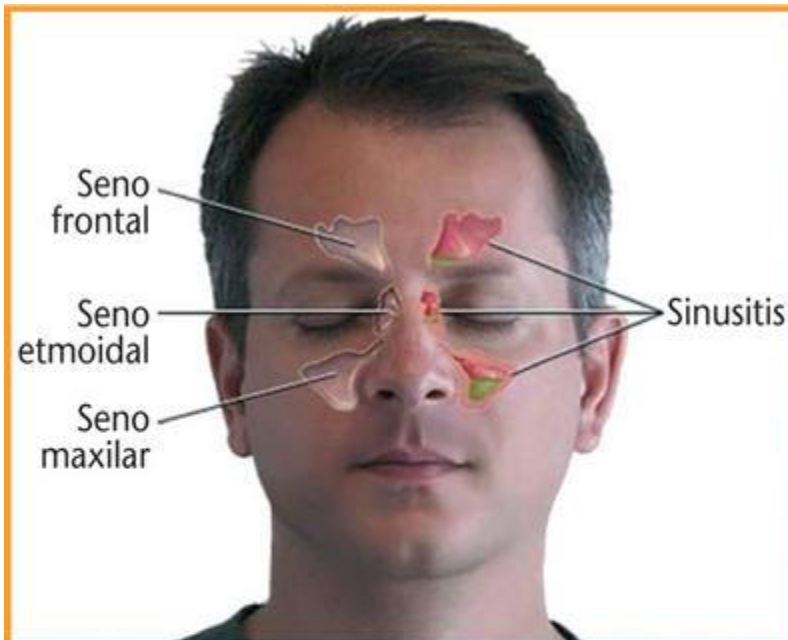


Alfa-ceto



Delta 16- ol



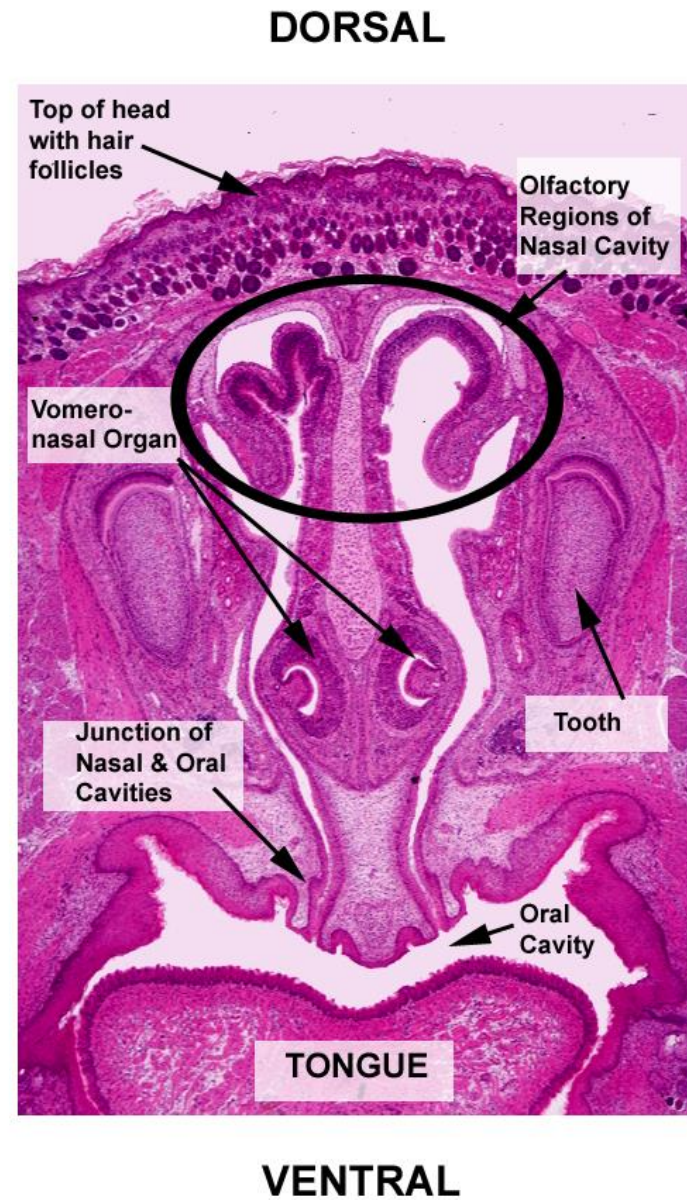


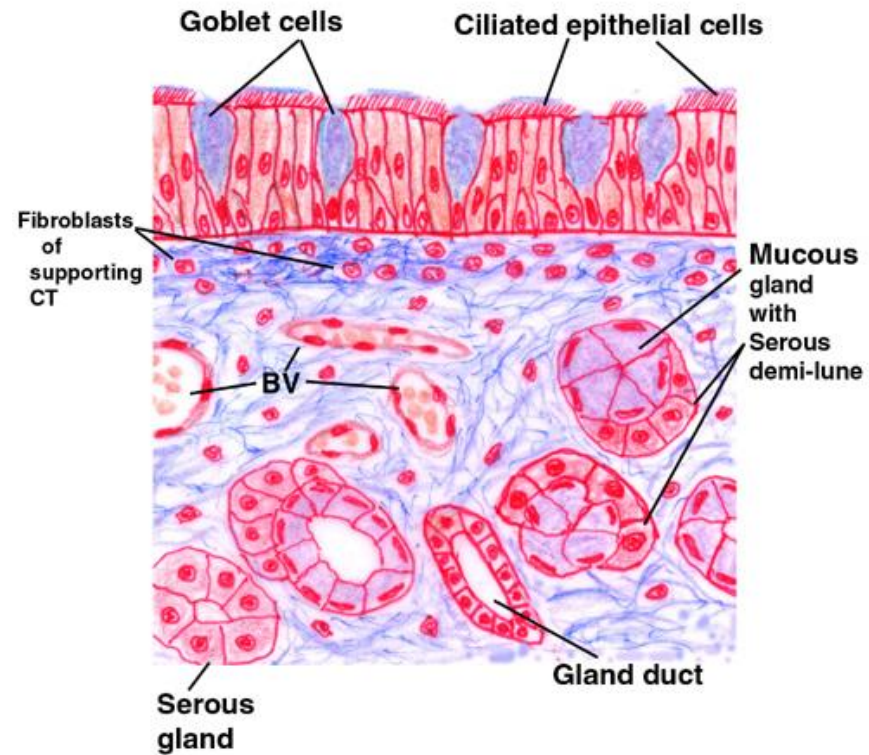
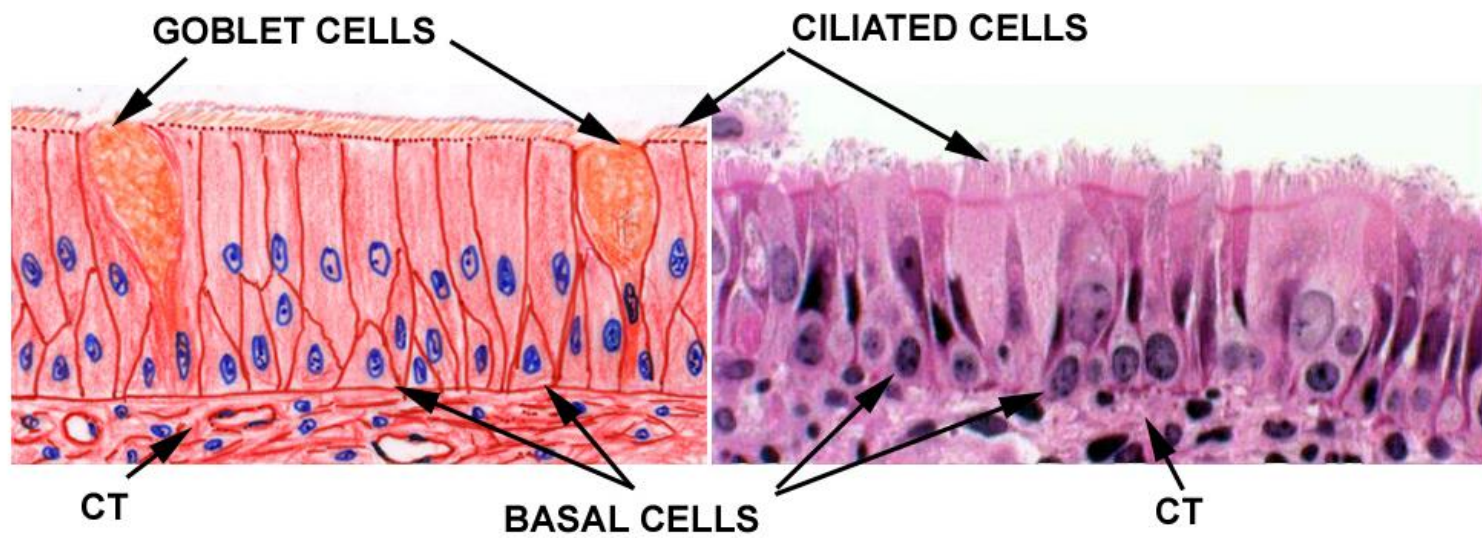
La sinusitis puede causar dolor en las mejillas, en la frente o alrededor de los ojos.





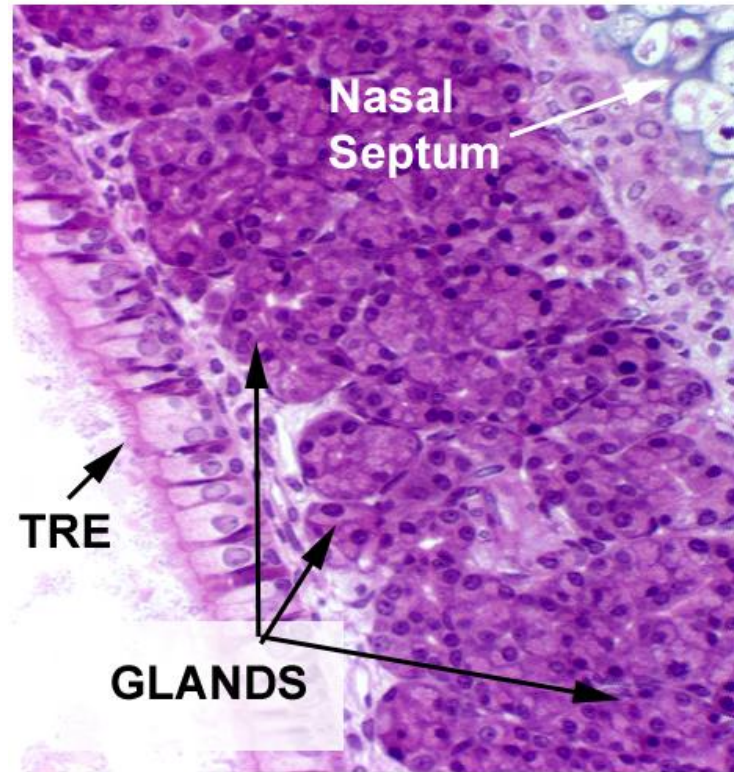
# Sección coronal de las fosas nasales: mucosa nasal y sus epitelios





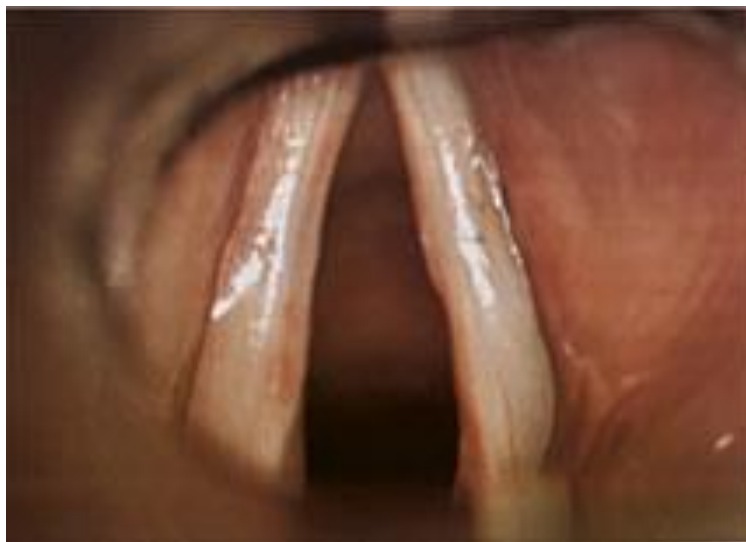


Derivadas del epitelio respiratorio existen dos tipos de glándulas submucosas: Serosas y Mucosas

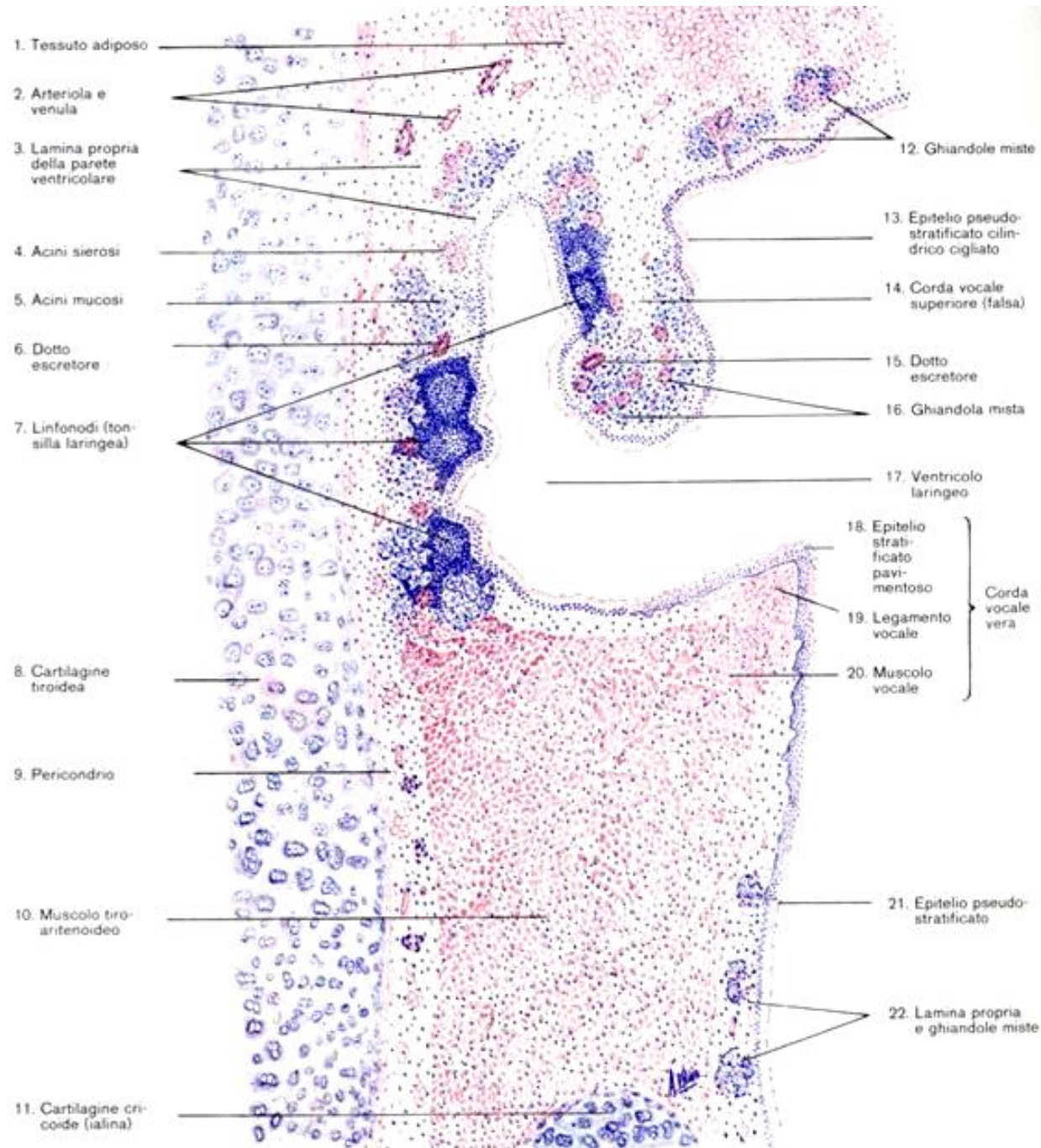


Serosas - Mucosas

# Cuerda vocal: cerrada, semiabierta, y abierta

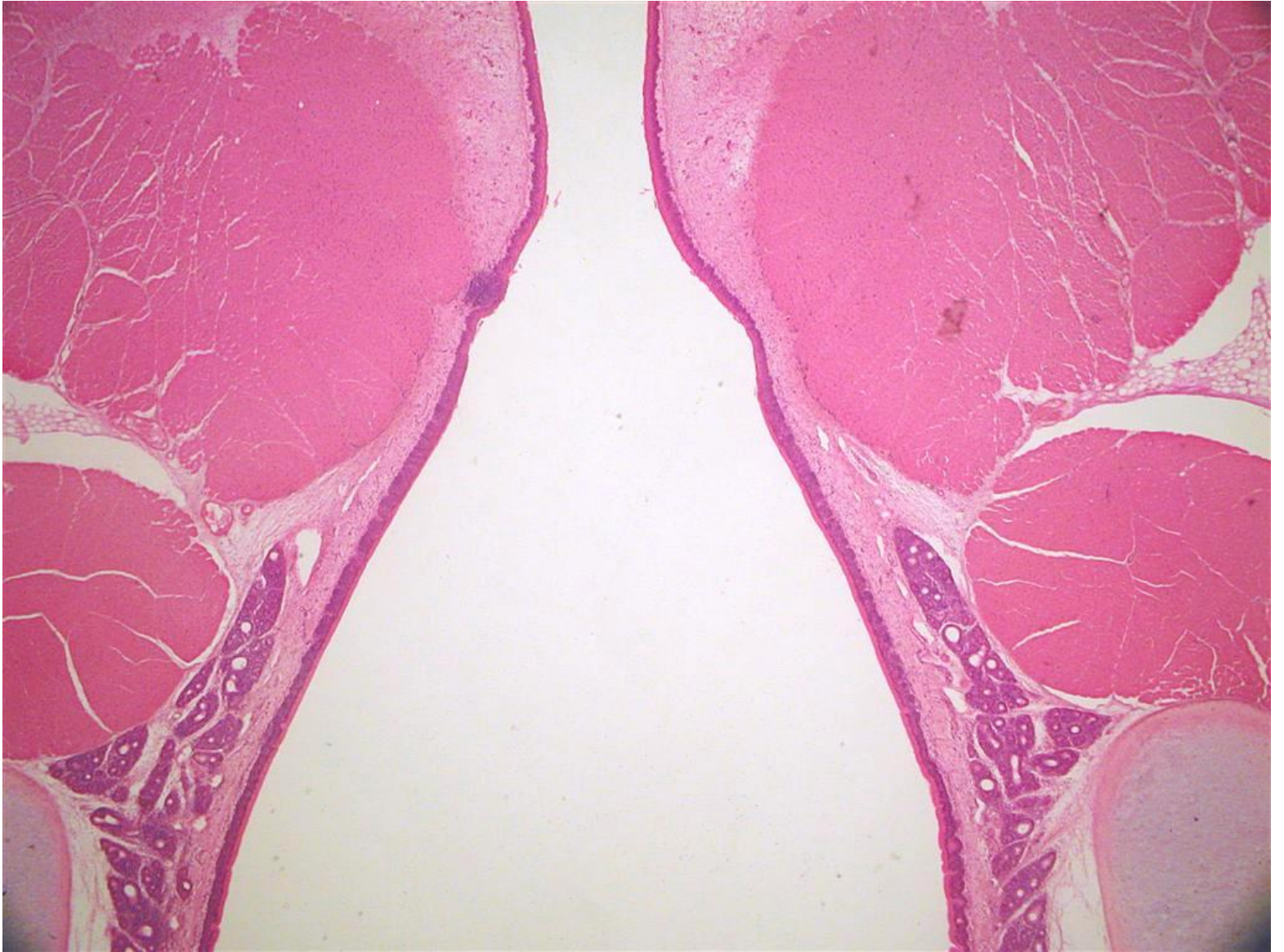


# Laringe





# Laringe



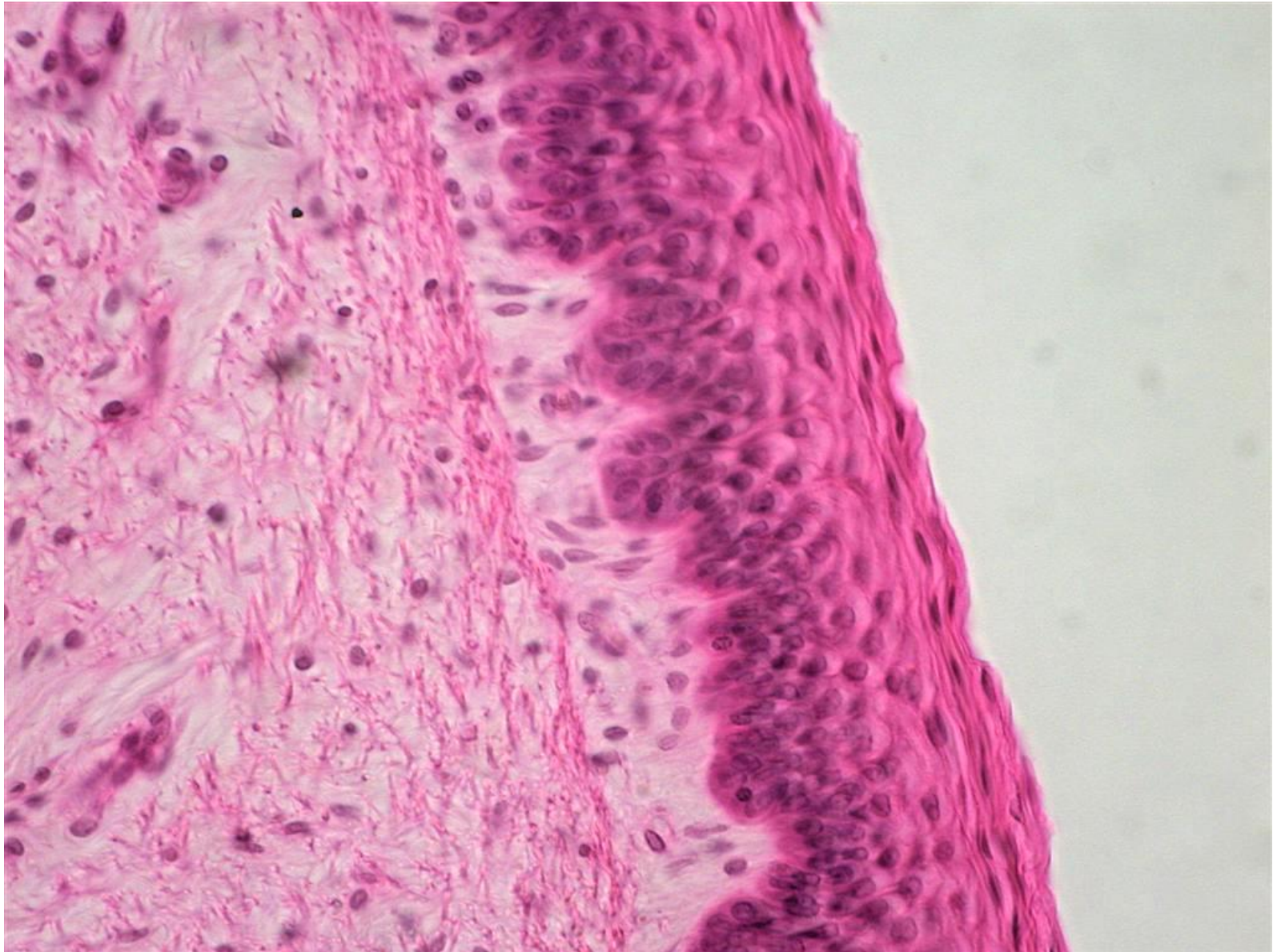


# Laringe: cuerda vocal verdadera



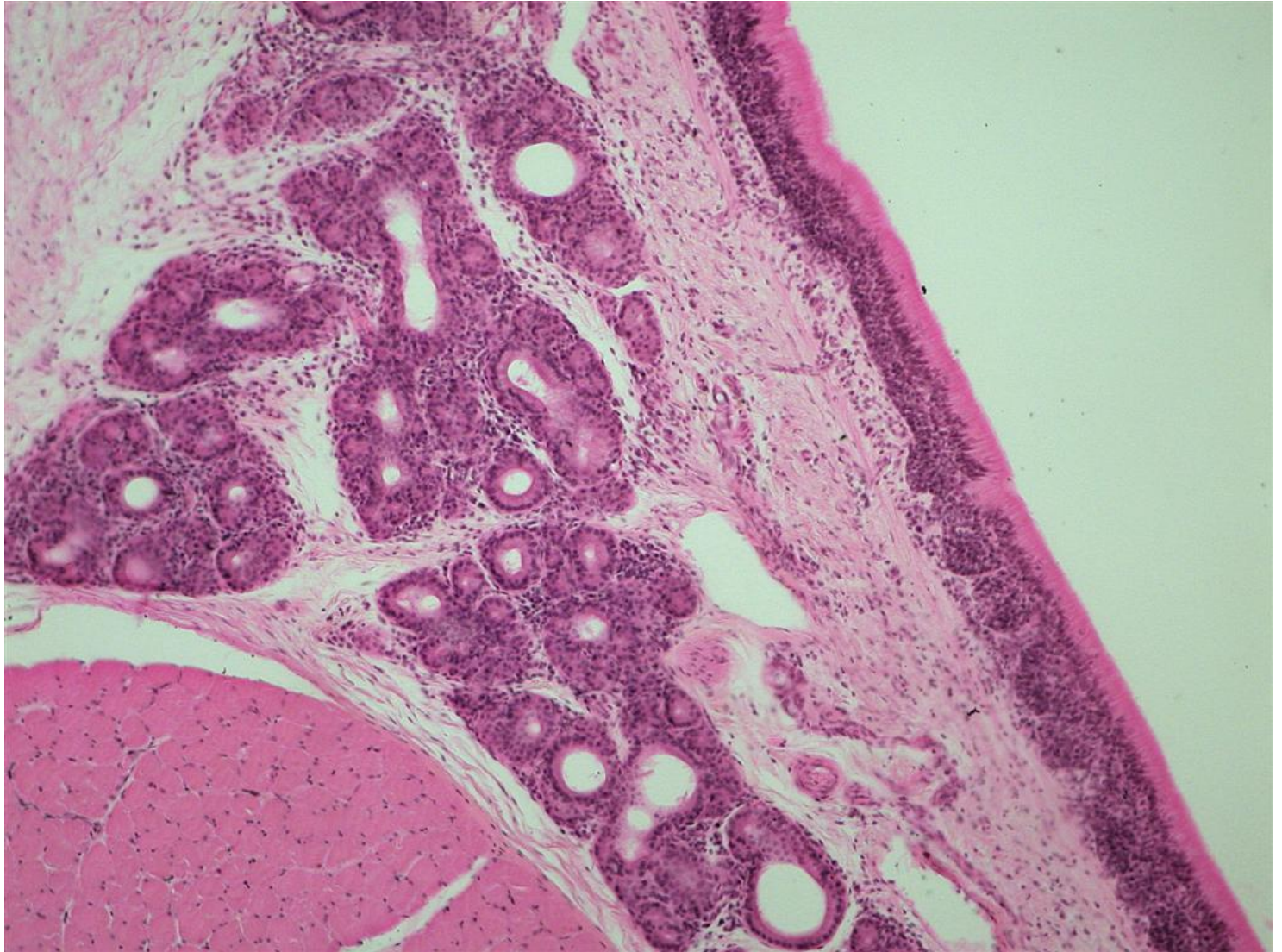


# Laringe

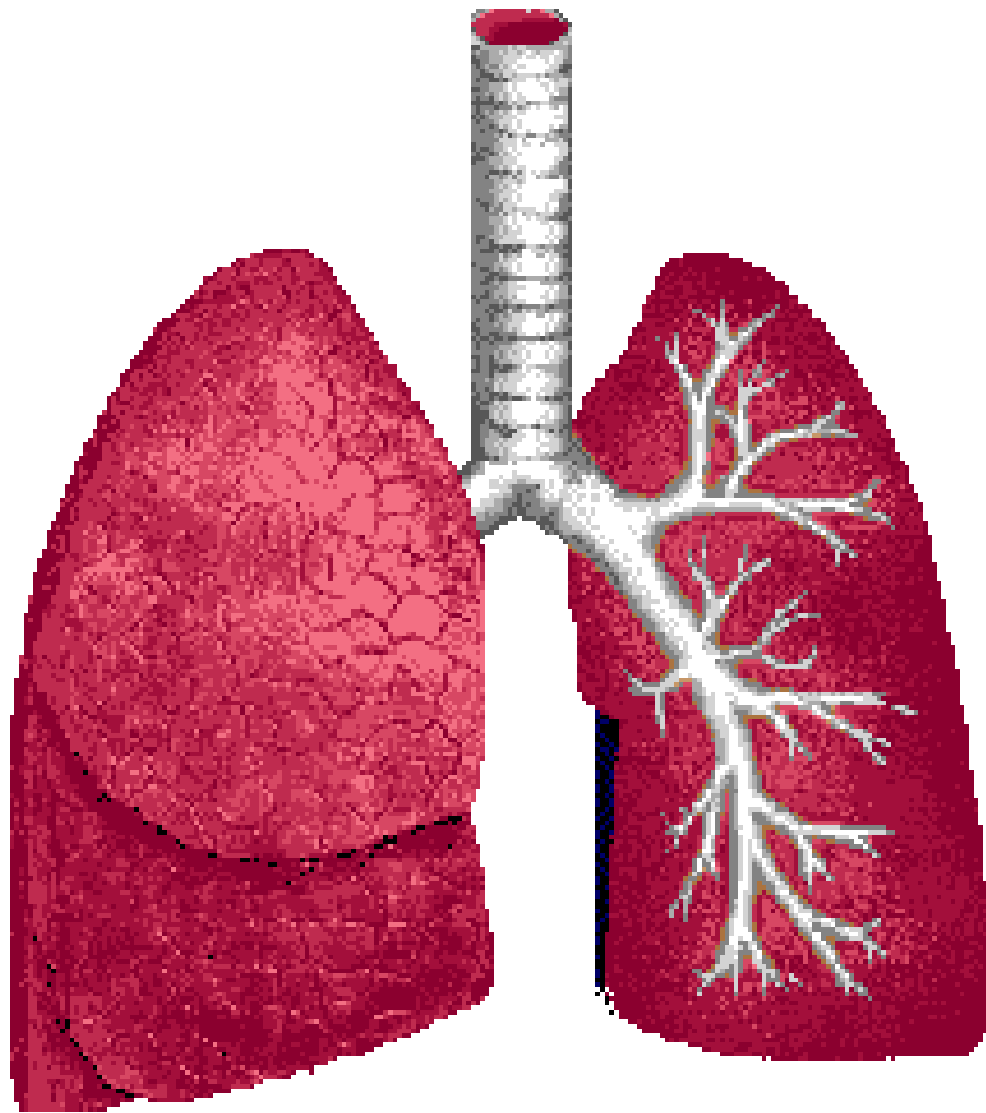




# Laringe: glándula

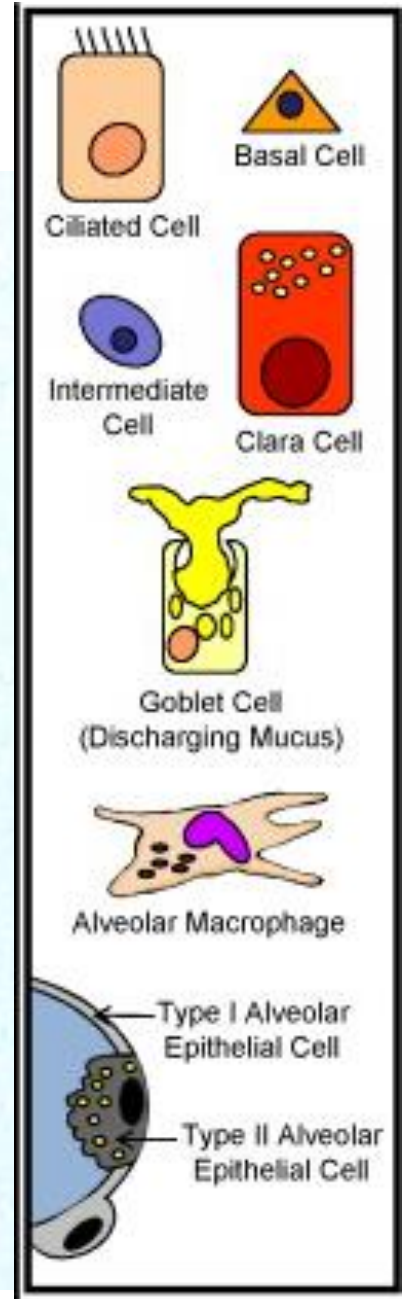
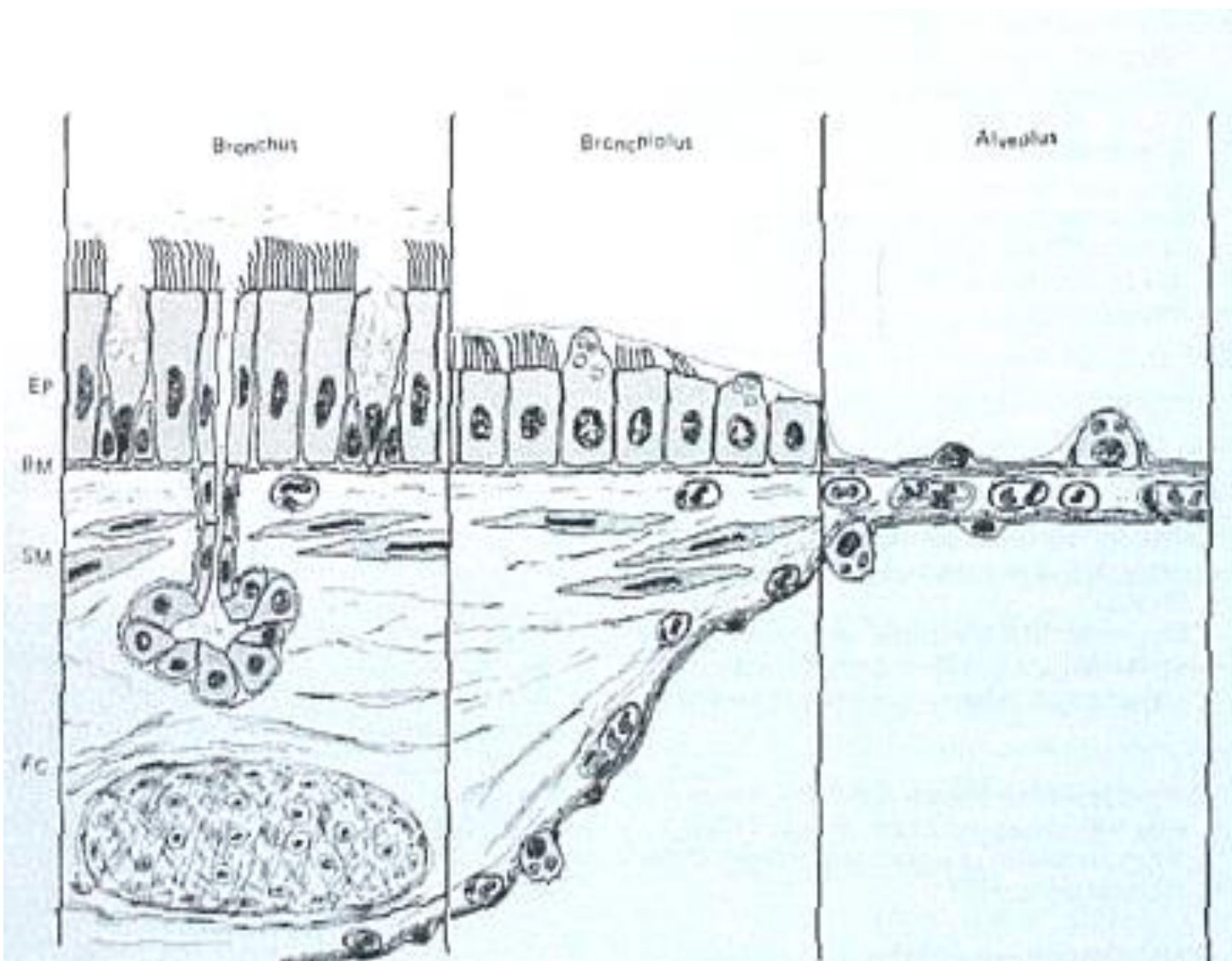


# Pulmón

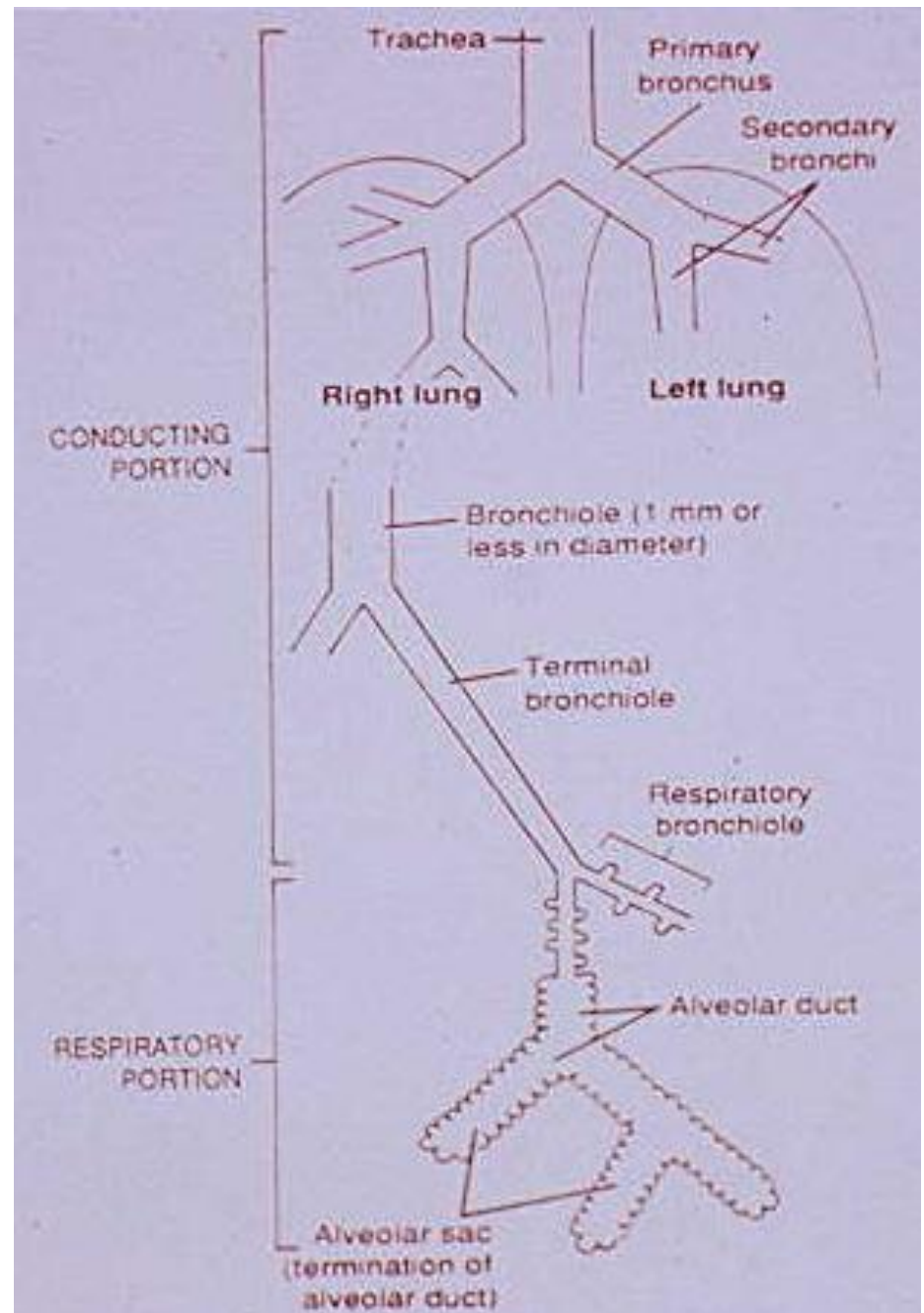
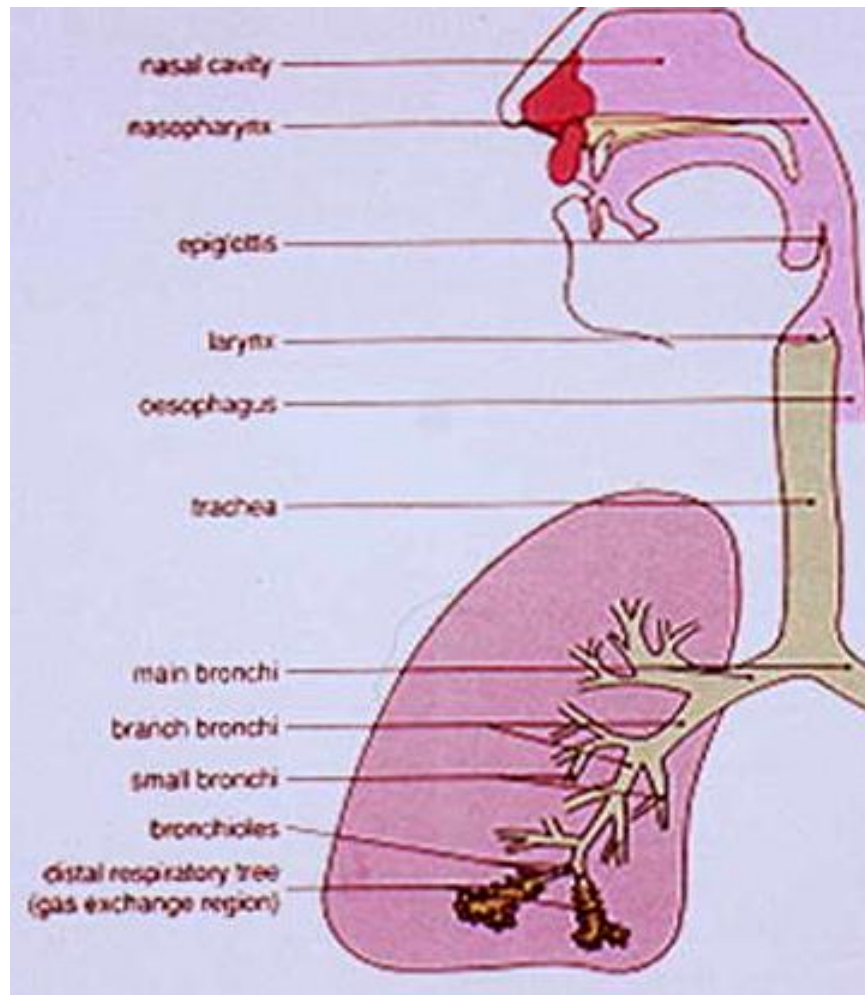




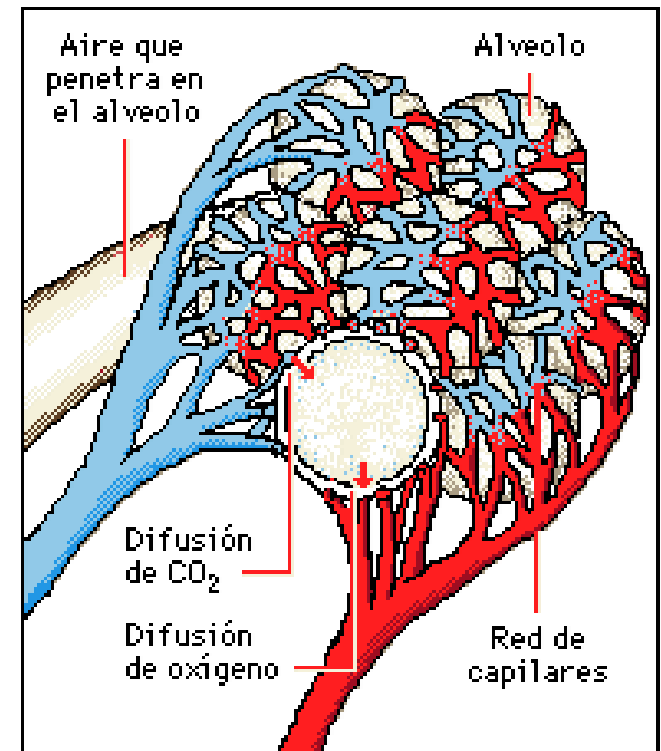
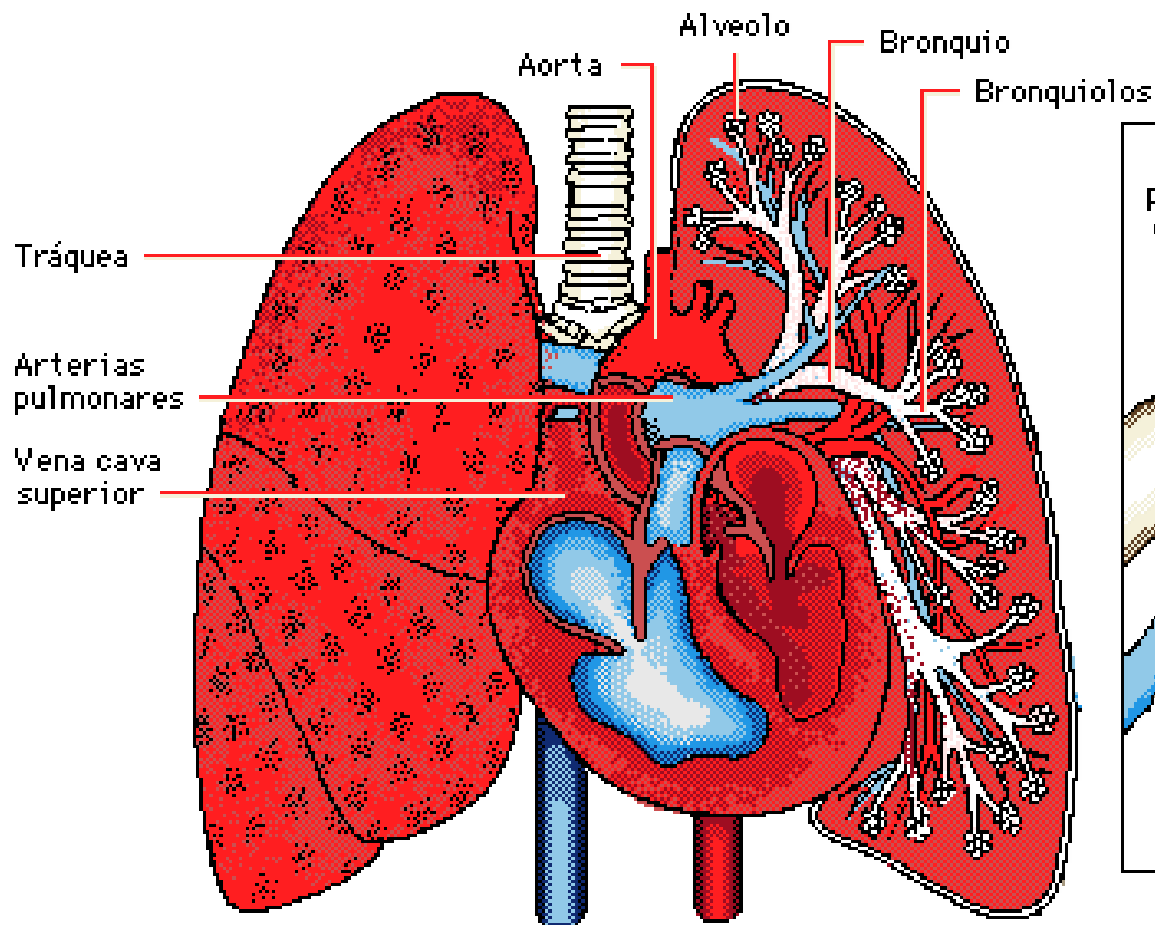
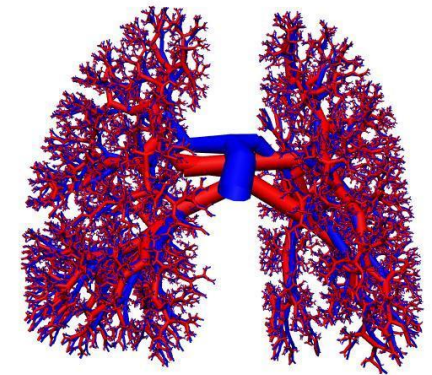
# Arbol respiratorio



# Arborización pulmonar



# Sistema respiratorio

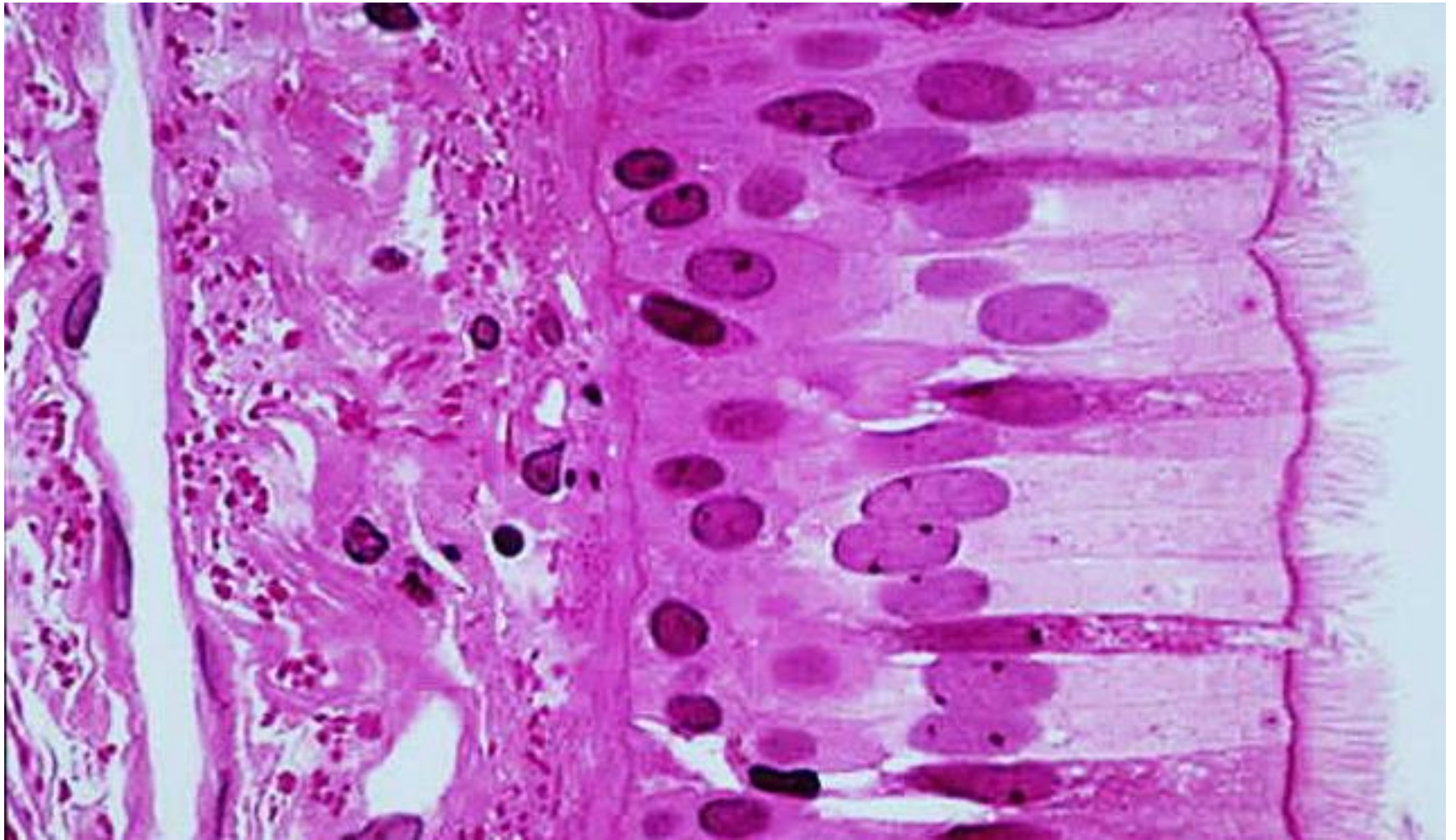




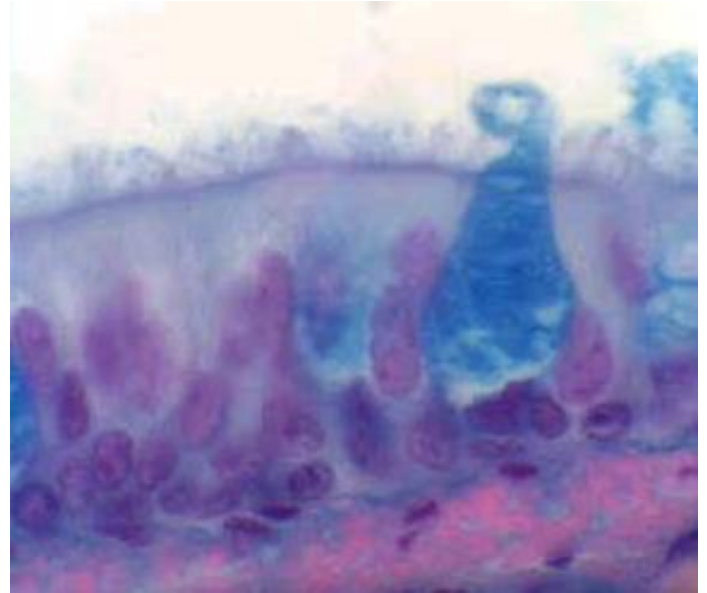
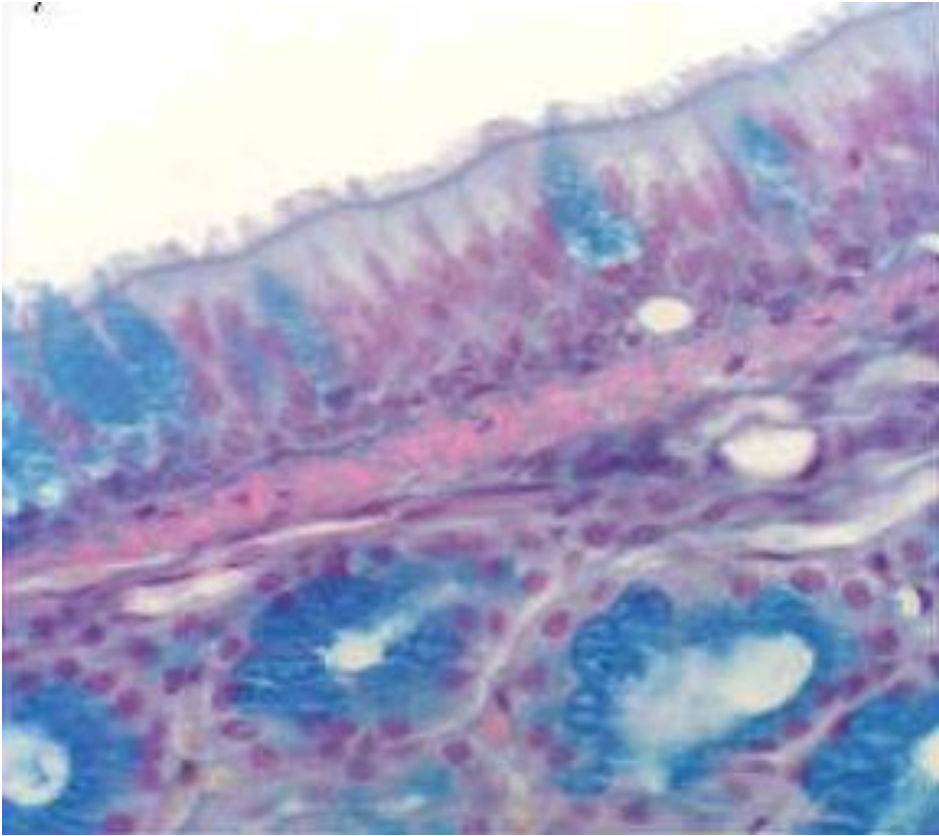
# Tráquea



# Tráquea

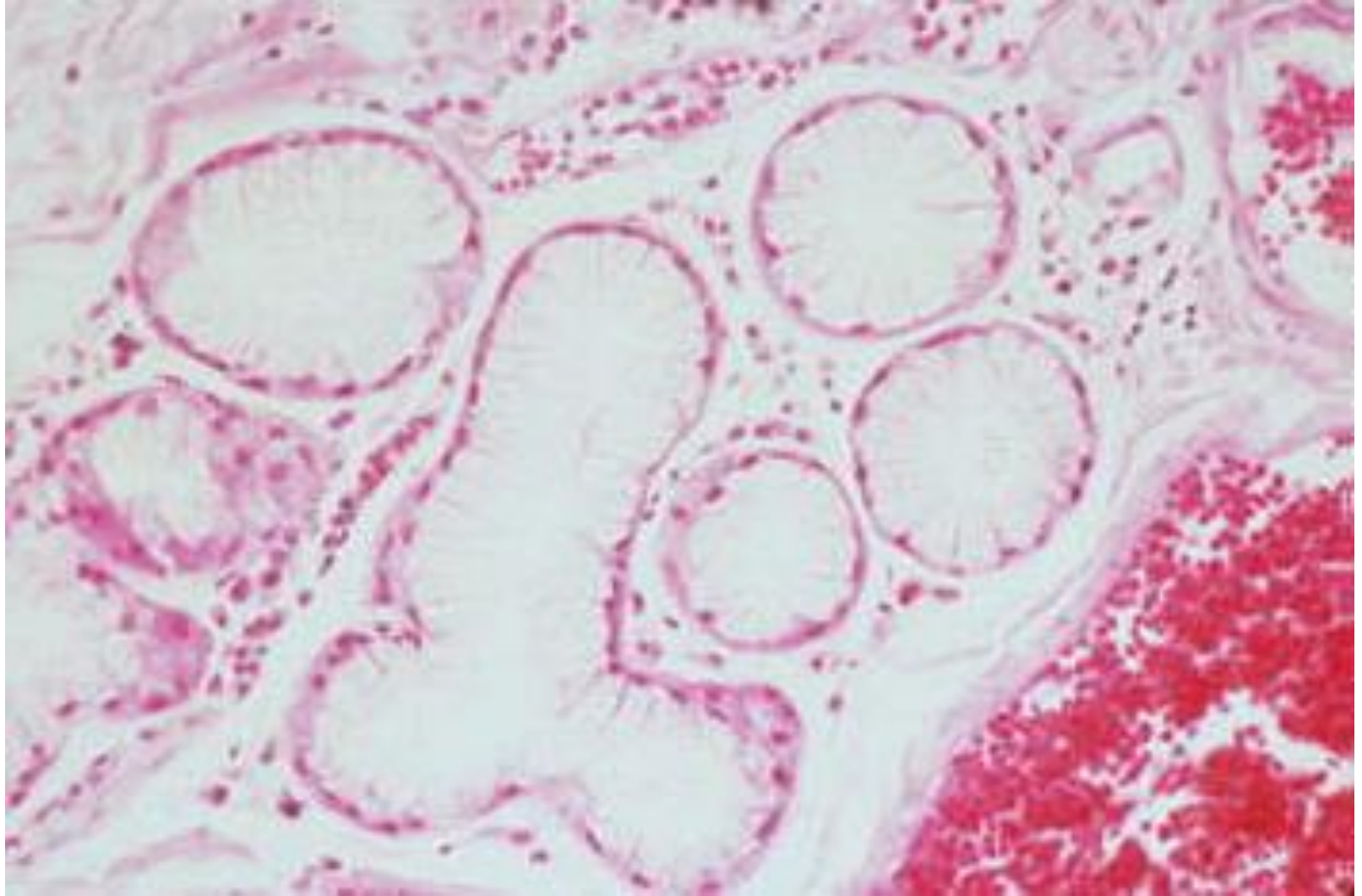


# Tráquea: glándulas mucosas

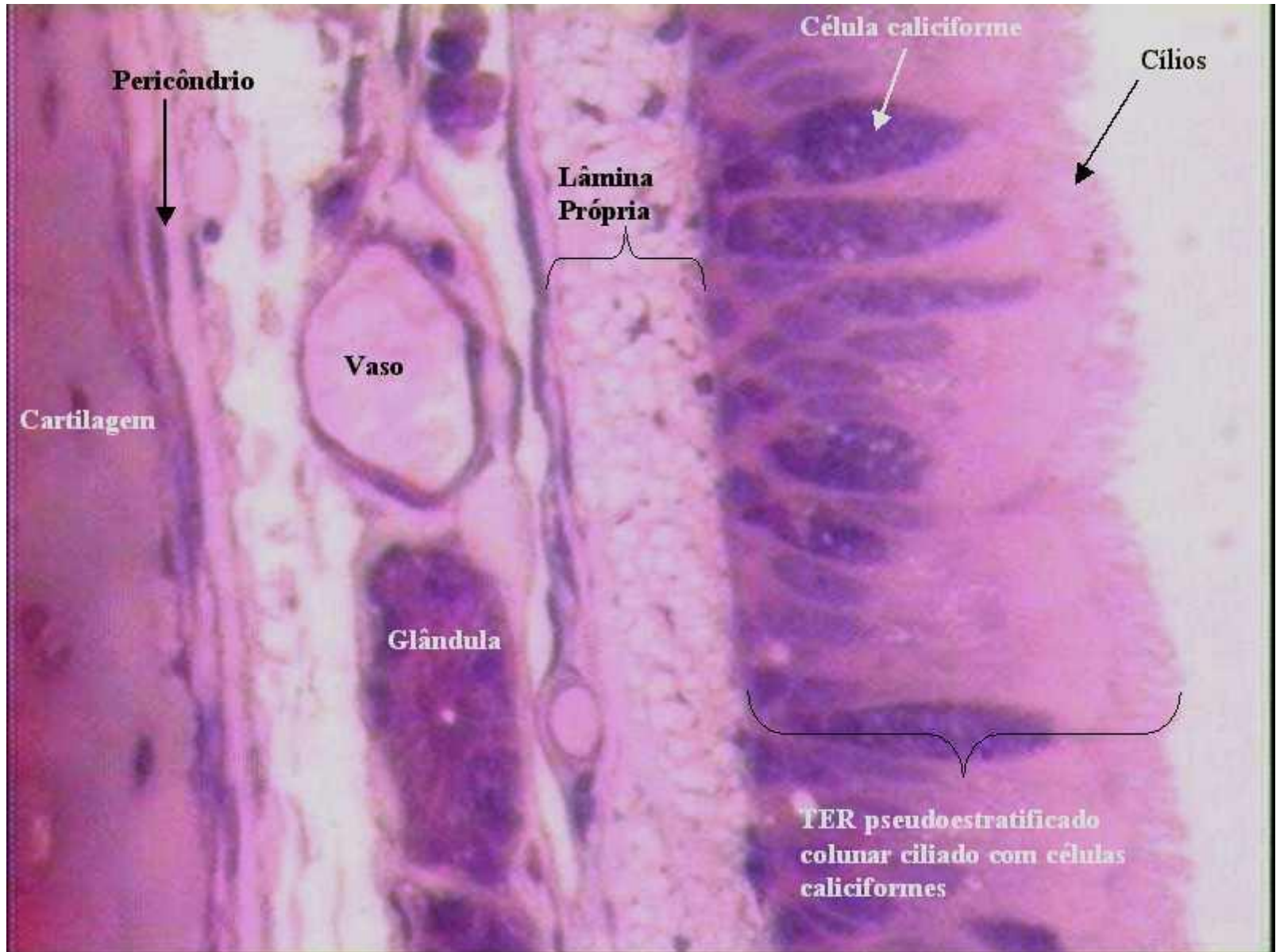




# Tráquea: glándulas seromucosas ? y células mioepiteliales



# Tráquea



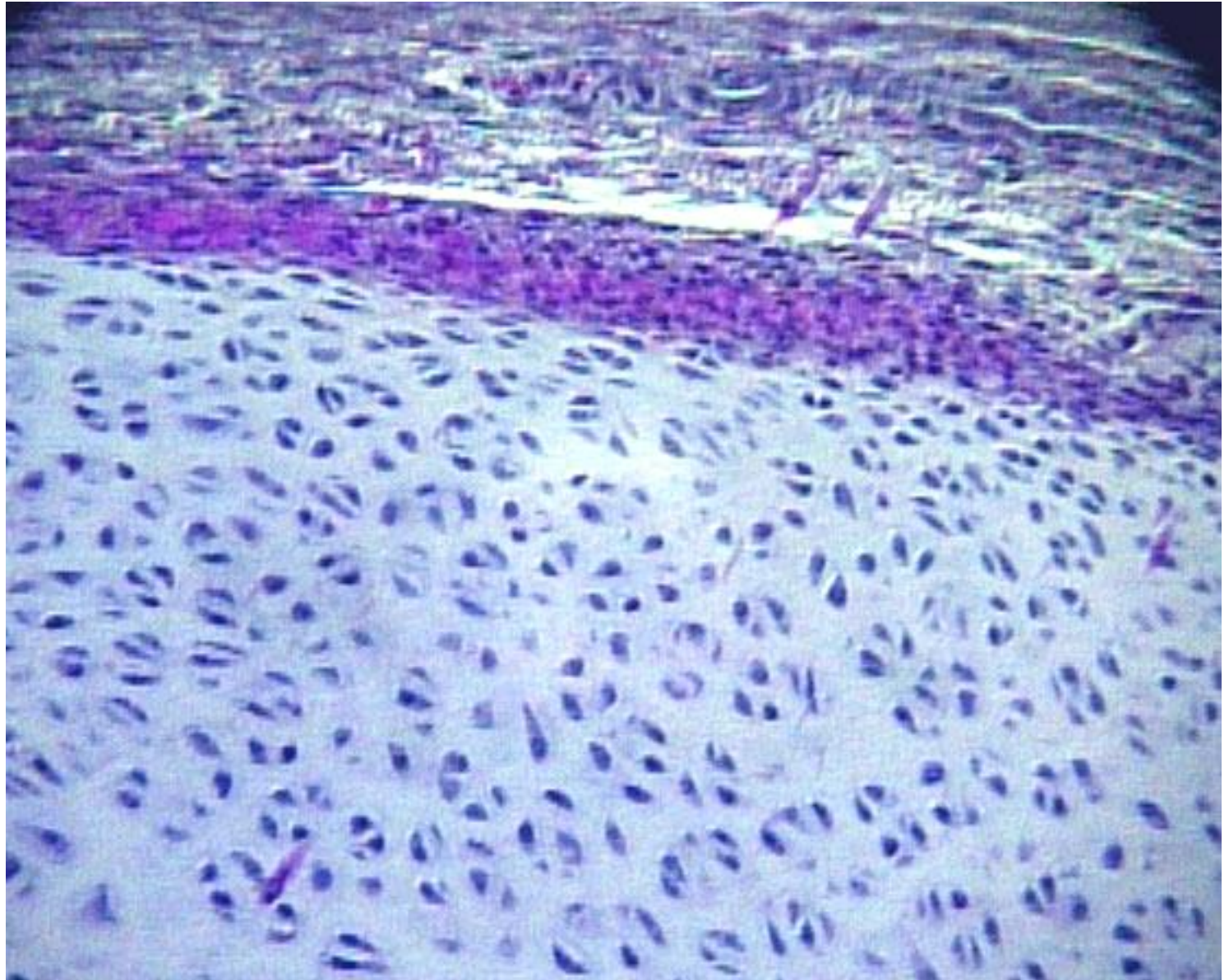


# Tráquea





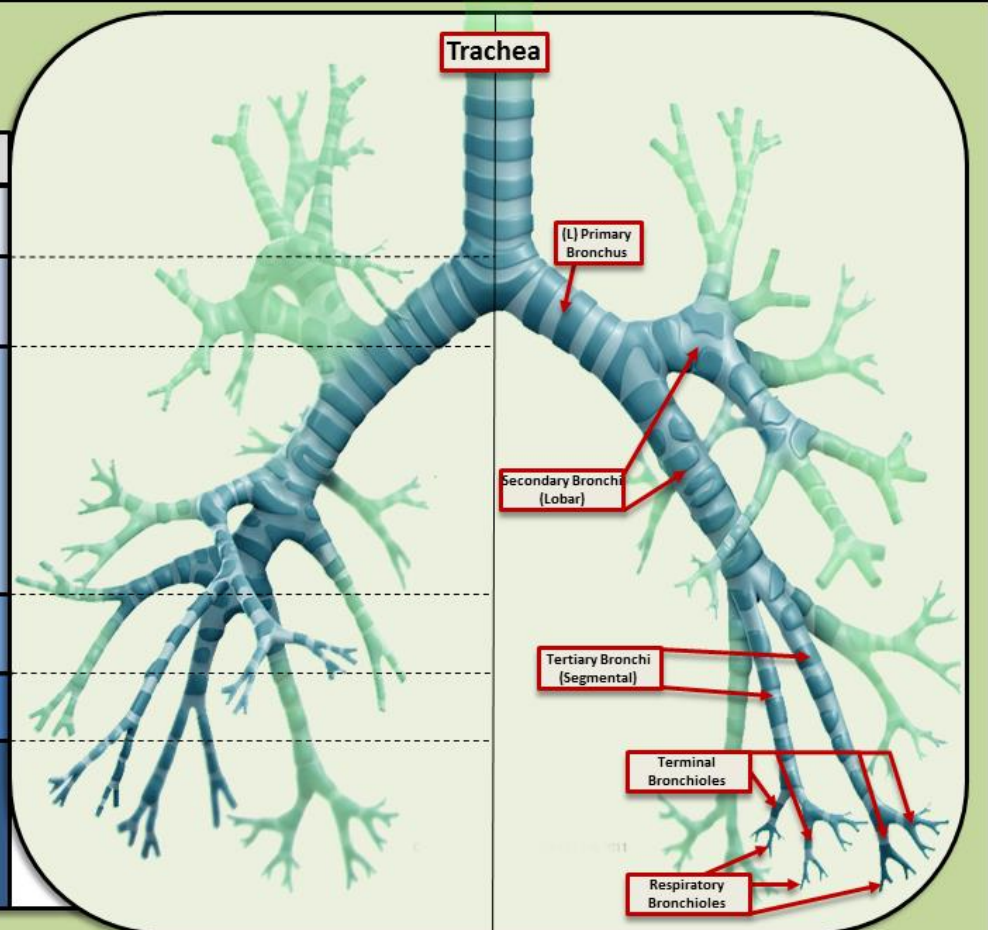
# Tráquea



# Bronquios principales

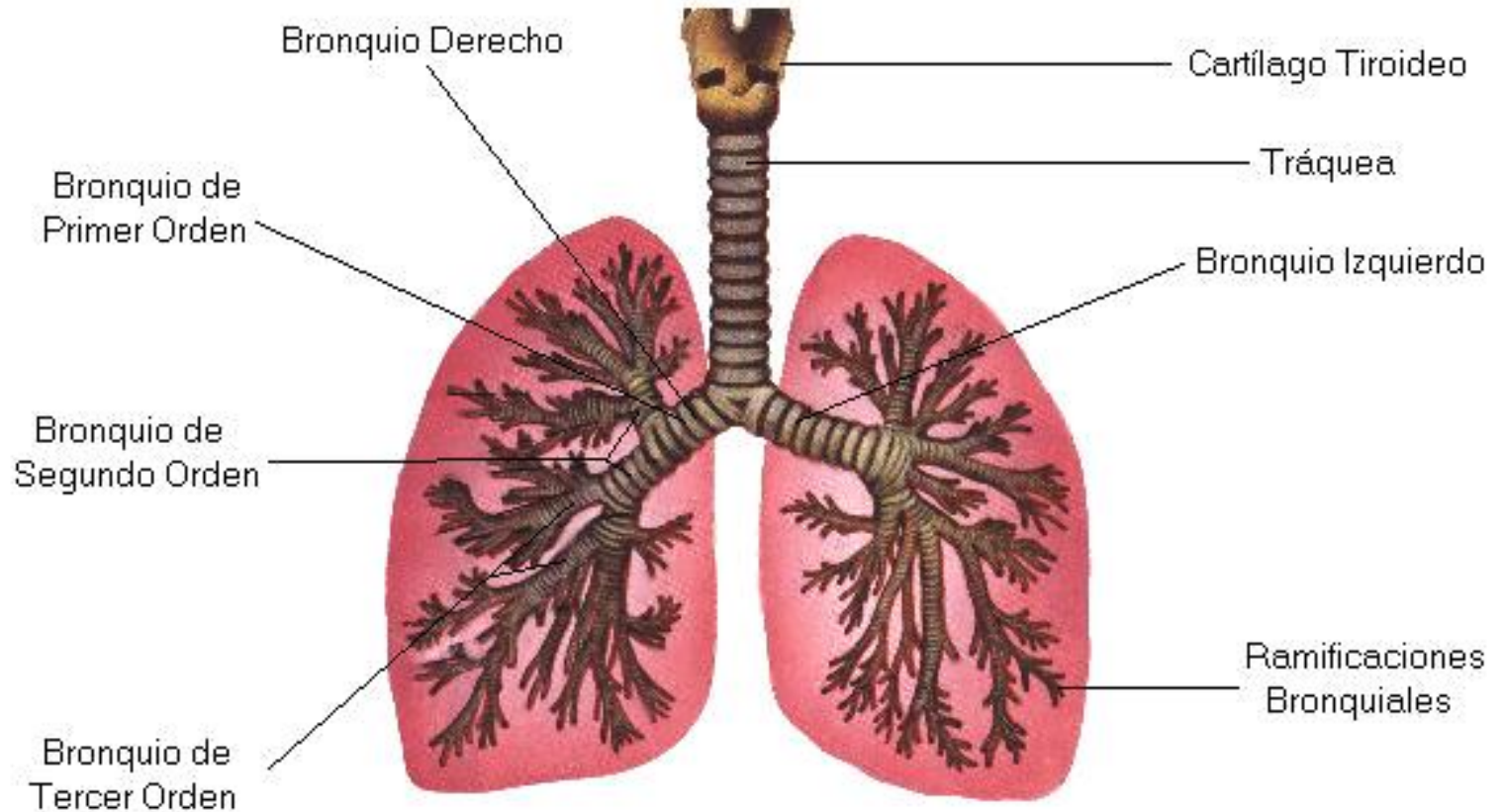
**Bronchial Tree  
Histology Breakdown**

	Epithelium	Goblet Cells	Ciliated Cells	Glands	Hyaline Cartilage	Smooth Muscle	Elastic Fibers
Trachea							
Primary Bronchus (L) & (R)							
Secondary Bronchi (Lobar)							
Tertiary Bronchi (Segmental)							
Terminal Bronchioles							
Respiratory Bronchioles							
Alveolar Duct							
Alveolar Sac							
Alveolus							



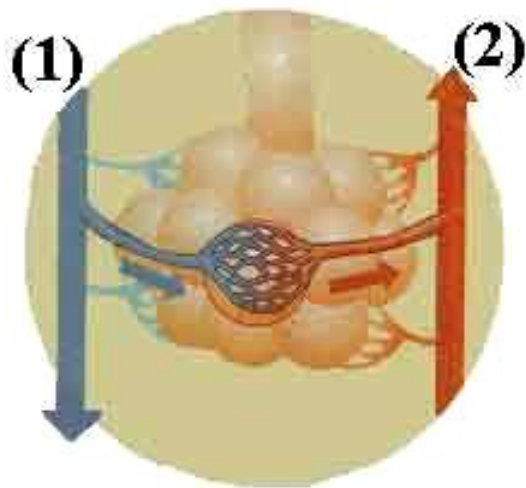


# Bronquios de 1º, 2º y 3º orden





# Arbol respiratorio

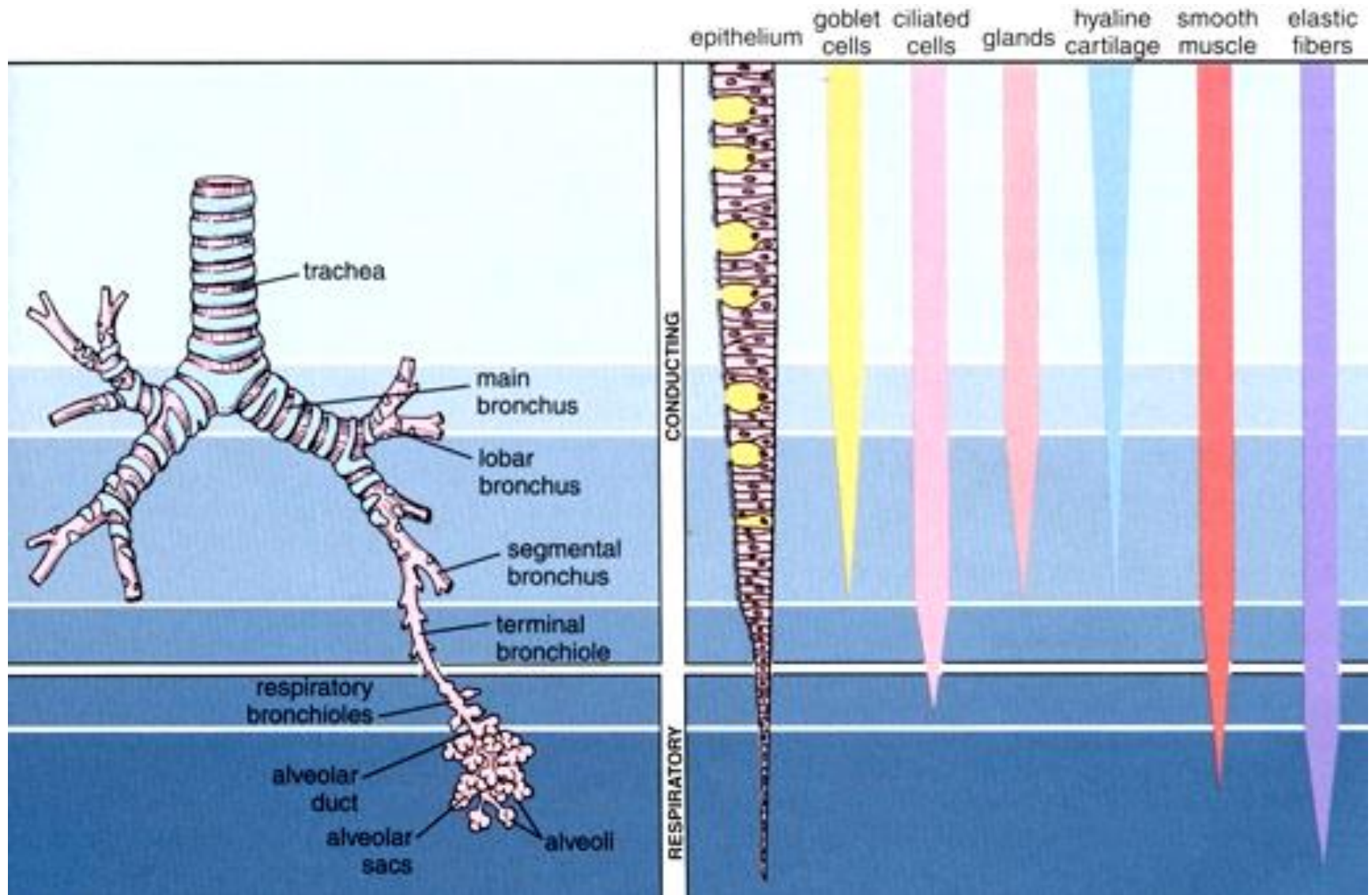


**(1). Bronquio**

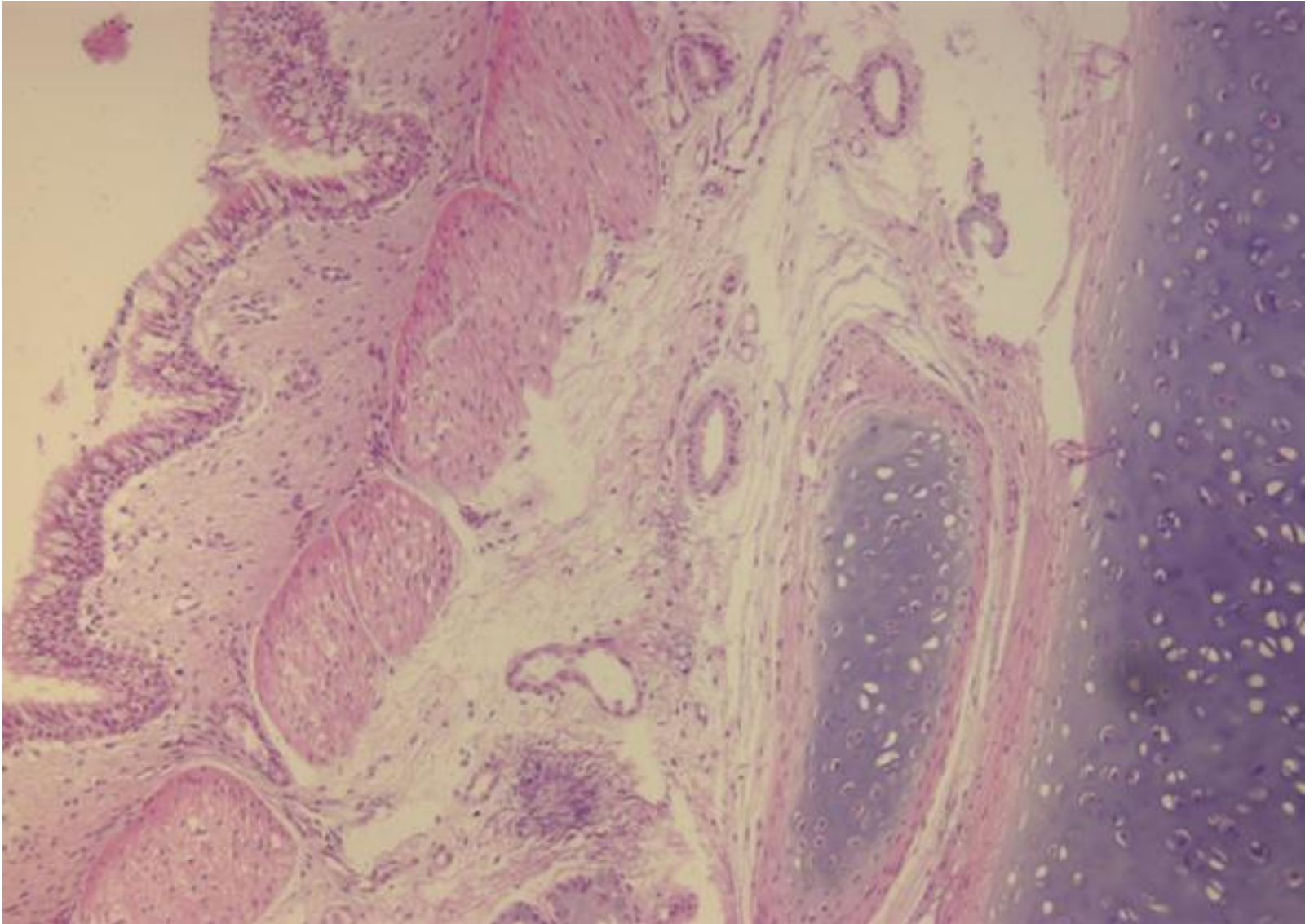
**(2). Bronquíolo**

**(3). Alvéolo**

# Componentes tisulares

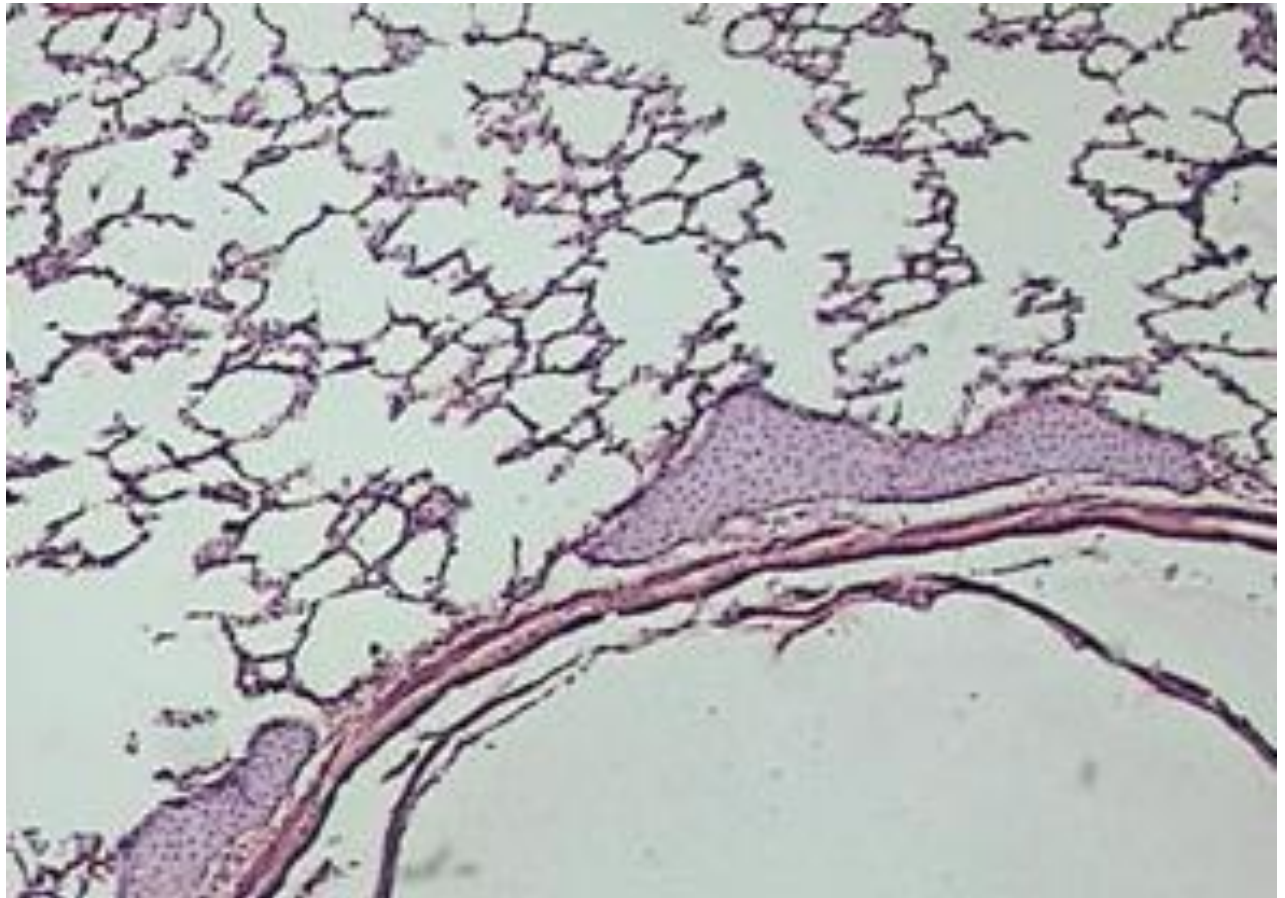


# Bronquio mediano

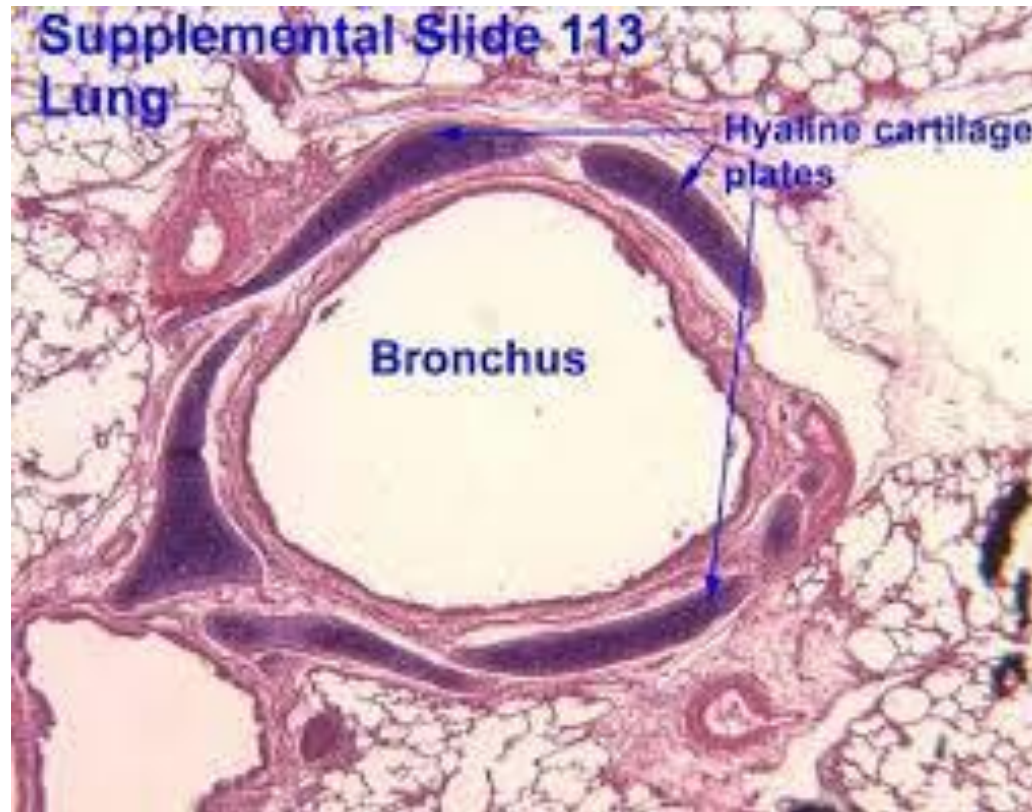




# Pared de un bronquio (10X H/E)

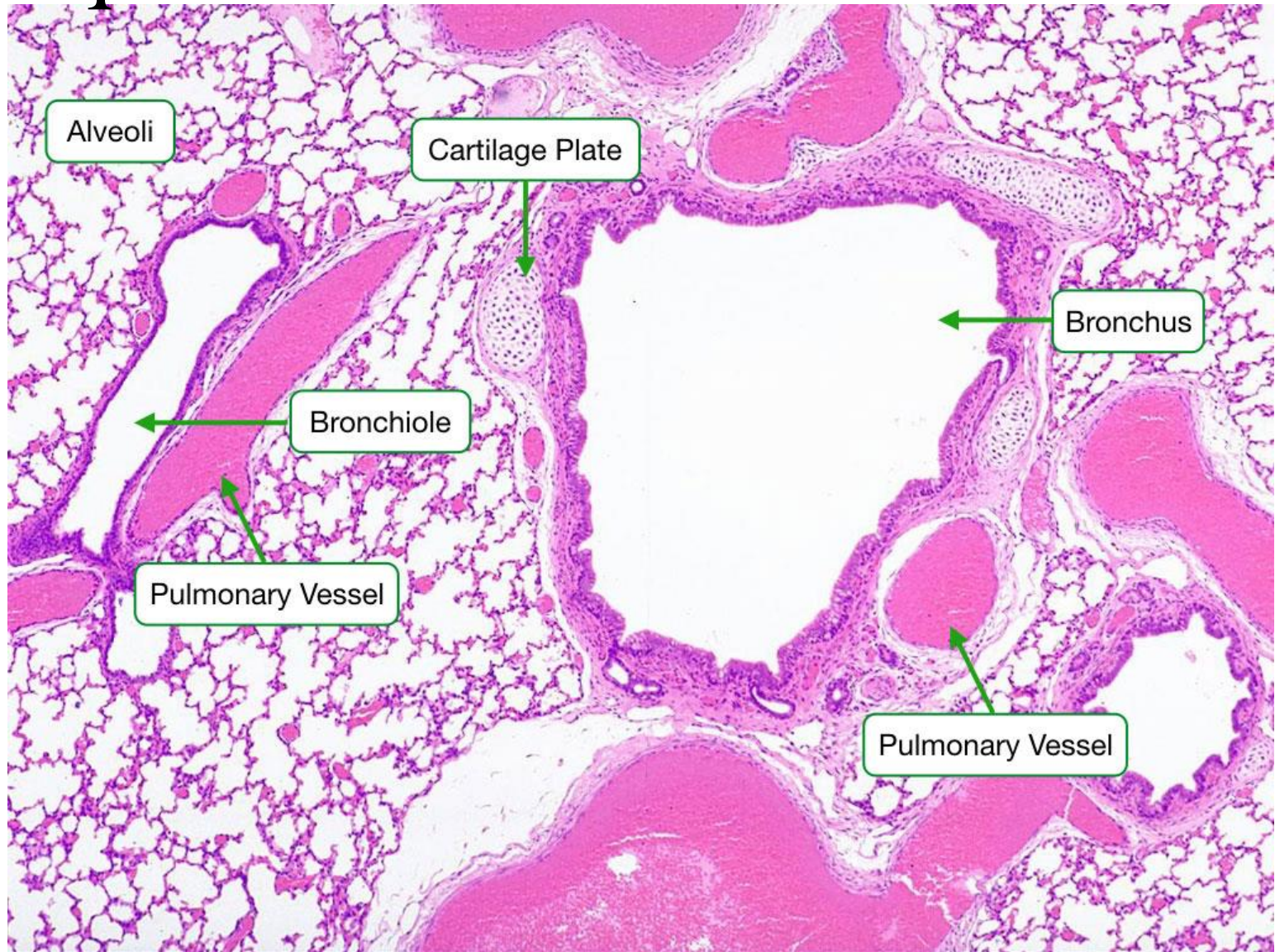


# Bronquio medio





# Bronquio medio



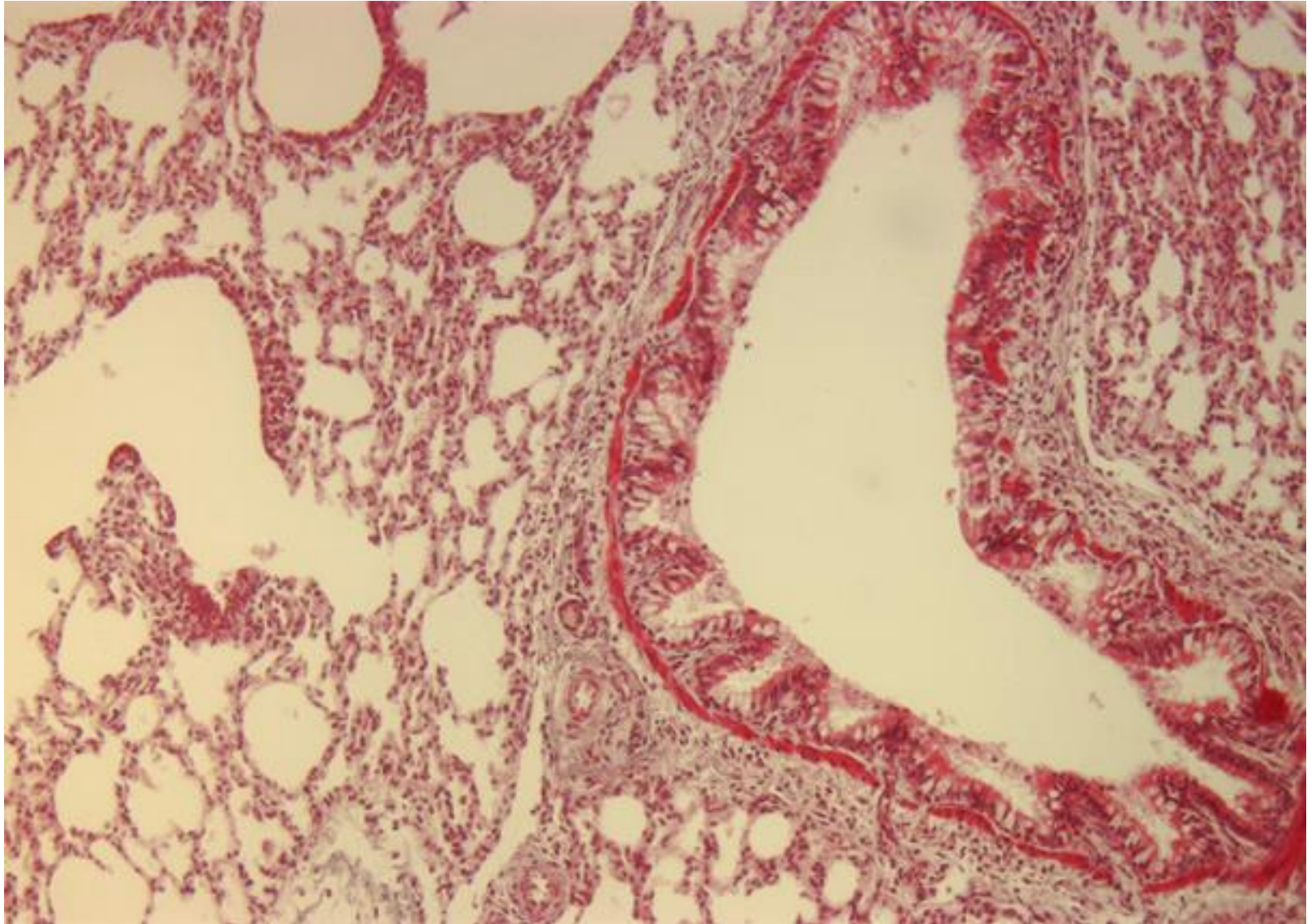


# Bronquio menor

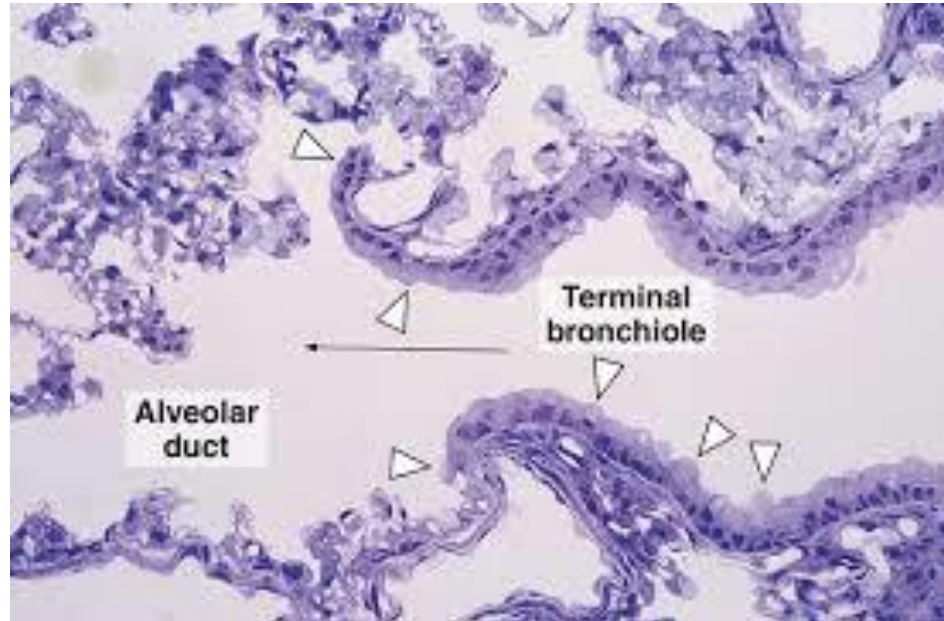




# Bronquiolo y pulmón

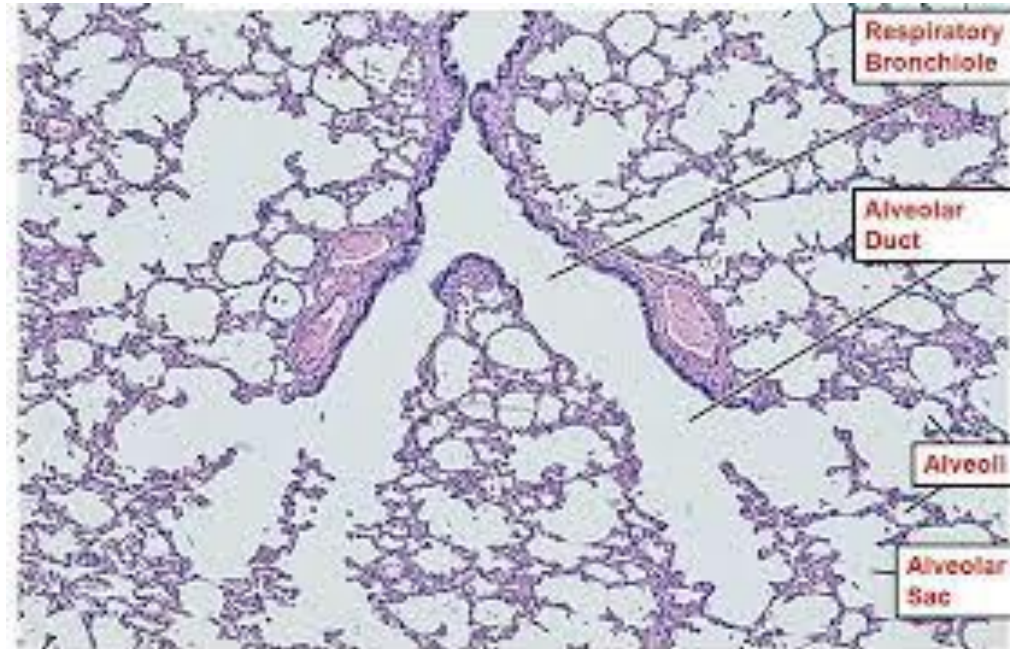


# Bronquiolo terminal (10X H/E)

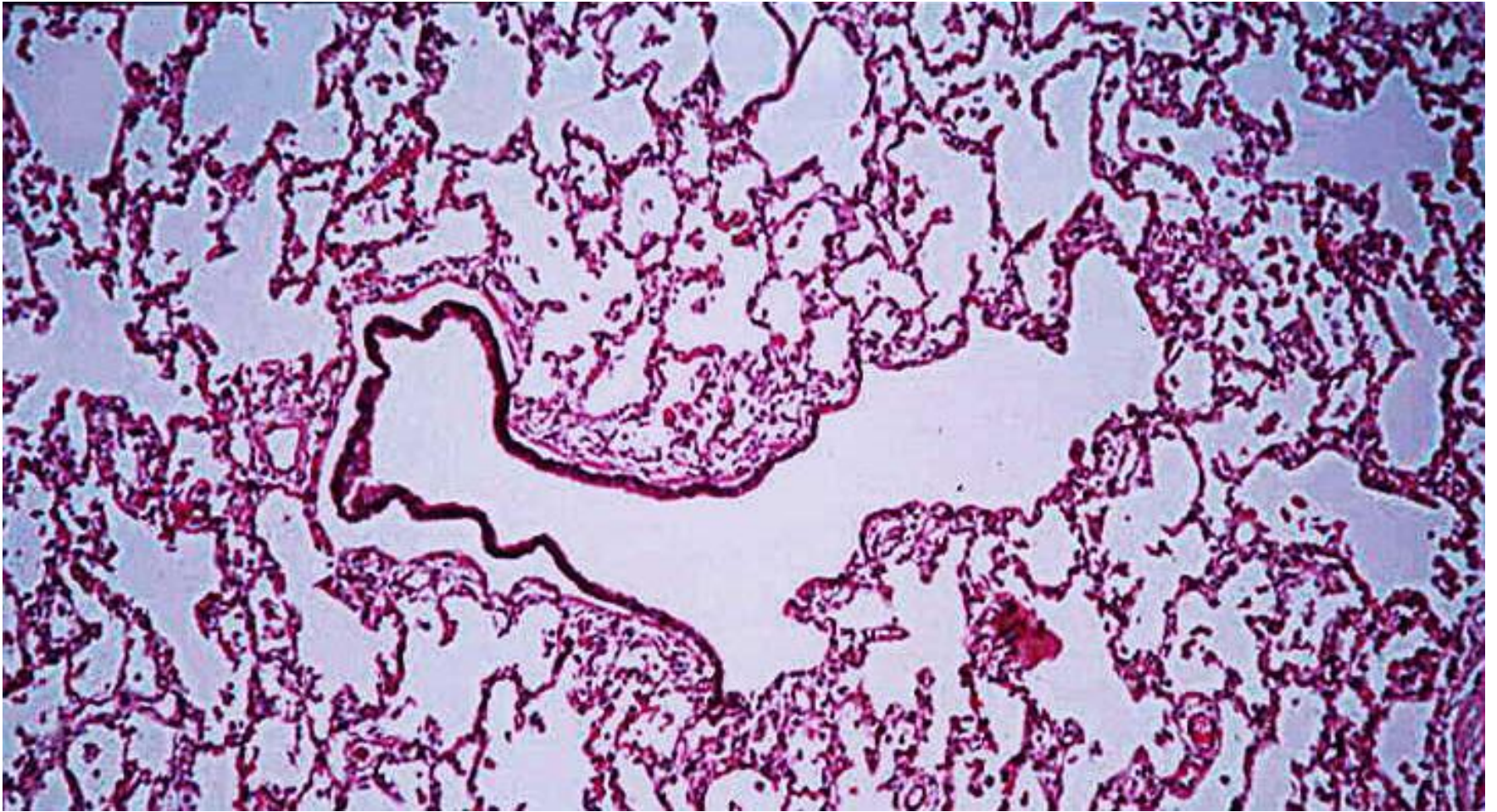




# Bronquiolo respiratorio (10X H/E)

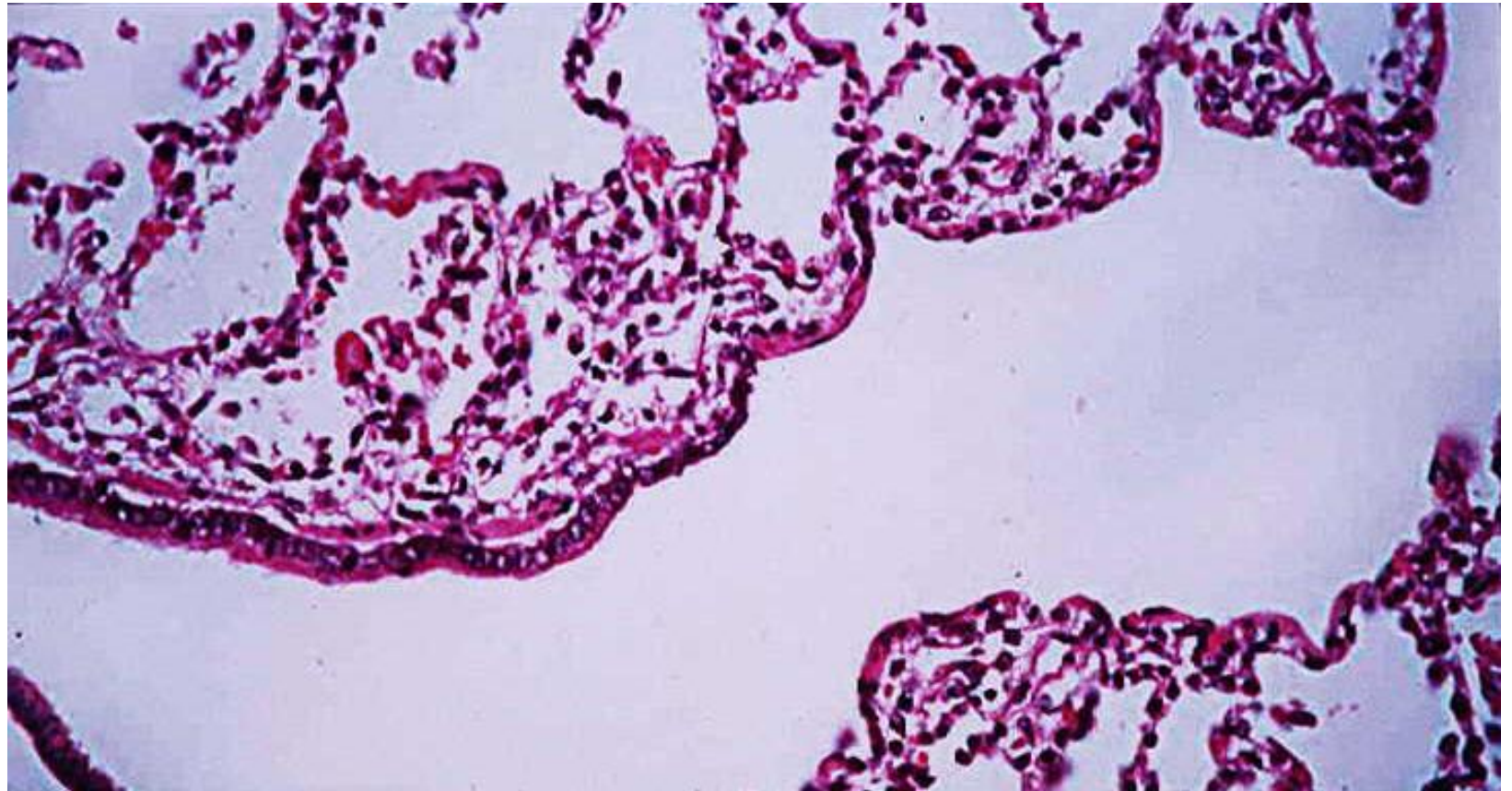


# Bronchiolo respiratorio



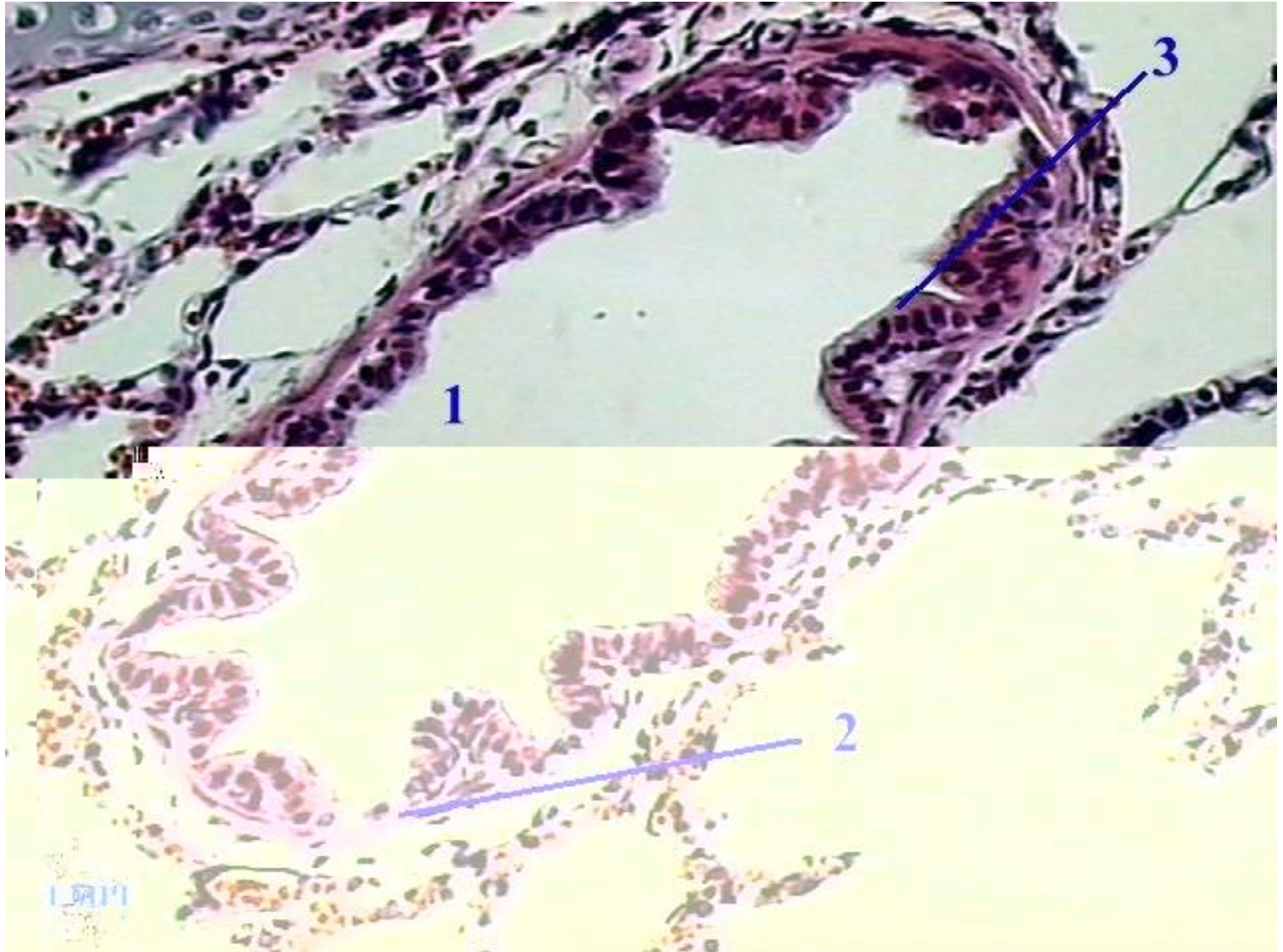


# Bronquiolo respiratorio

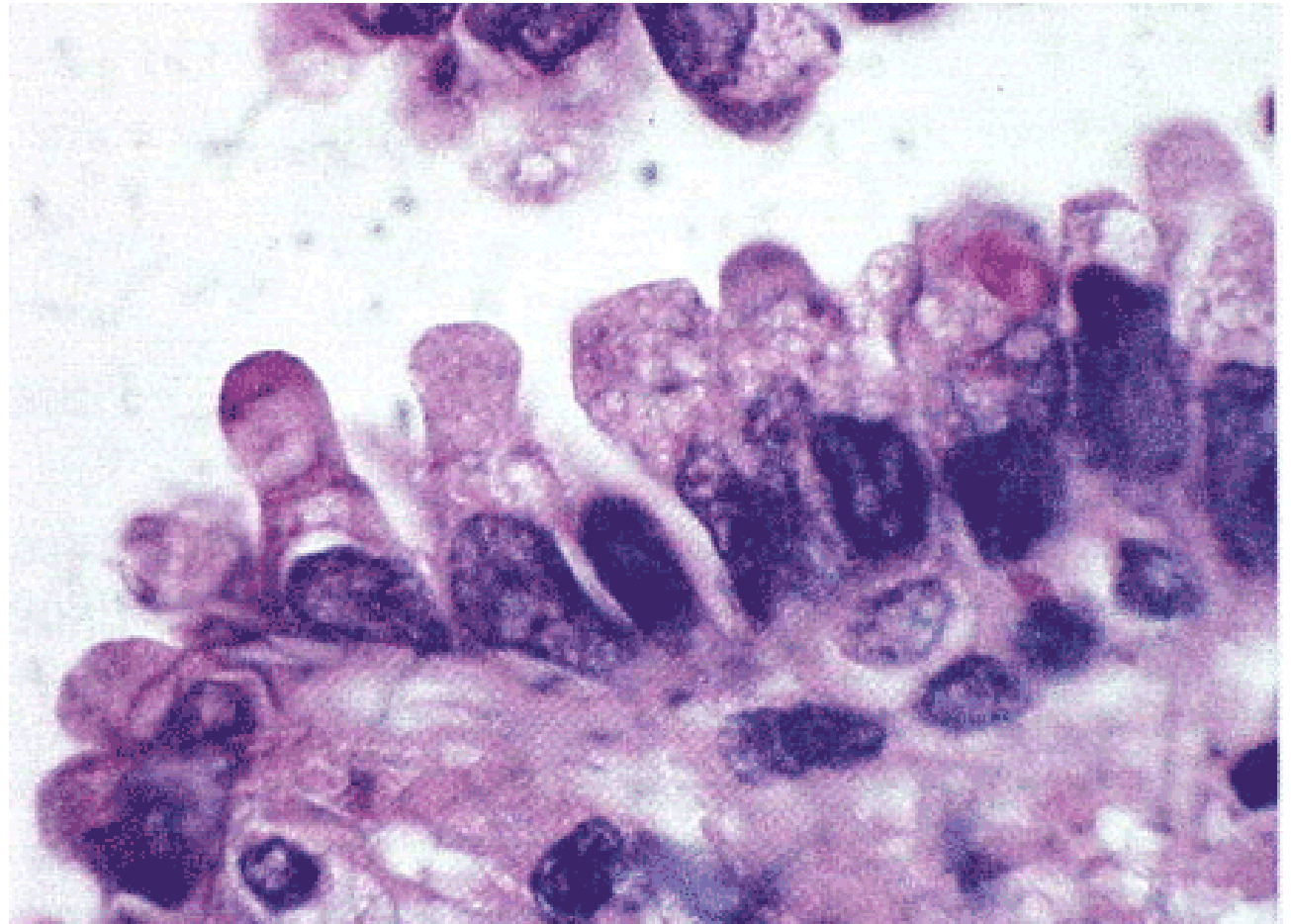
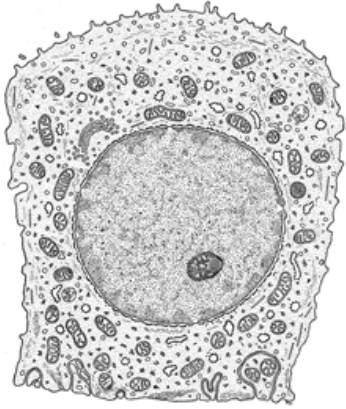




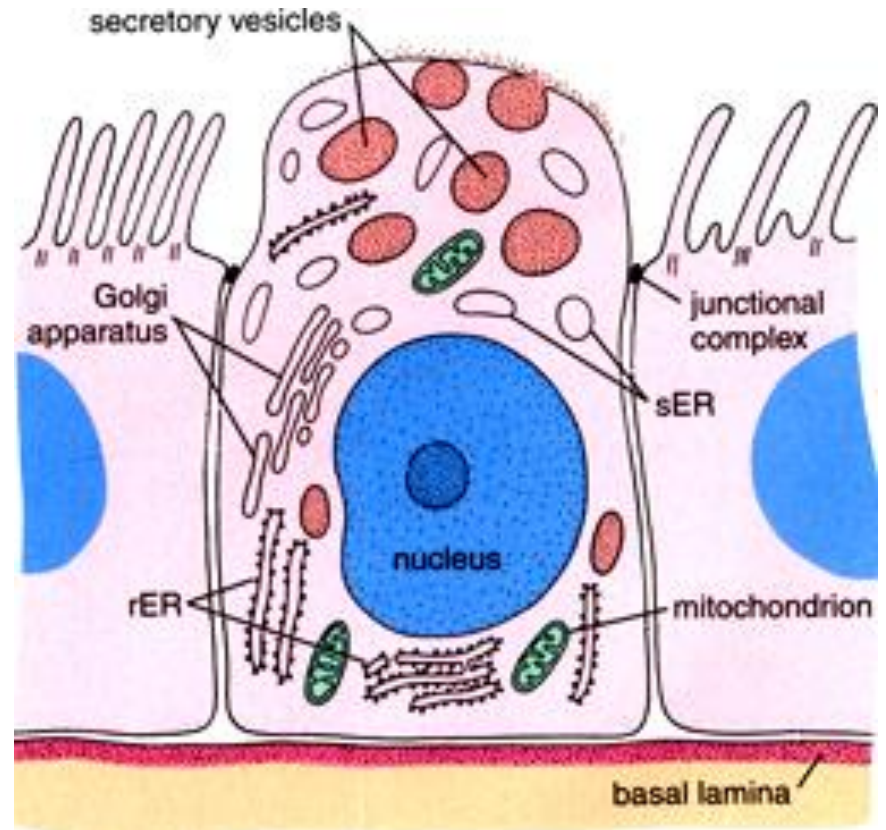
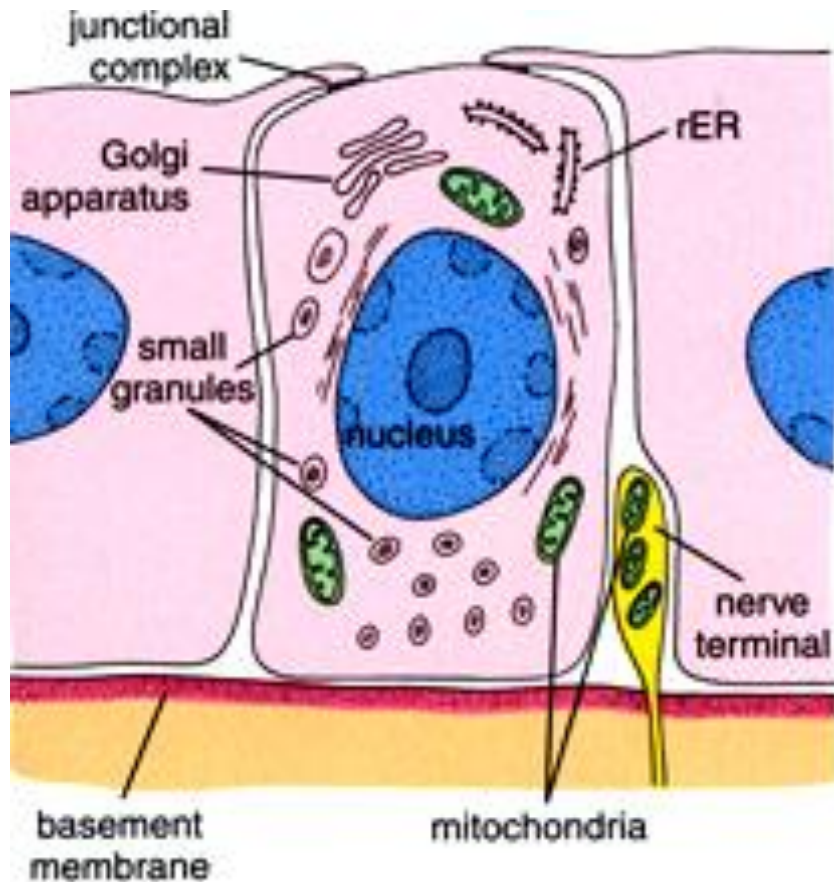
# Bronquiolo intrapulmonar



# Células de Clara



# Células de Clara: bronquiolos y bronquiolos terminales. Secretan lipoproteínas como surfactante



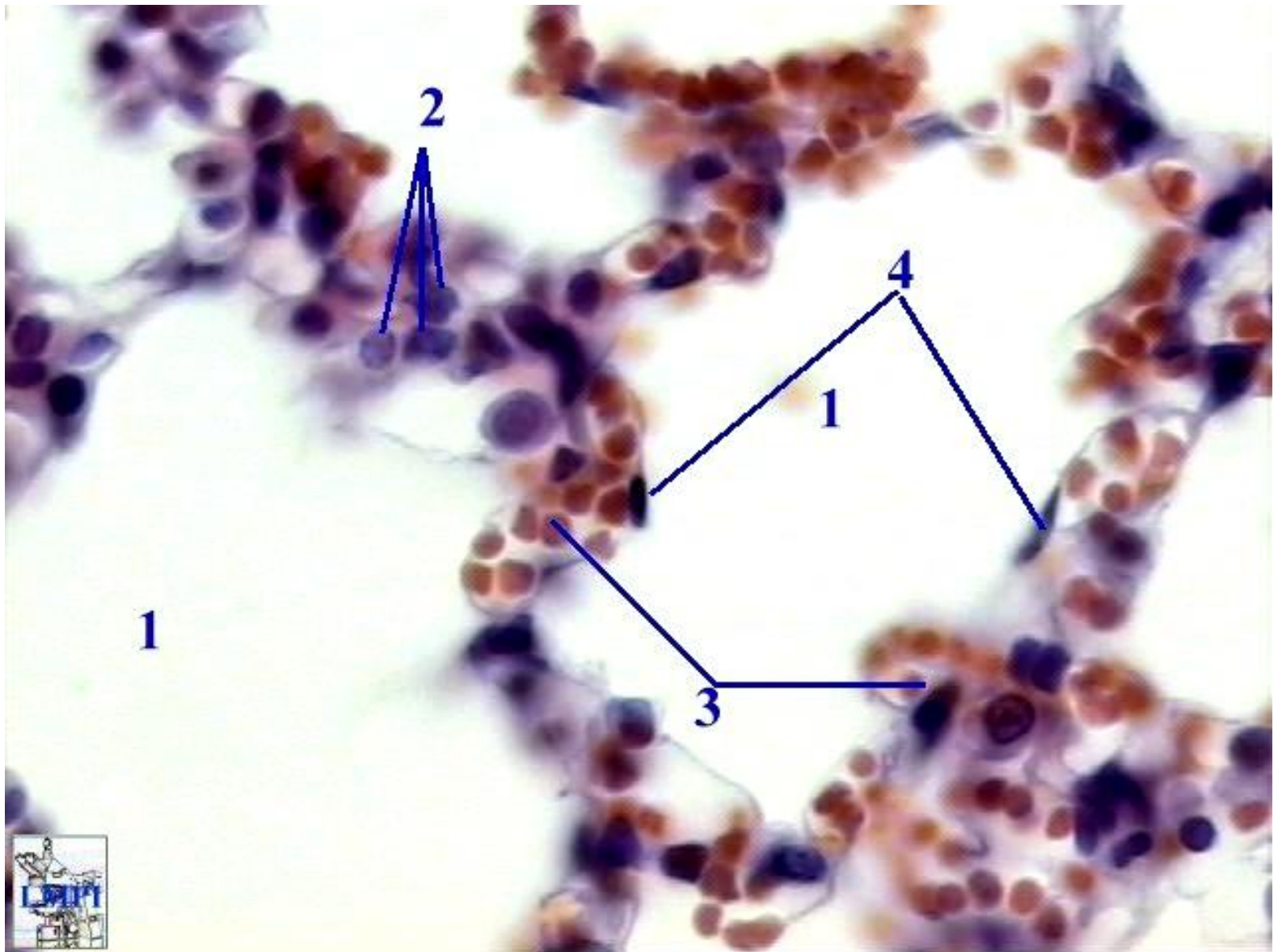


1.- Espacio alveolar

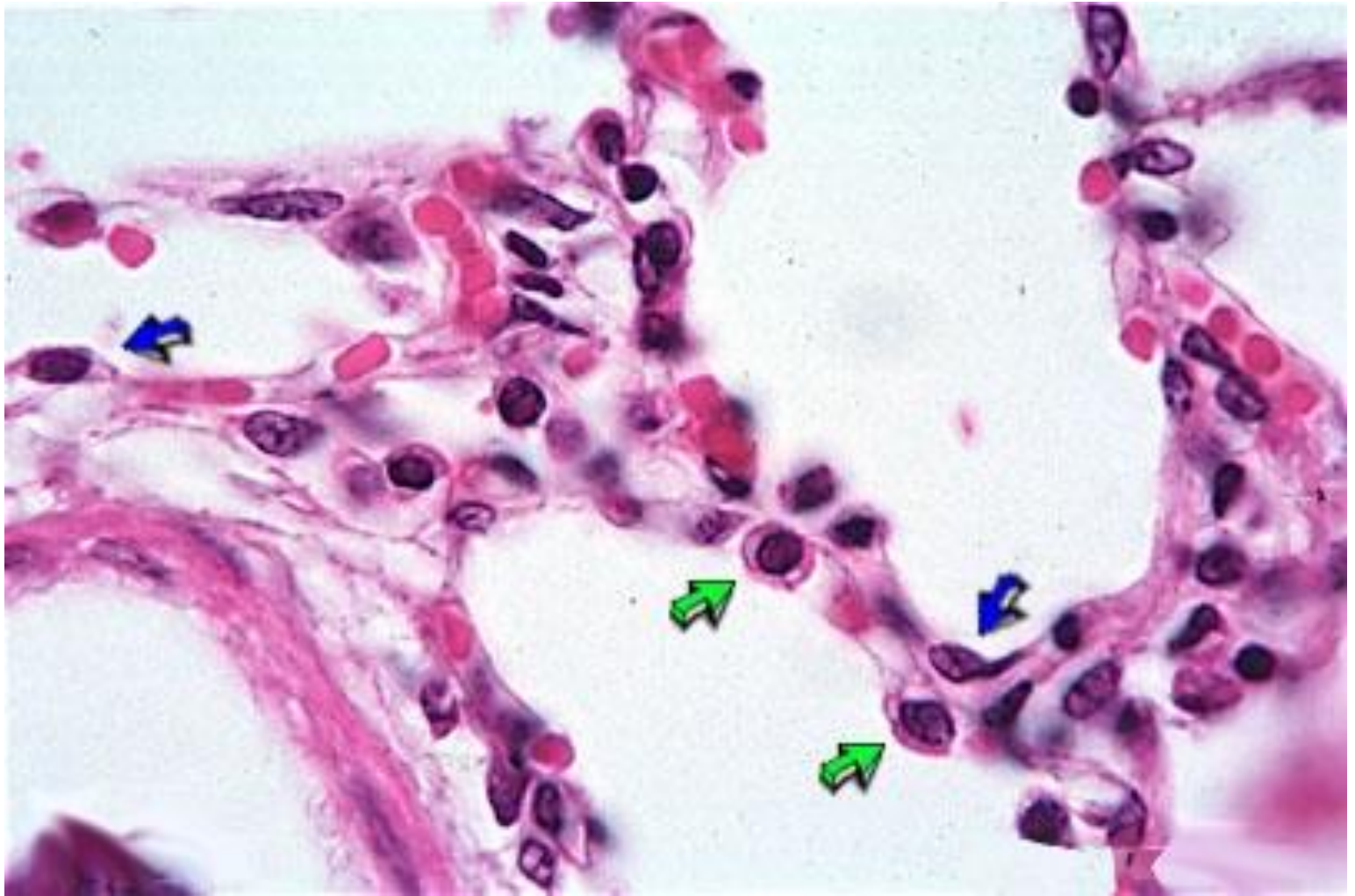
3.- Capillar con eritrocitos

2.- neumocito II

4.- Neumocito I

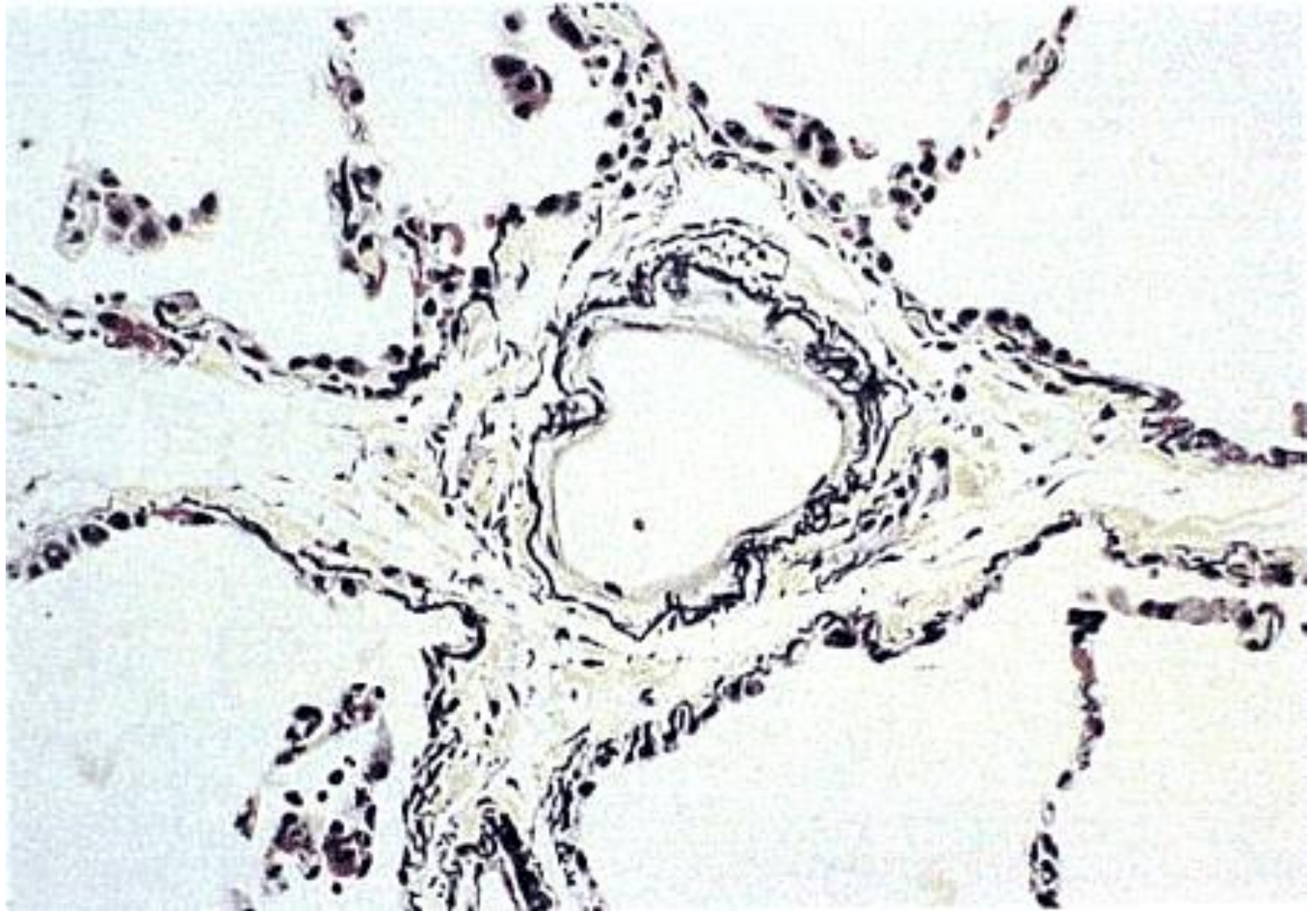


# Alveolo: neumocitos I y II



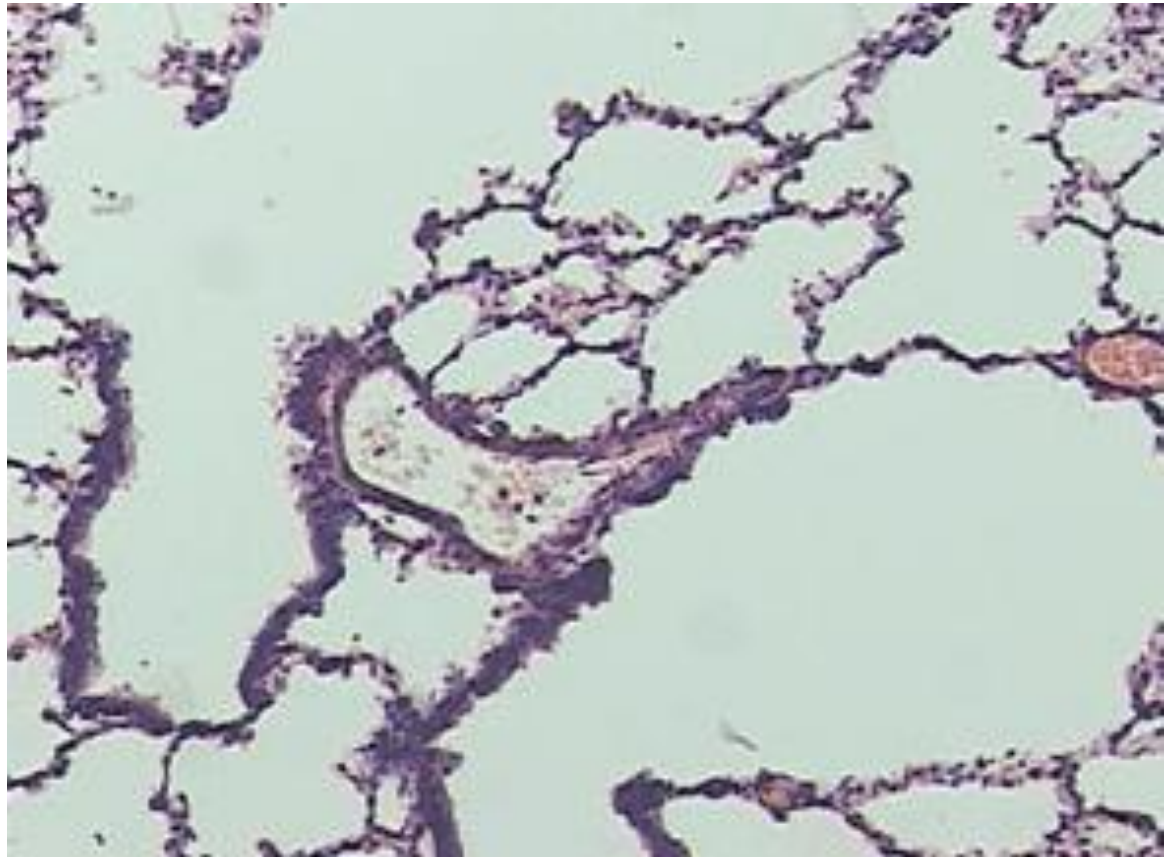


# Fibras elásticas

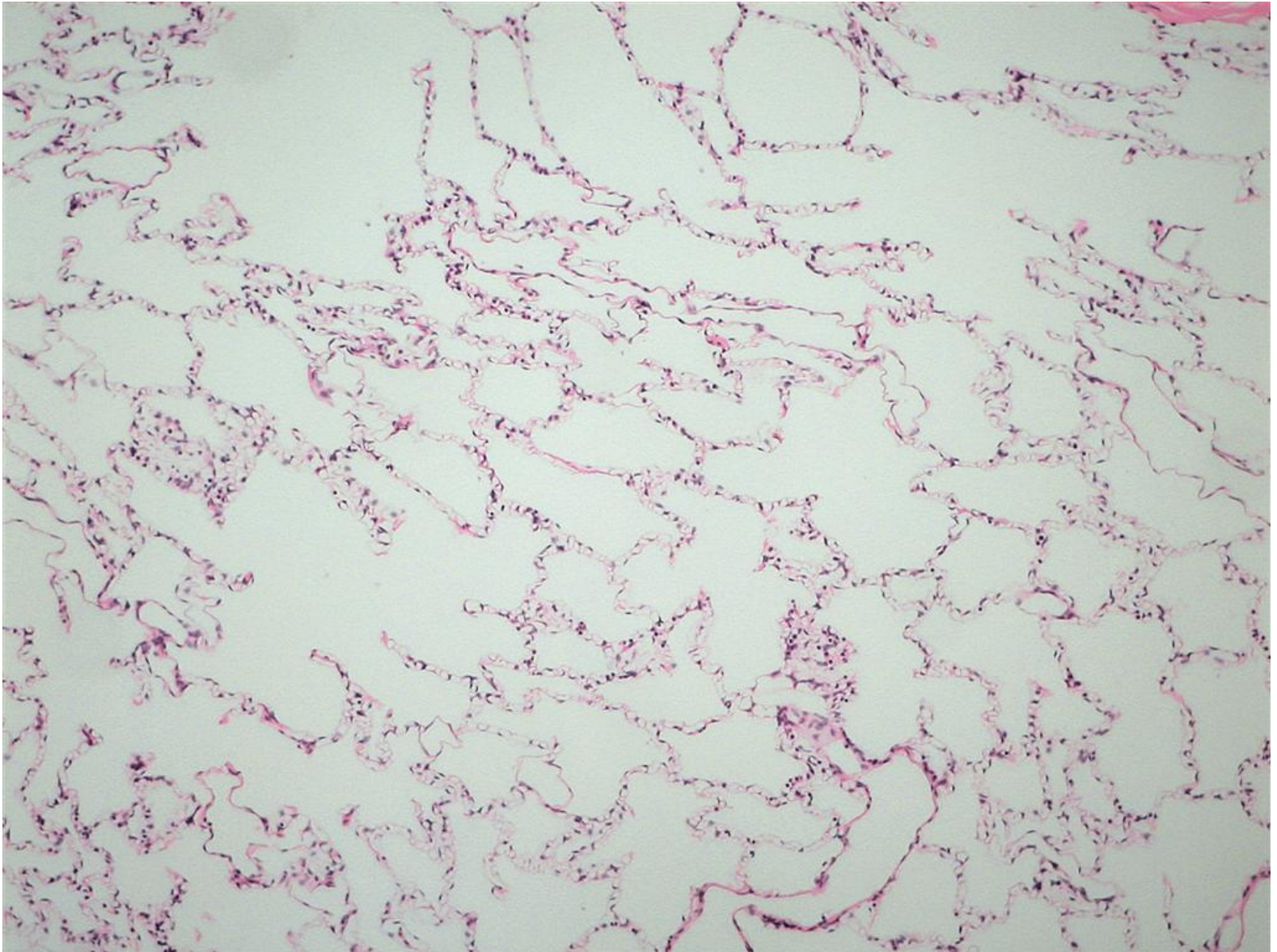




# Bronquiolos terminal y respiratorio (10X H/E)

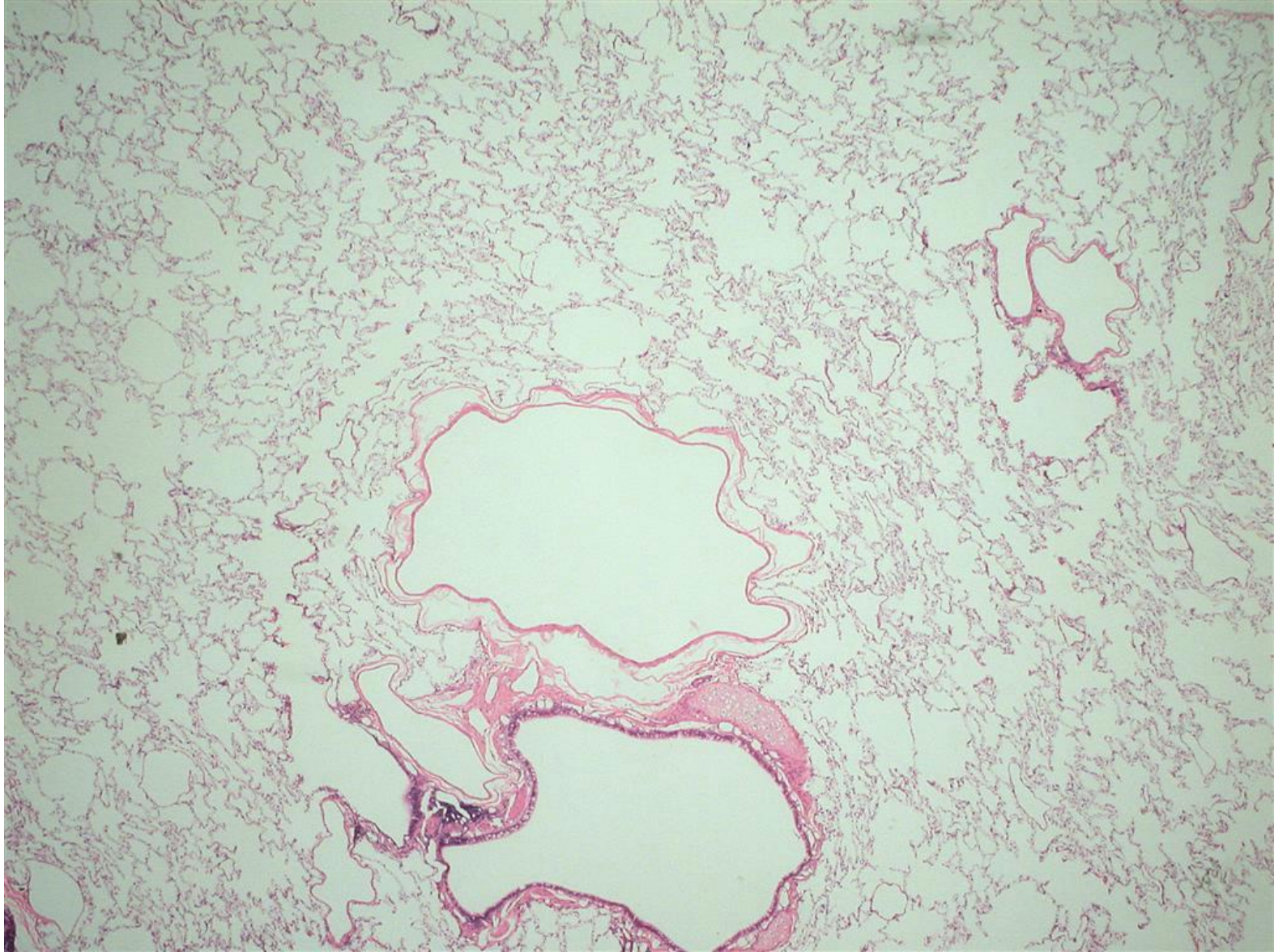


# Pulmones: alveolos



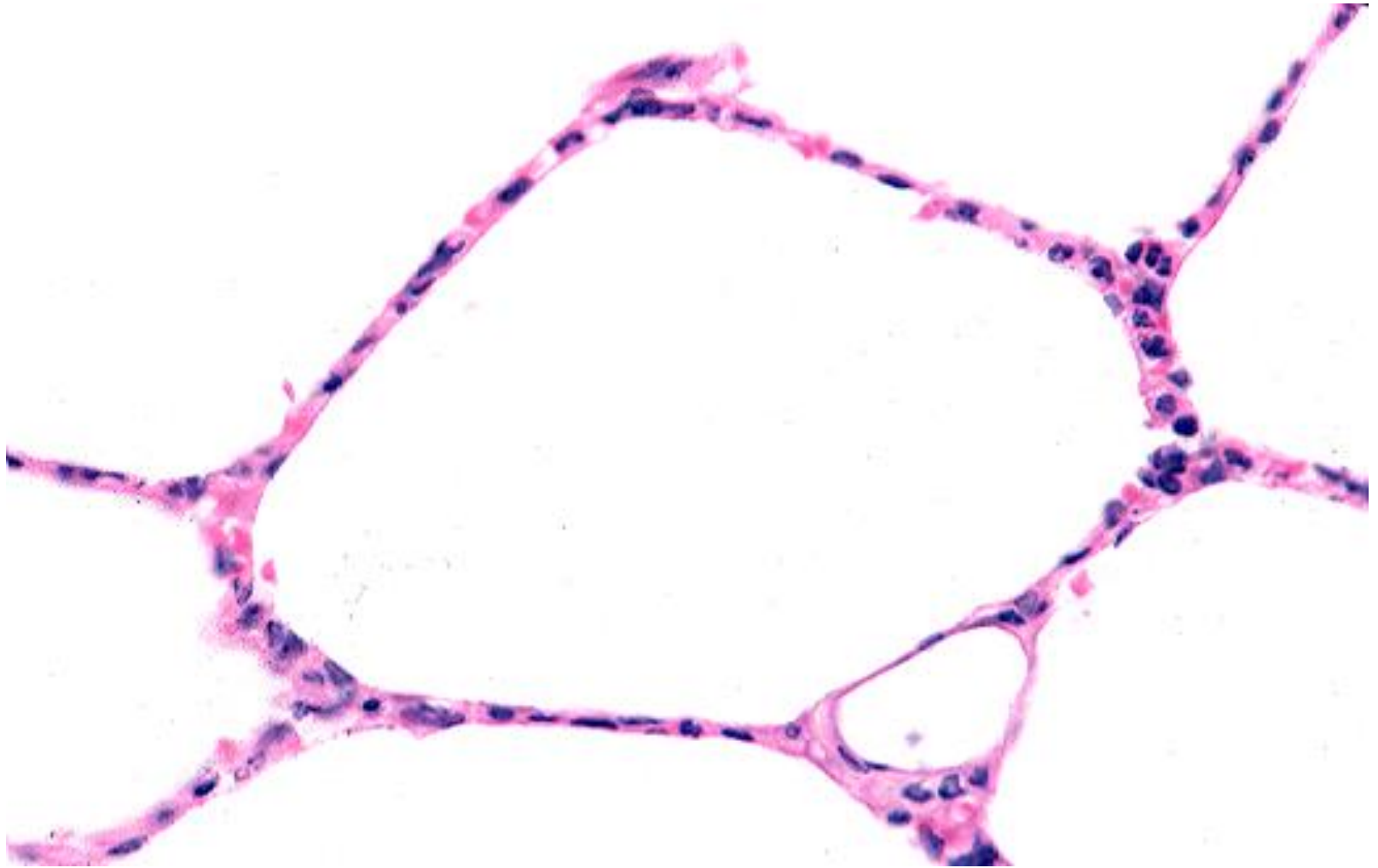


# Pulmón

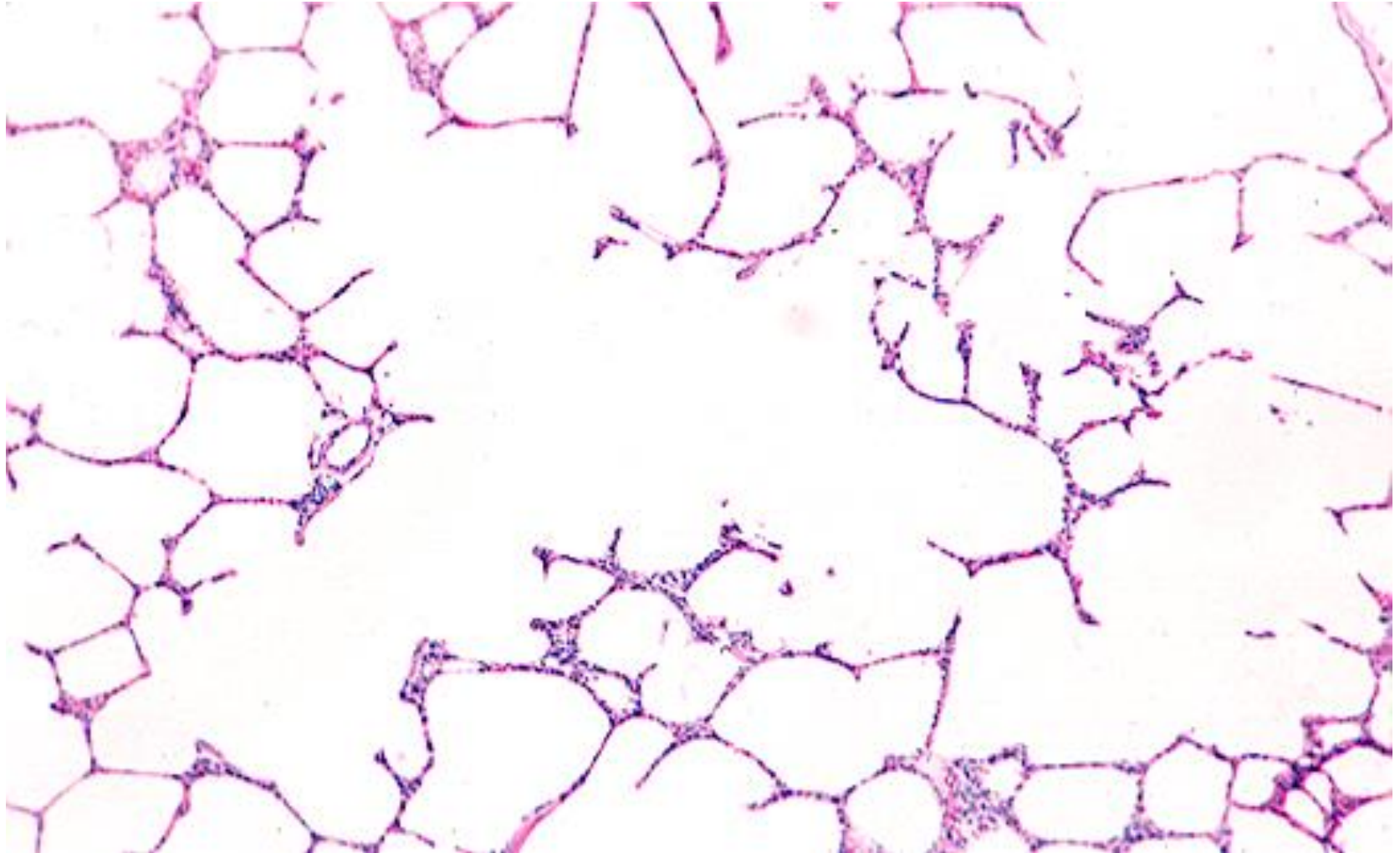




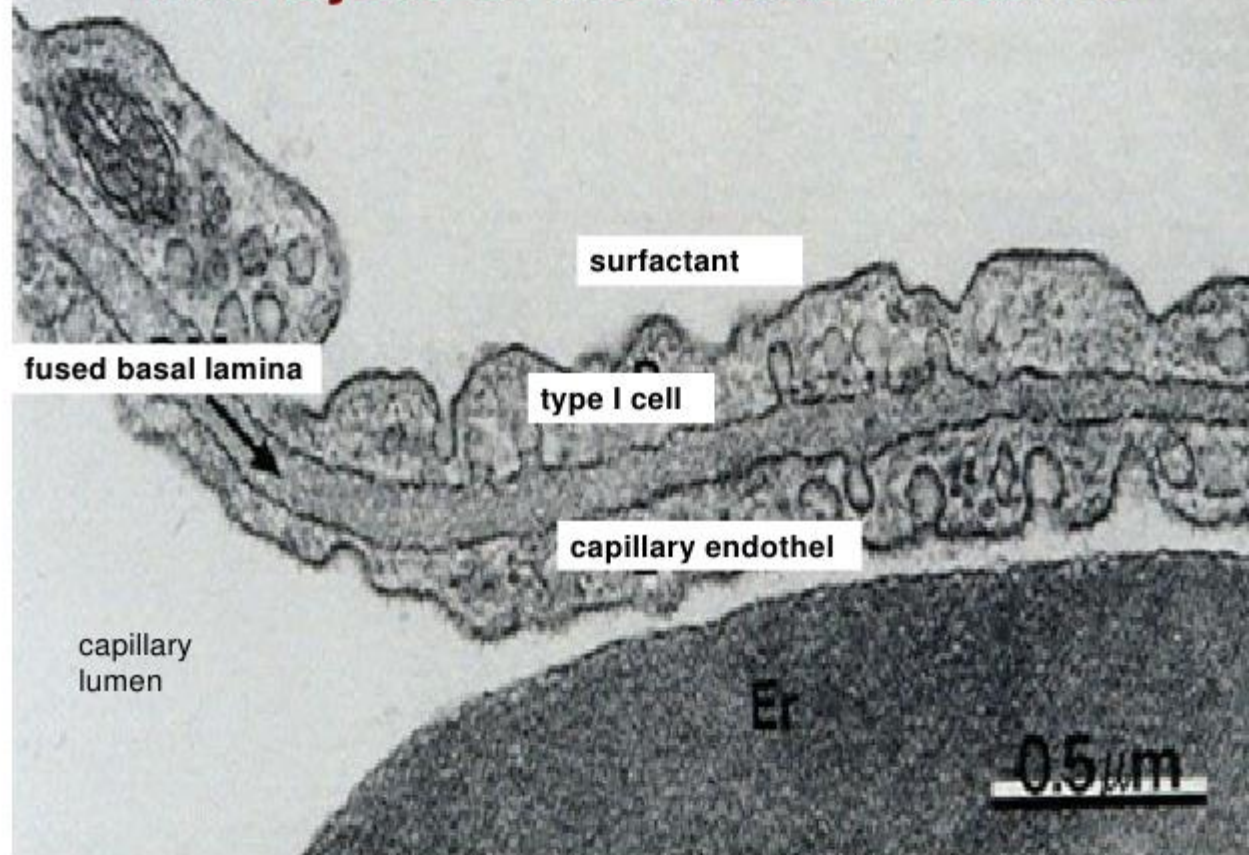
# Alveolo



# Conductos y almohadillas alveolares

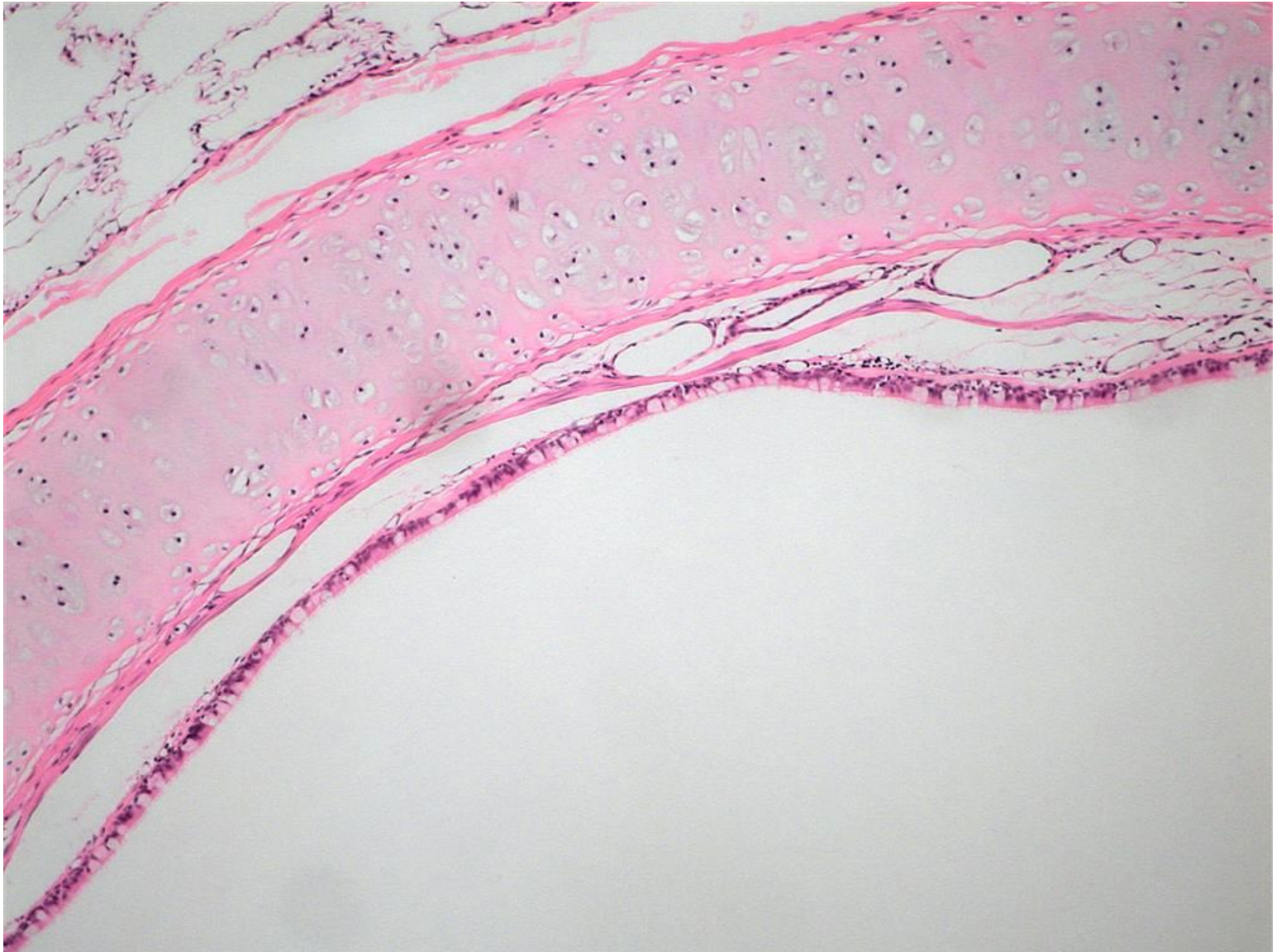


## The layers of the blood-air barrier





# Bronquio

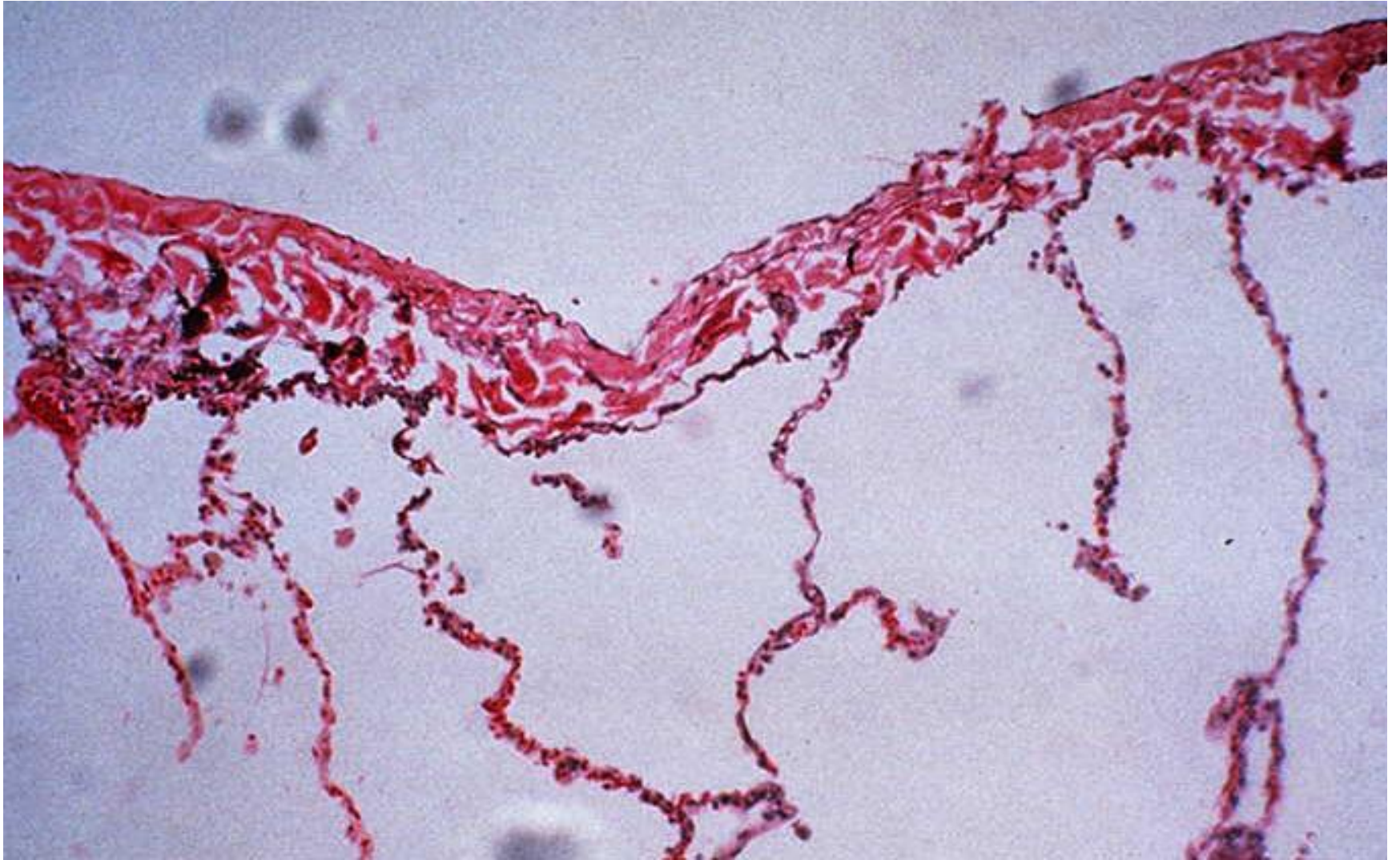


# Pulmón: vaso sanguíneo





# Pleura visceral: mesotelio





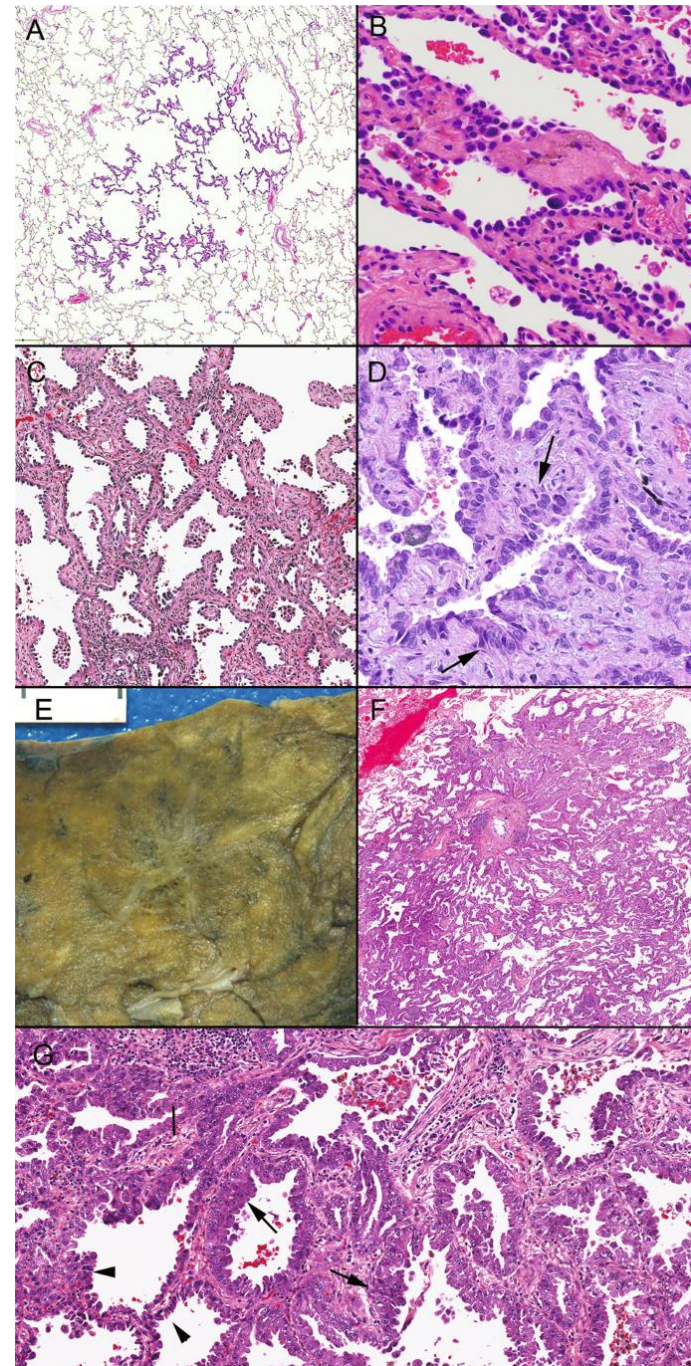
## Colapso pulmonar



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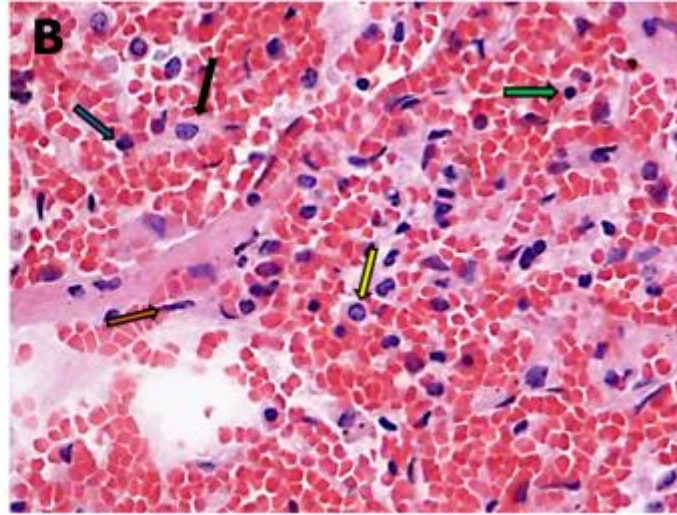
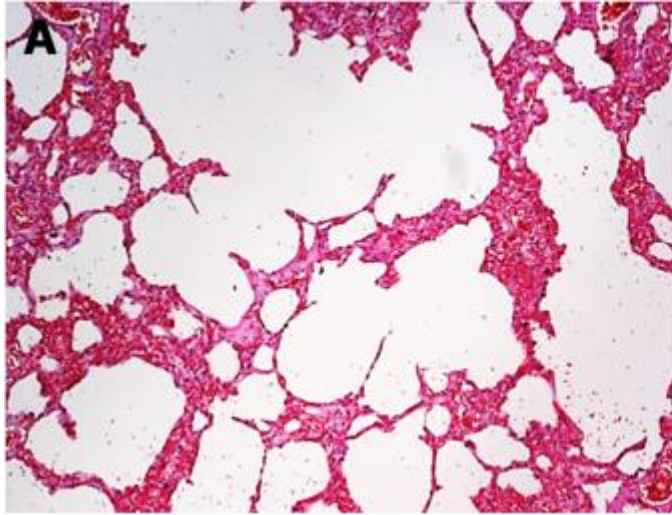
# Aspectos patológicos del pulmón

**Una** hiperplasia adenomatosa atípica se puede identificar con un aumento bajo por el aumento del tamaño de las células del revestimiento y la demarcación nítida con el pulmón adyacente. **B** Las paredes alveolares pueden estar engrosadas y el revestimiento tanto con neumocitos tipo 2 de forma variable como con neumocitos tipo 1. **C** El adenocarcinoma in situ no mucinoso contiene áreas de espacios alveolares reemplazados de manera más uniforme por neumocitos tipo 2, a menudo de bajo grado, sin los espacios de las células residuales tipo 1. **D** Si bien el adenocarcinoma in situ puede consistir en células cúbicas altas o células columnares con mayor atipia, generalmente son capas únicas con pliegues ocasionales o mechones de dos capas (flecha). **E** Imagen macroscópica de un adenocarcinoma mínimamente invasivo, muy borroso pero con un área de distorsión central. **F** A bajo aumento, predomina el patrón de crecimiento alveolar con un área de mayor densidad y distorsión. **G** A gran aumento, la proliferación incluye epitelio multicapa junto con perfiles glandulares angulados.





# Pulmón y Covid-19



Neumonía viral

