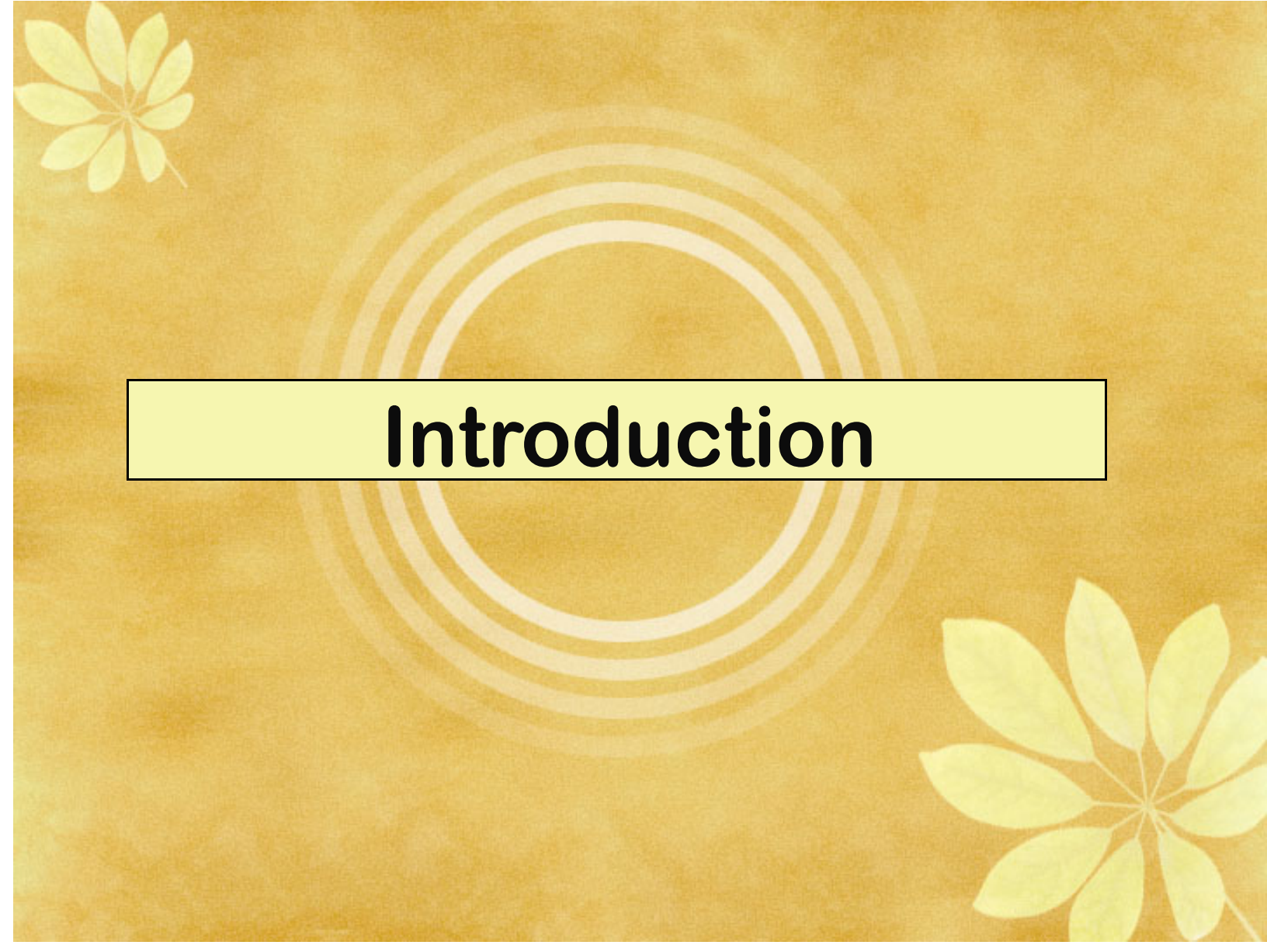




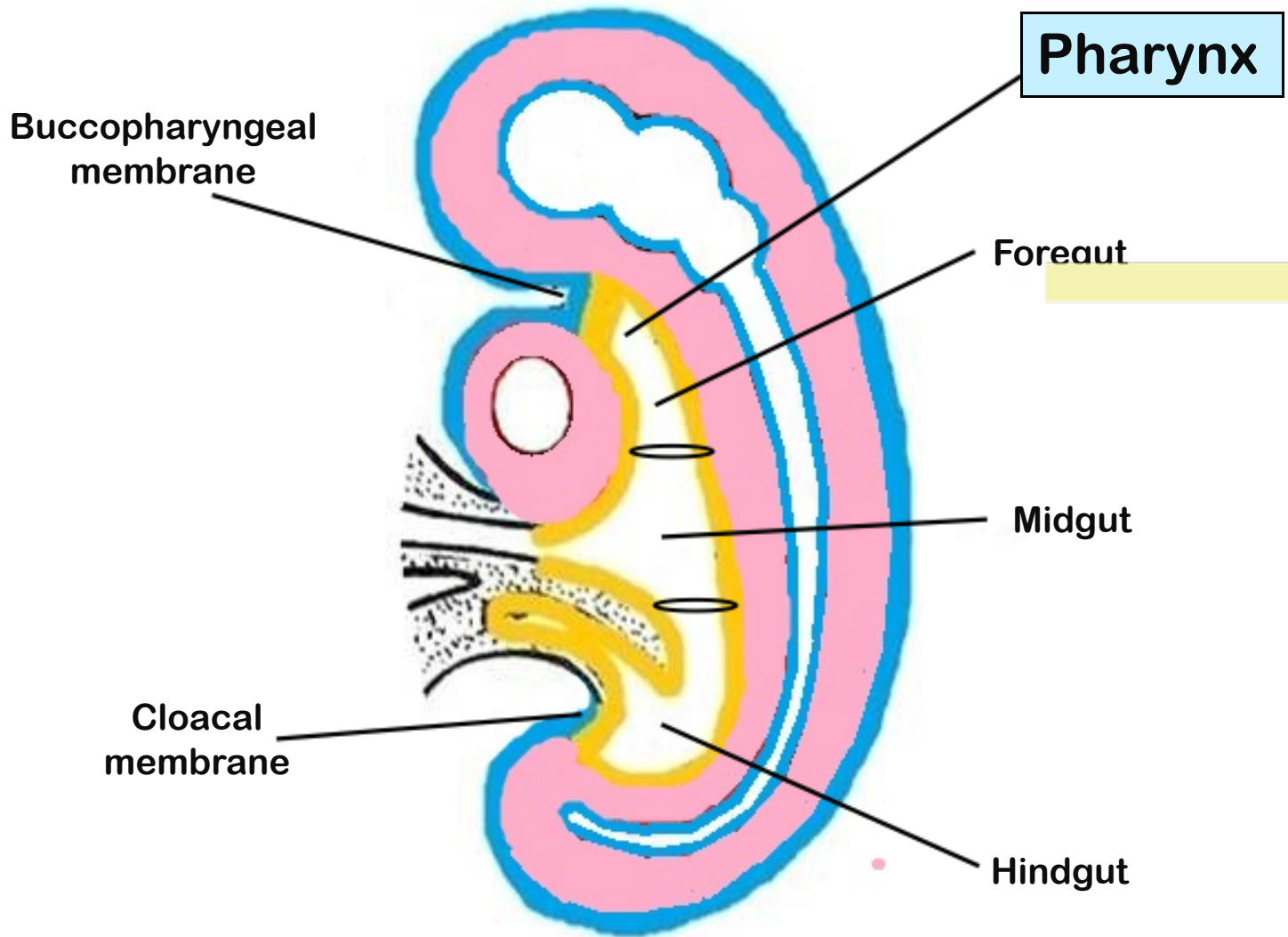
Dr. Doaa Shuaib

Development of respiratory system

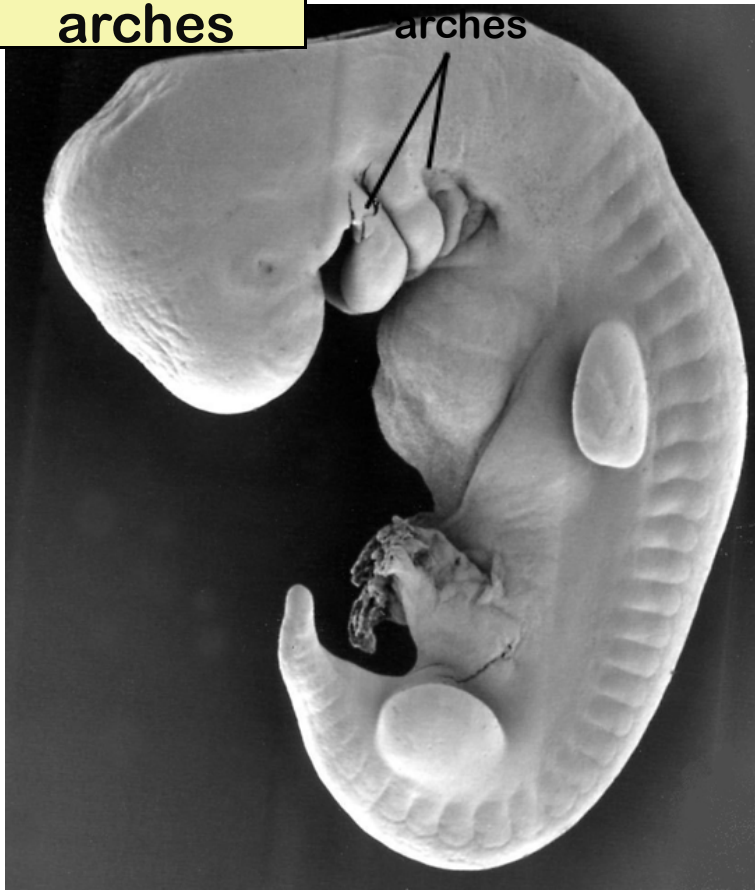
**Assistant Professor of Anatomy & Embryology
Faculty of Medicine – Cairo University
Email: doaa.shuaib@kasralainy.edu.eg**

The background is a textured, warm yellowish-brown color. In the center, there are several concentric circles in a lighter, cream-colored tone. In the top-left and bottom-right corners, there are stylized floral motifs with multiple pointed petals in a light yellow color.

Introduction



Pharyngeal arches



Pharyngeal arches



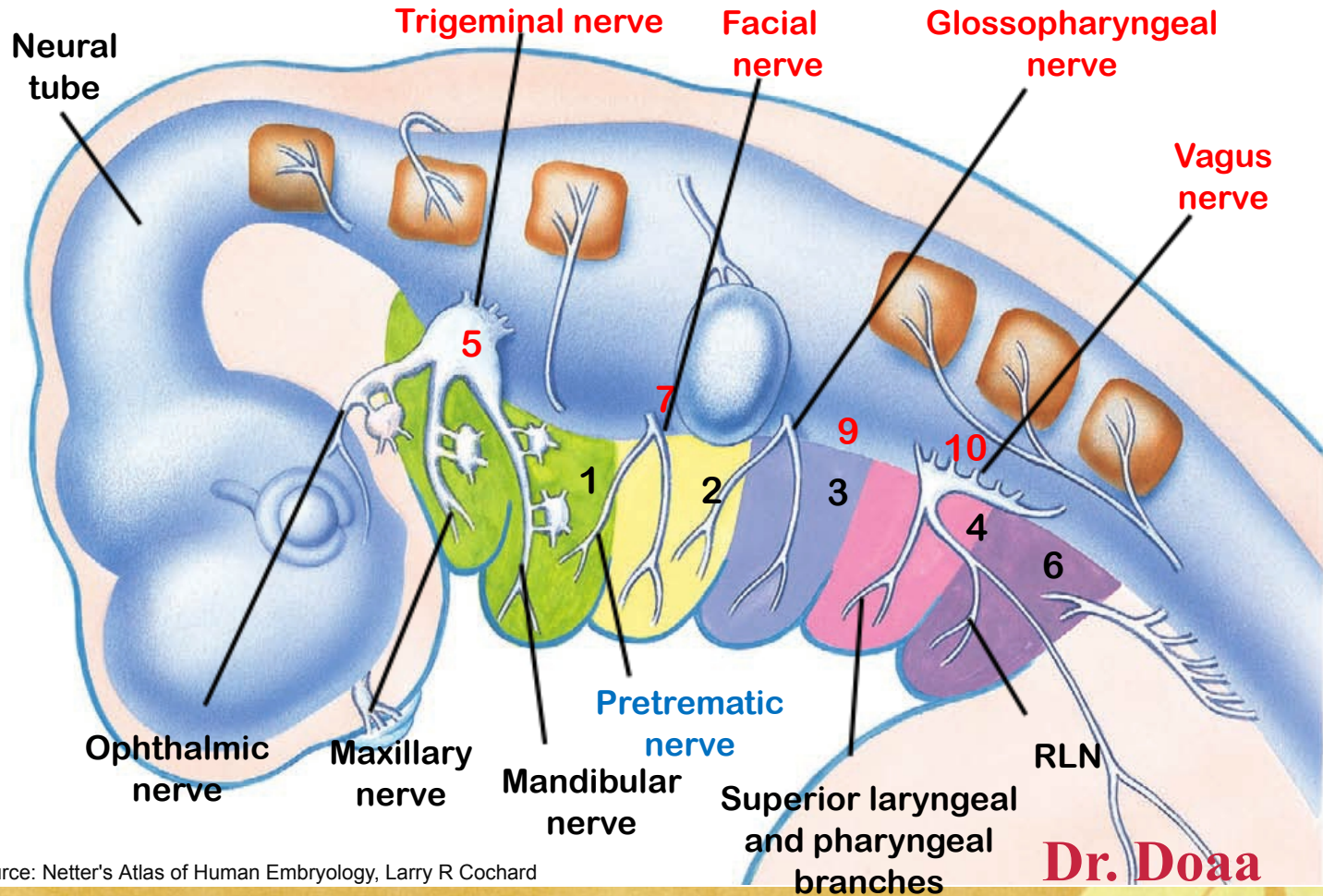
Pharyngeal arches

Dr. Doaa

Shuaib

Pharyngeal arches are 6 curved cylindrical mesodermal thickenings on each side of the pharyngeal gut
Covered by surface ectoderm & lined by endoderm

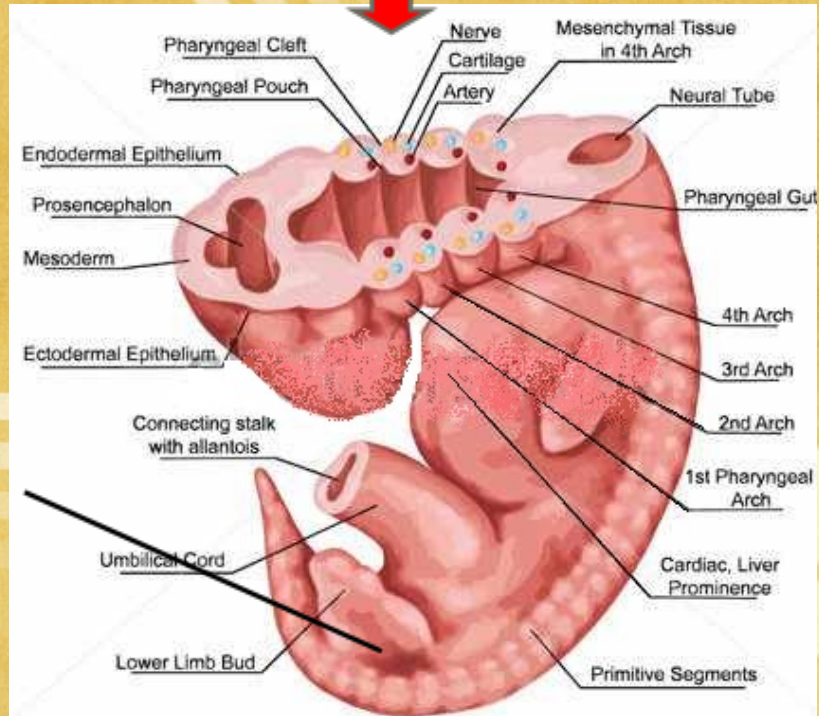
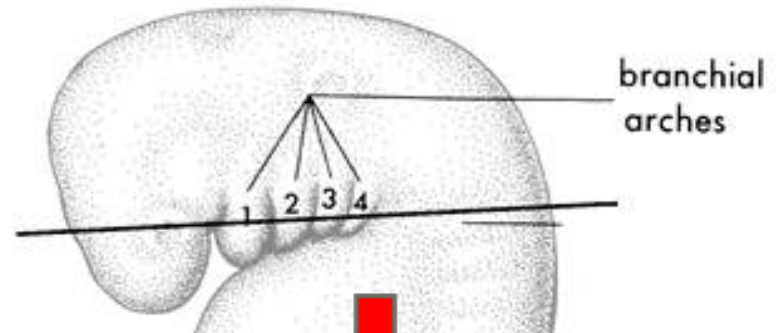
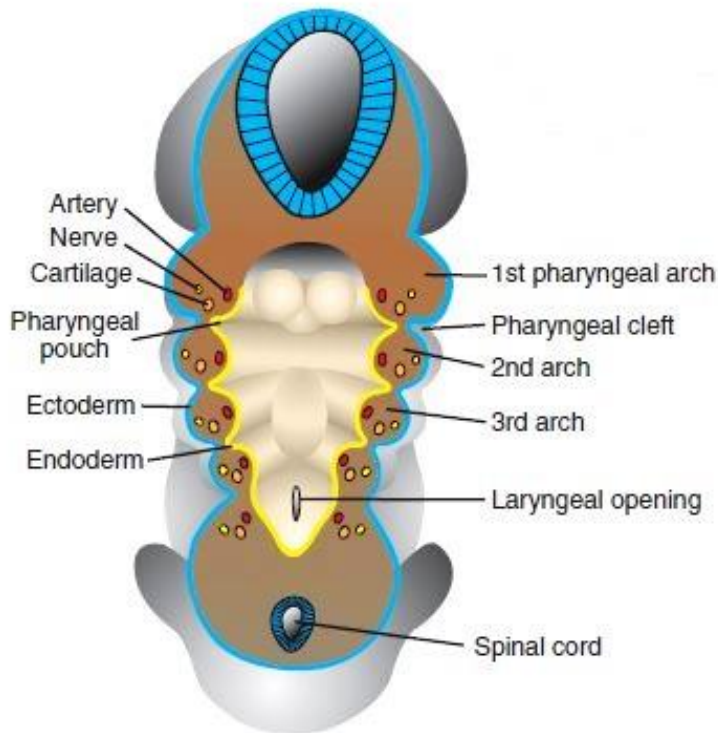
Each arch has its own cranial nerve



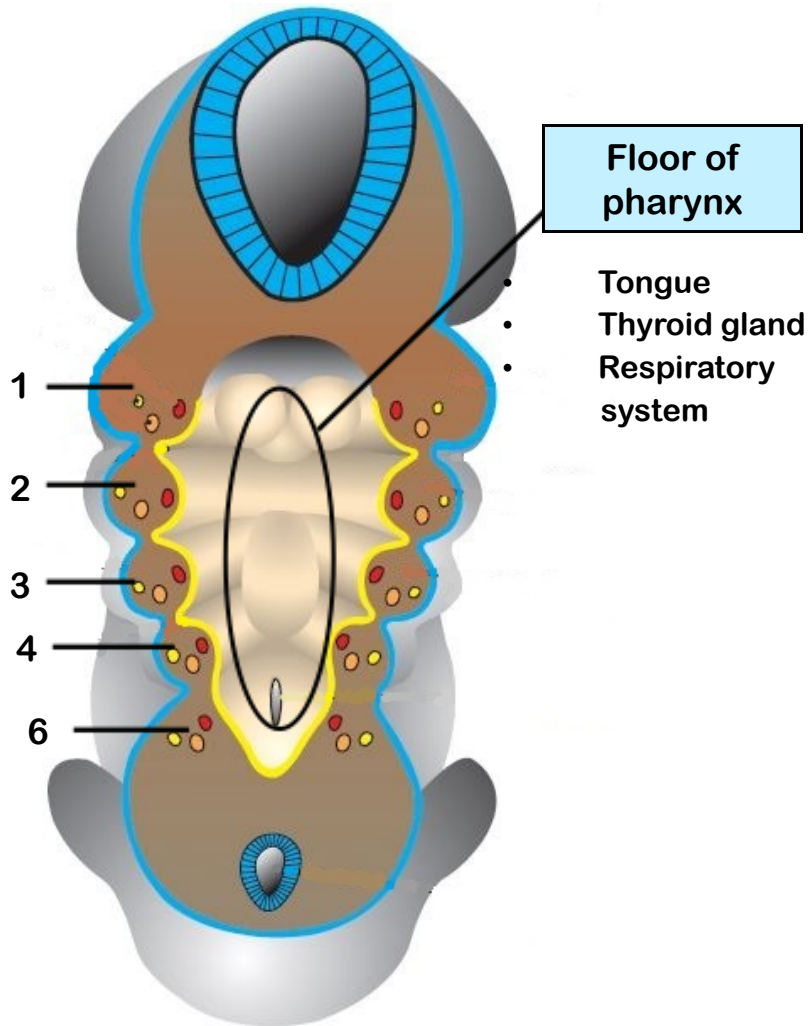
Source: Netter's Atlas of Human Embryology, Larry R Cochard

* The **5th arch** either never forms in human or forms and rapidly regresses

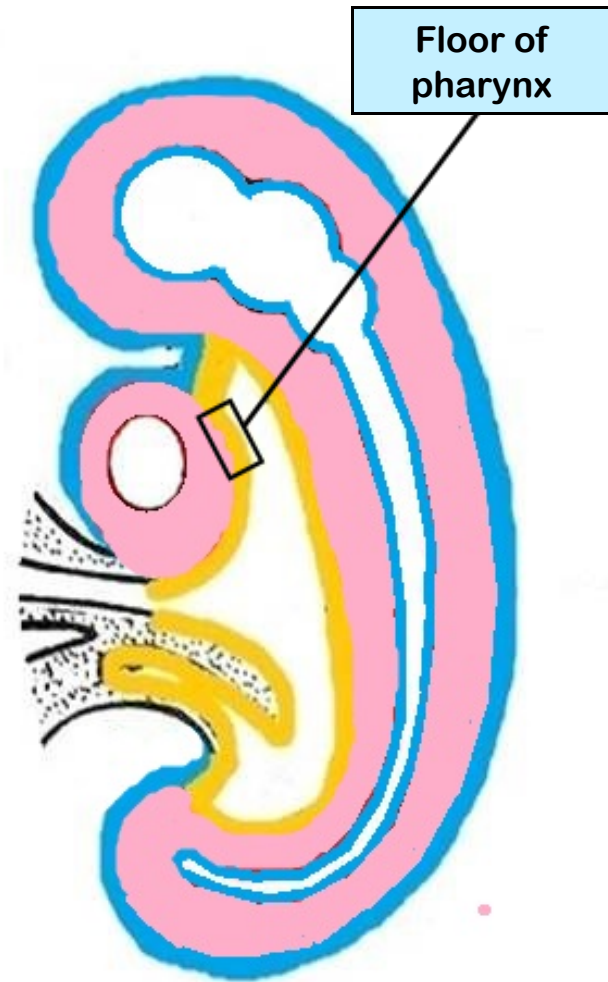
Cut section in the wall of the pharynx



Dr. Doaa

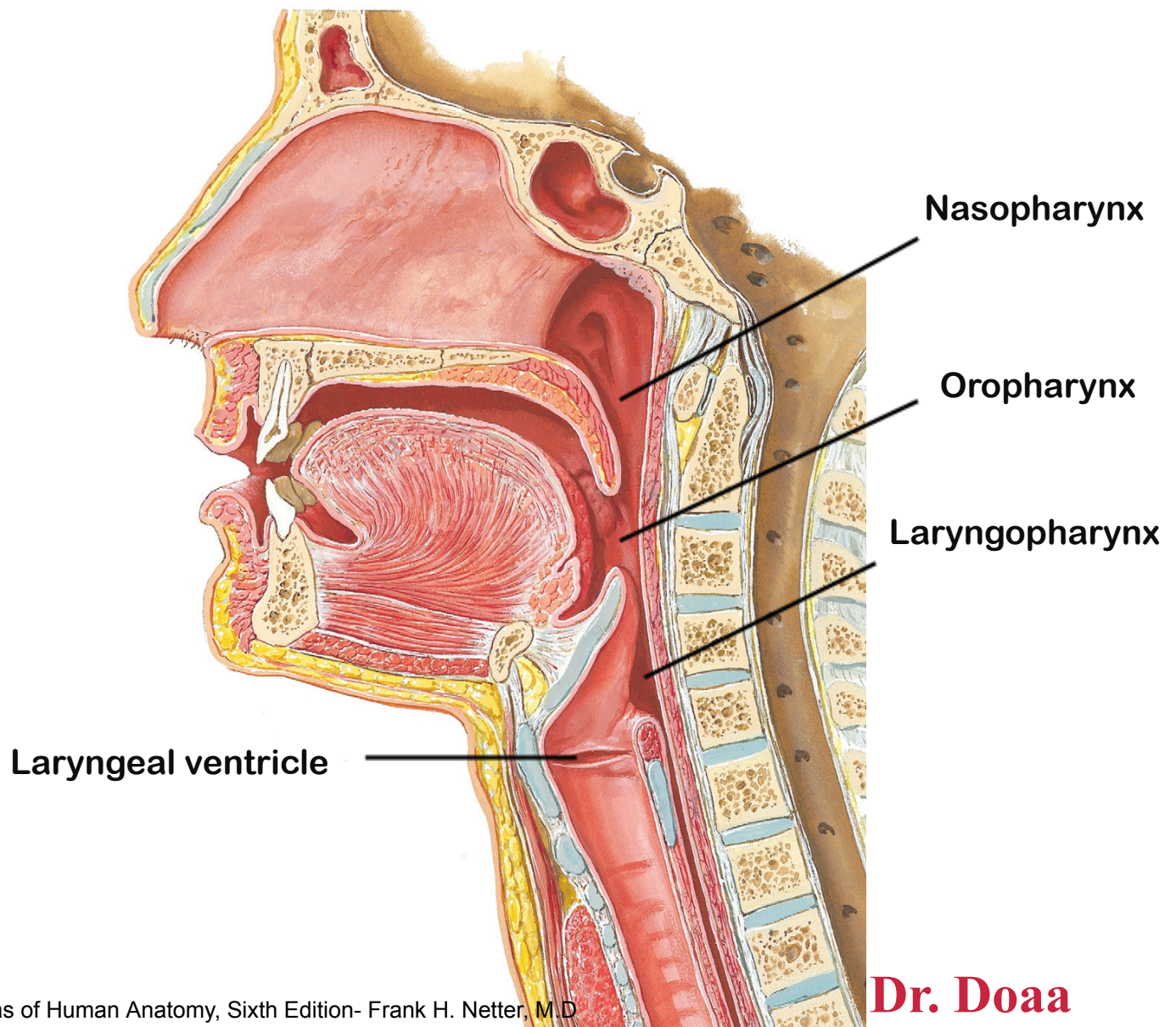


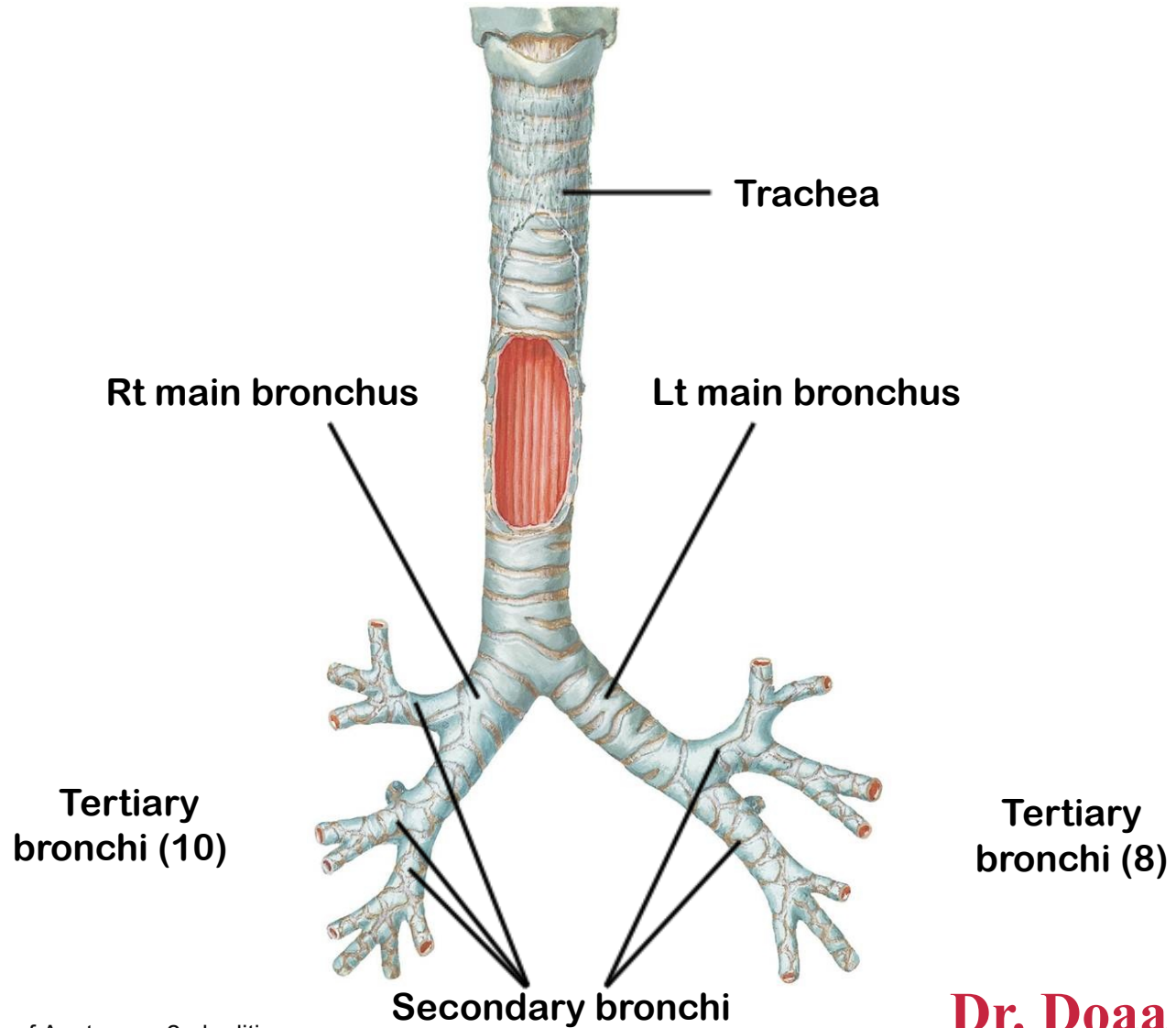
Source: Langman's Medical Embryology 13th edition

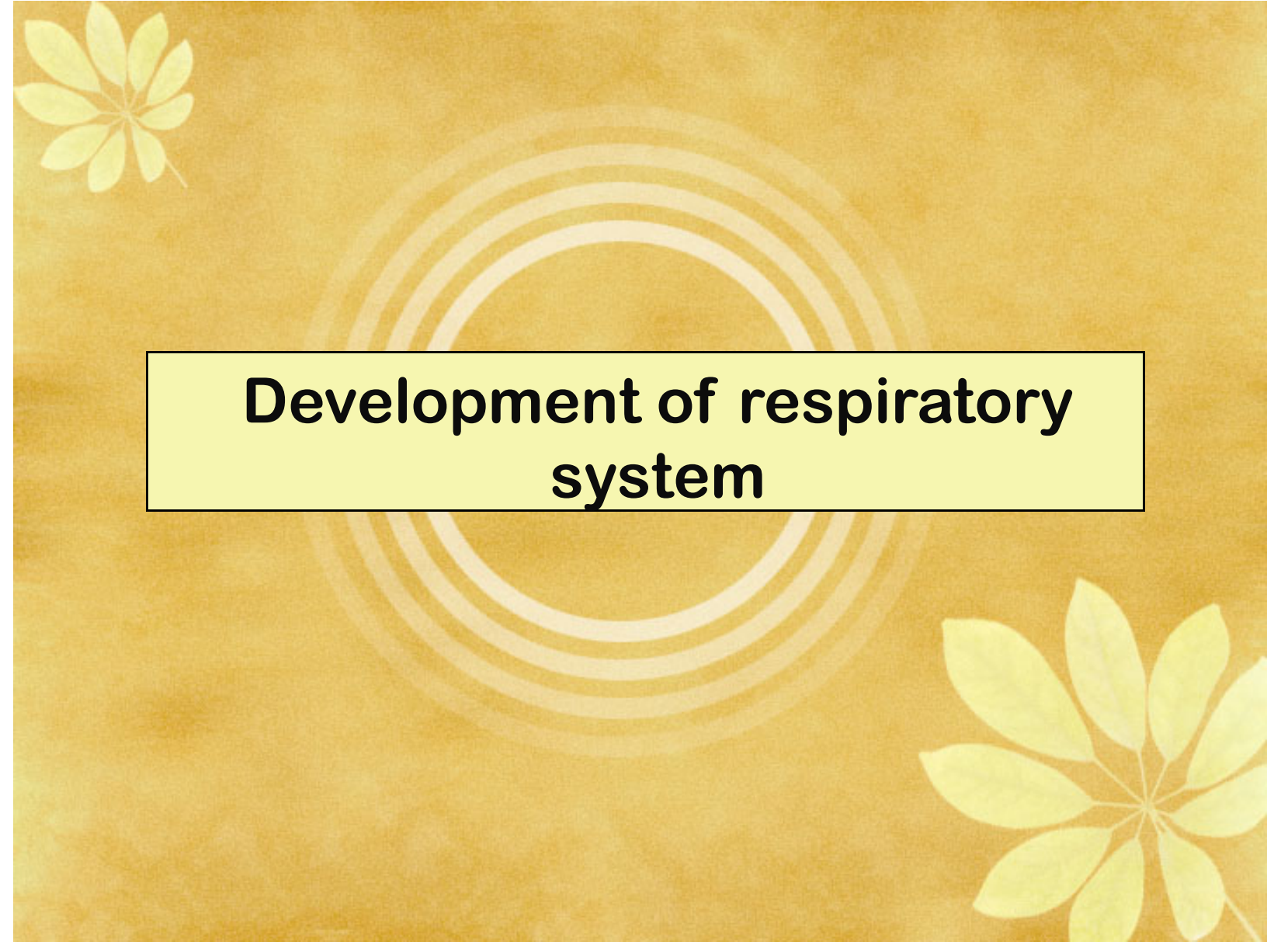


Source: DR. Fawzi Gaballah Atlas of Embryology

Dr. Doaa

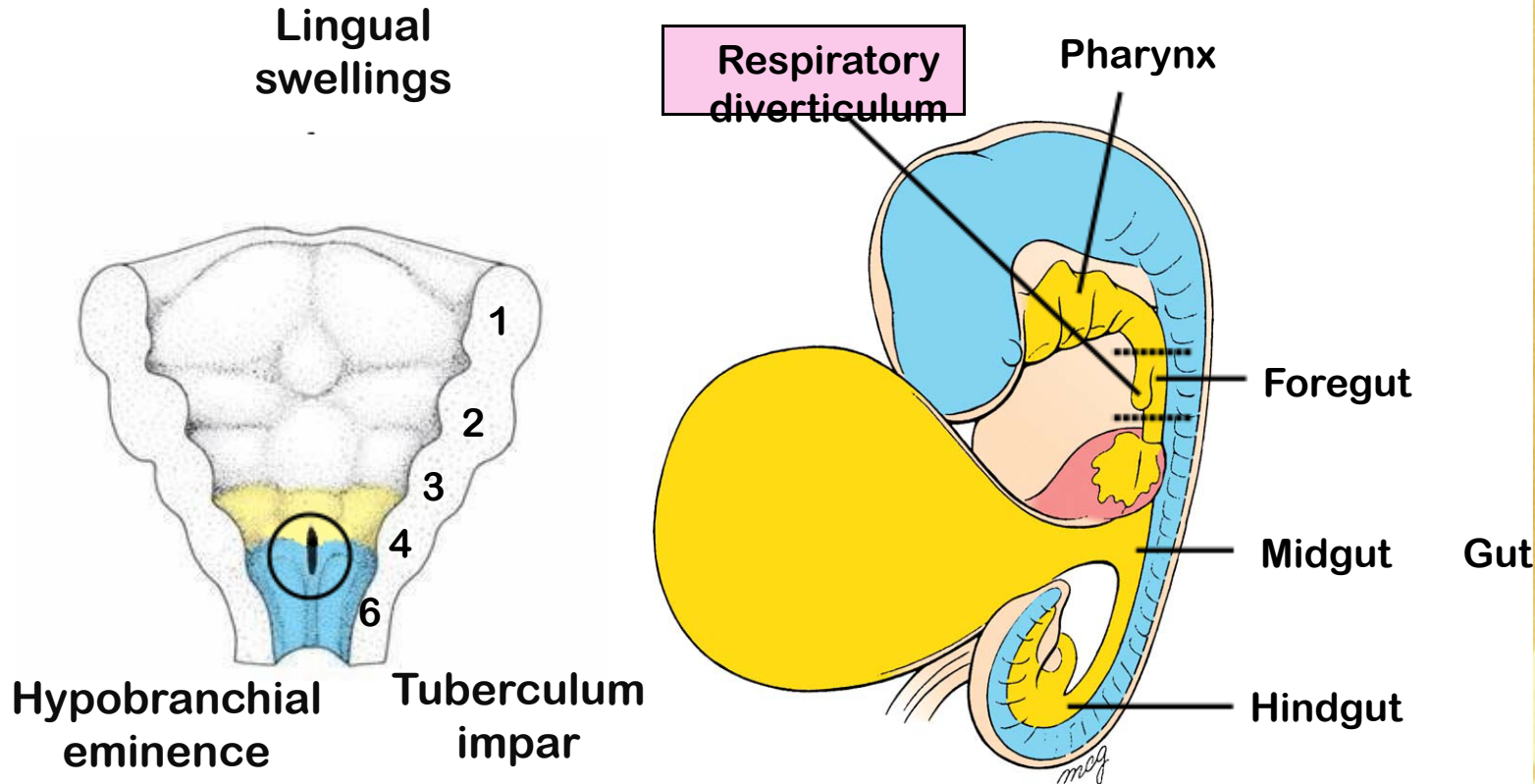




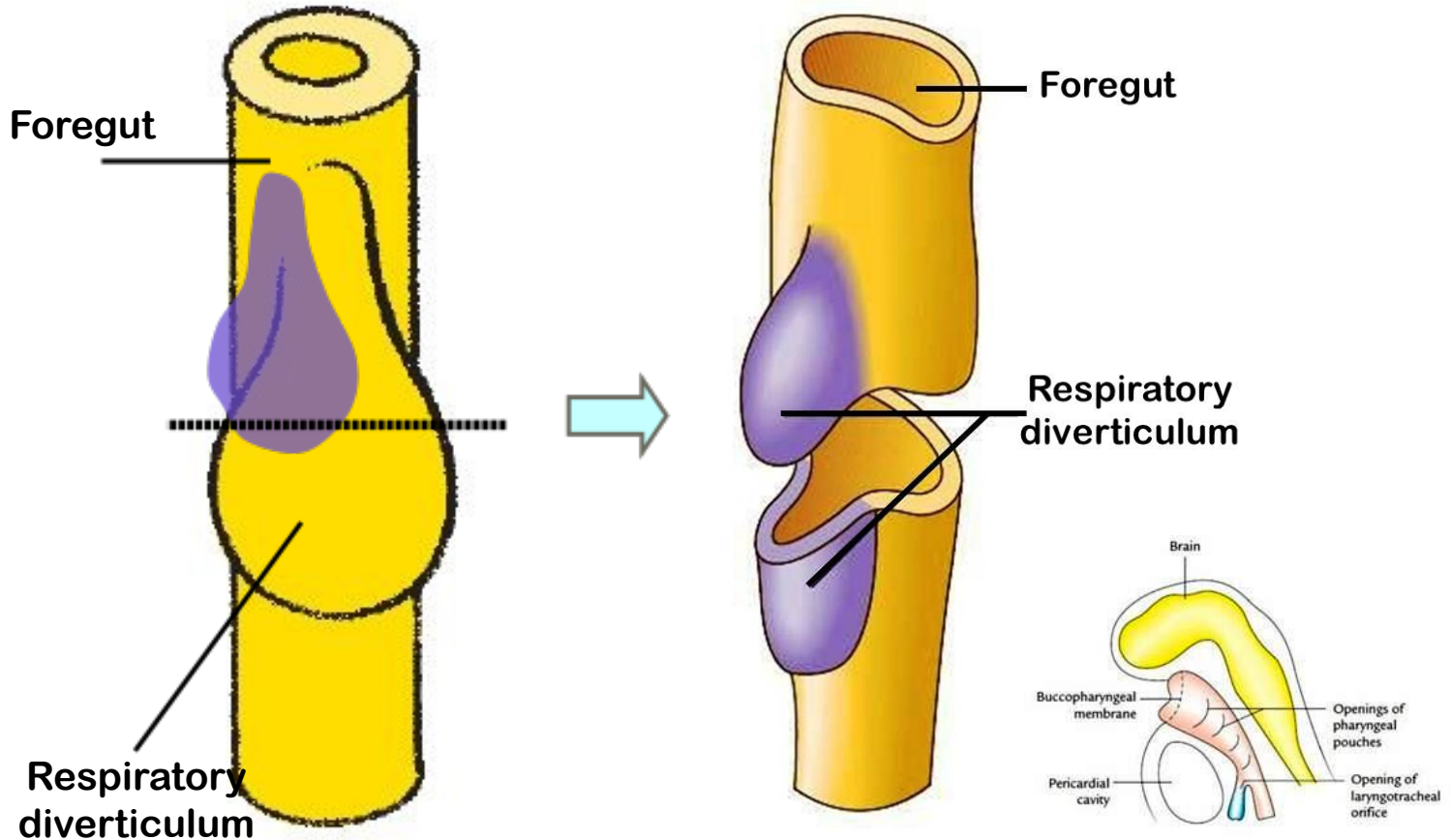
The background is a solid light beige color. In the center, there are several concentric circles in a slightly darker shade of beige. In the top-left and bottom-right corners, there are stylized floral motifs with multiple pointed petals.

Development of respiratory system

Respiratory diverticulum



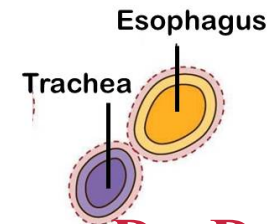
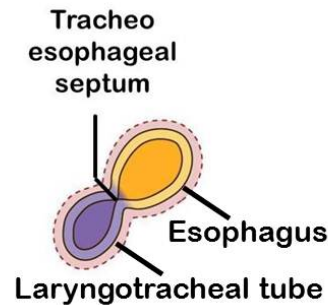
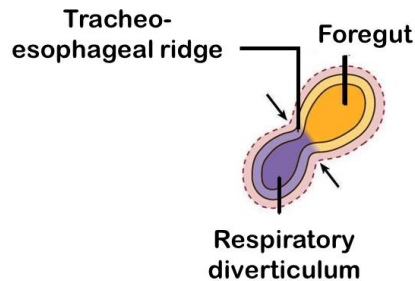
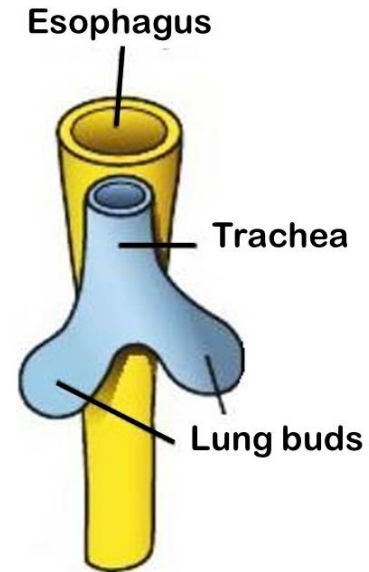
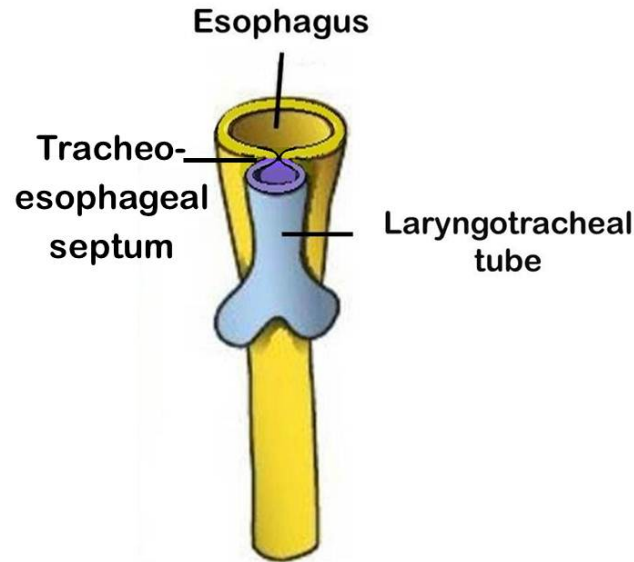
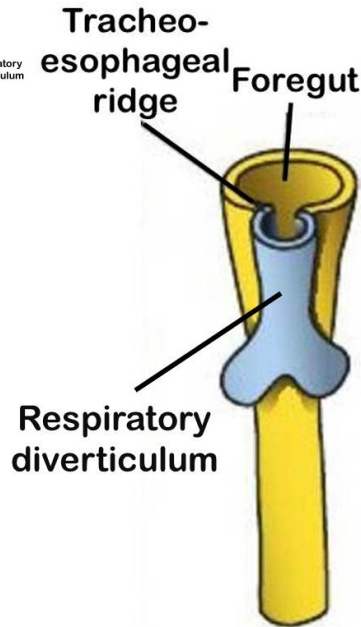
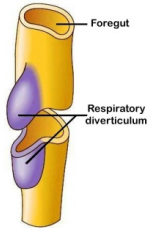
Respiratory diverticulum



Source: Larsen's Human Embryology, 5th edition

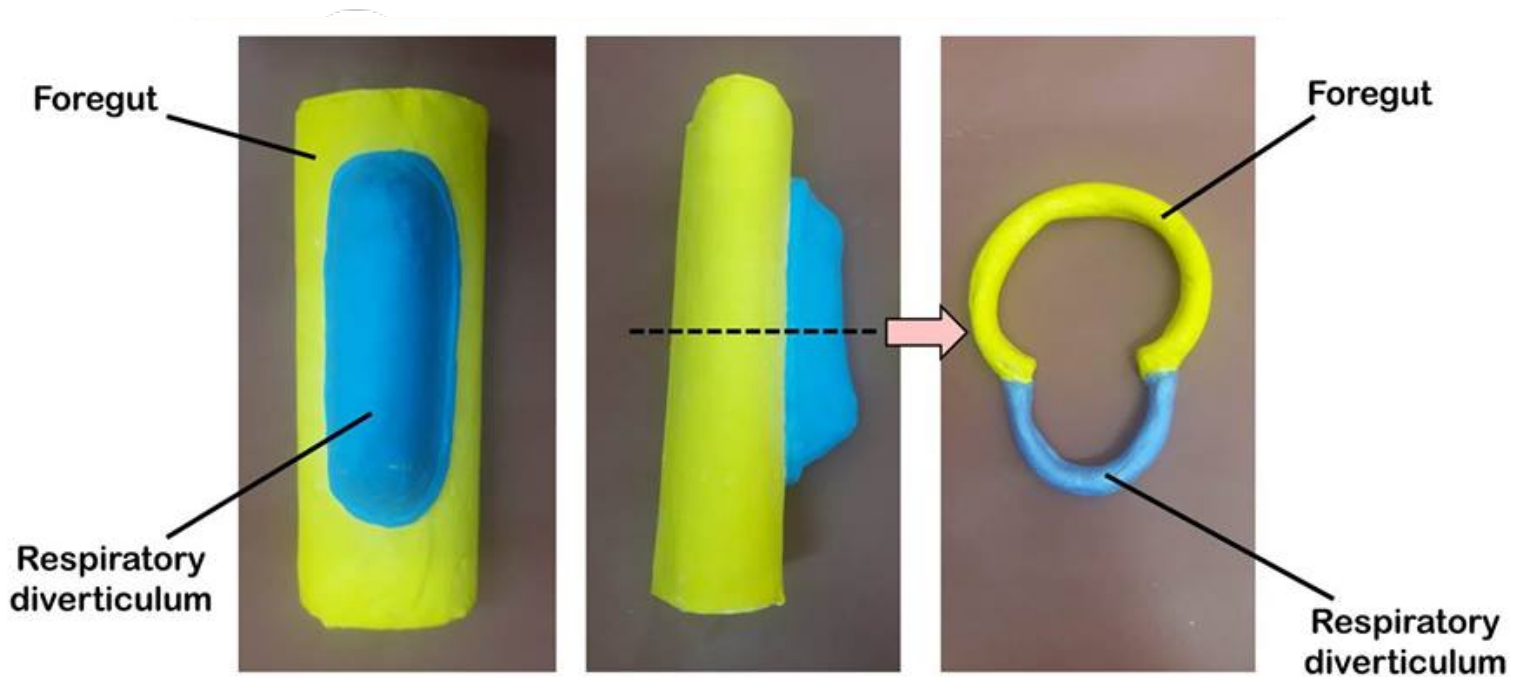
Dr. Doaa

Tracheoesophageal ridges & septum



Dr. Doaa

Tracheoesophageal ridges & septum

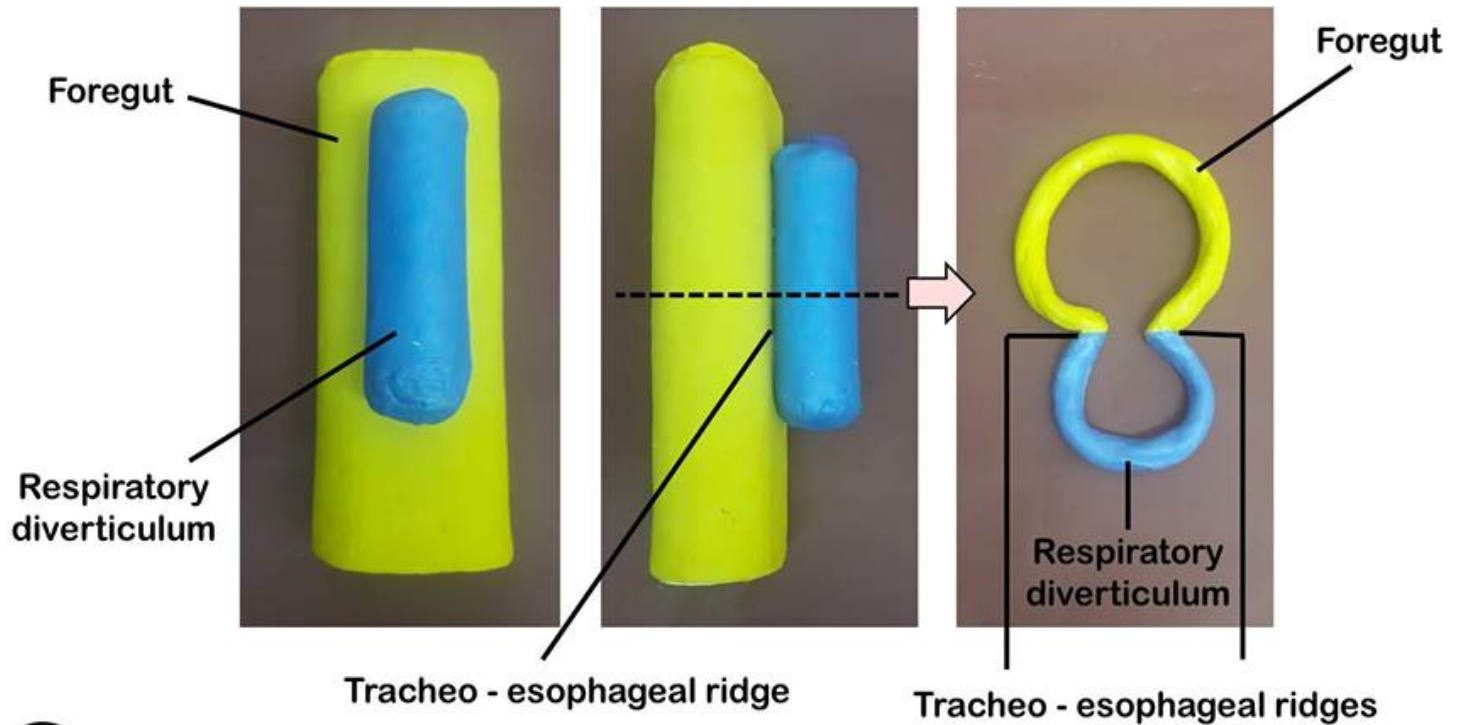


1

Designed by: Dr. Doaa Shuaib

Dr. Doaa

Tracheoesophageal ridges & septum

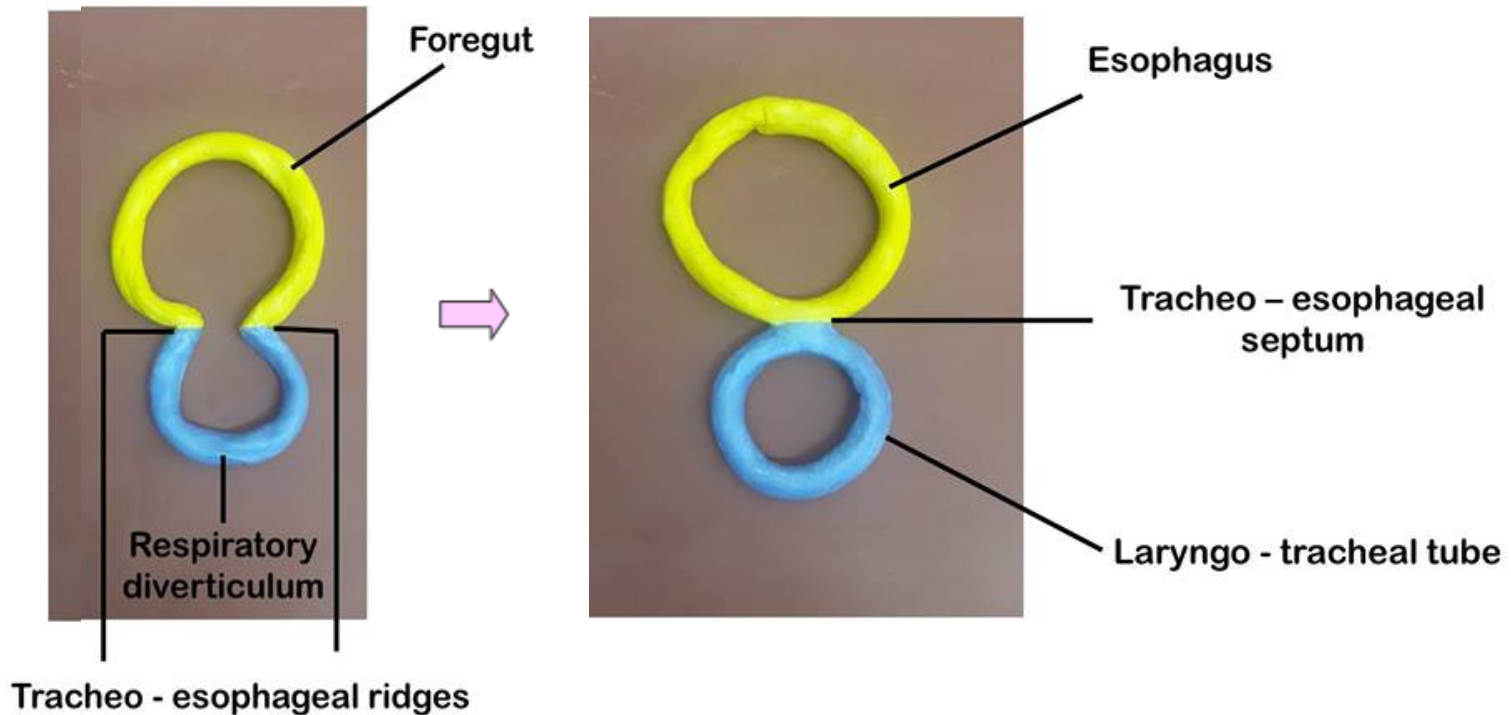


2

Designed by: Dr. Doaa Shuaib

Dr. Doaa

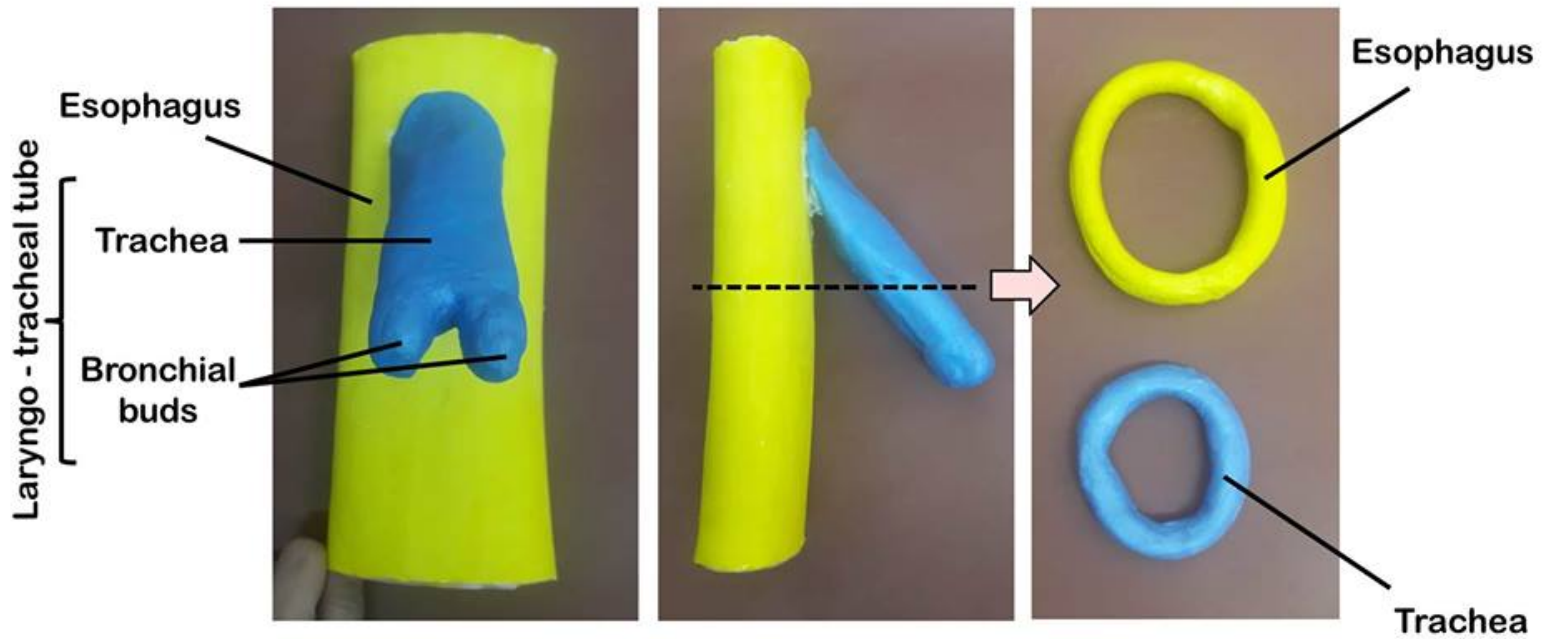
Tracheoesophageal ridges & septum



Designed by: Dr. Doaa Shuaib

Dr. Doaa

Tracheoesophageal ridges & septum



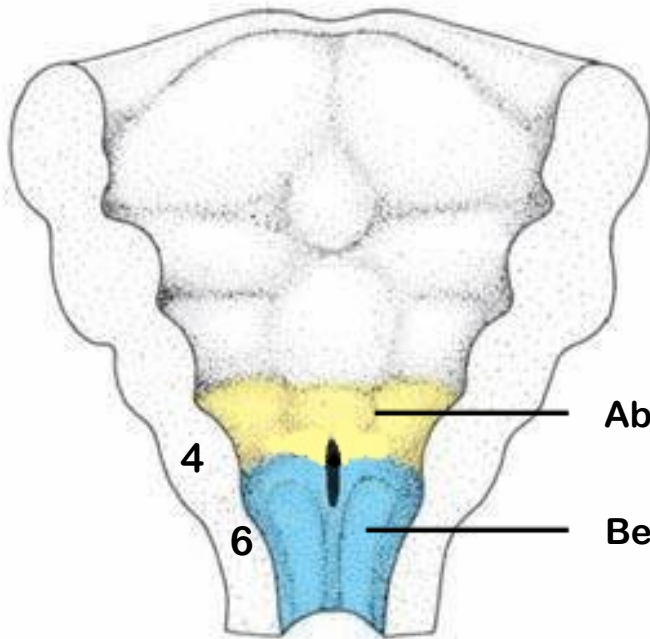
4

Designed by: Dr. Doaa Shuaib

Dr. Doaa

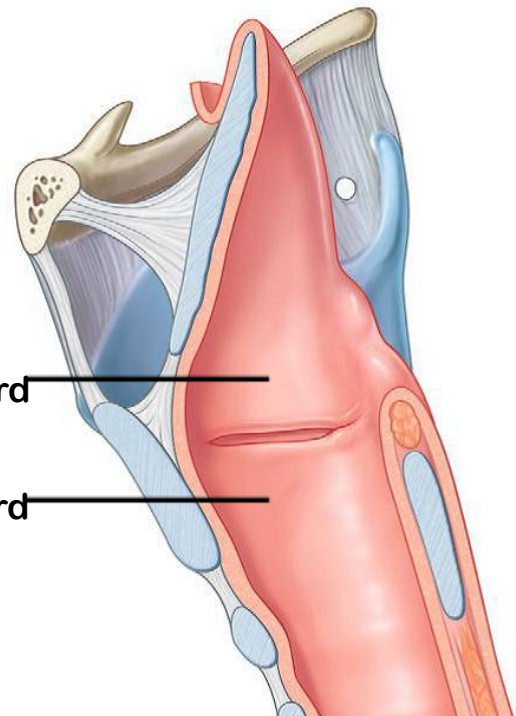
The background is a textured, golden-yellow surface. In the center, there are several concentric, light-colored circles. In the top-left and bottom-right corners, there are stylized, light-yellow floral or leaf-like motifs.

Larynx



Above the vocal cord
(4th arch)

Below the vocal cord
(6th arch)



Source: Langman's Medical Embryology (12th Edition)

Source: Gray's Anatomy for Students

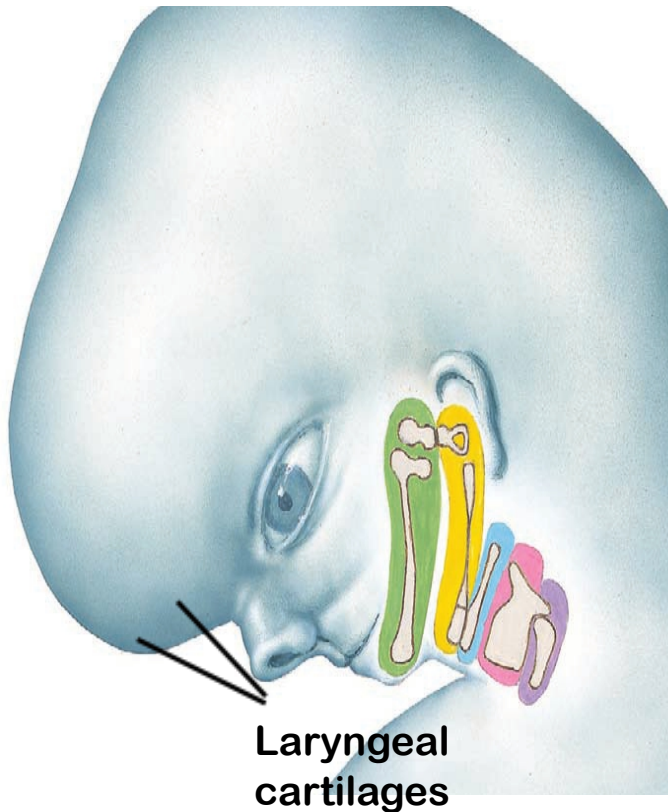
Lining
(endoderm)

Endoderm of the floor of the foregut

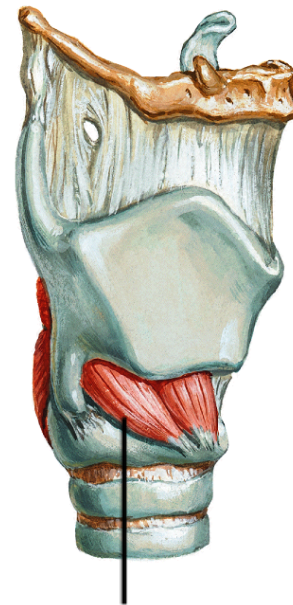
4th arch (ILN) => mucosa above the vocal cord

6th arch (RLN) => mucosa below the vocal cord

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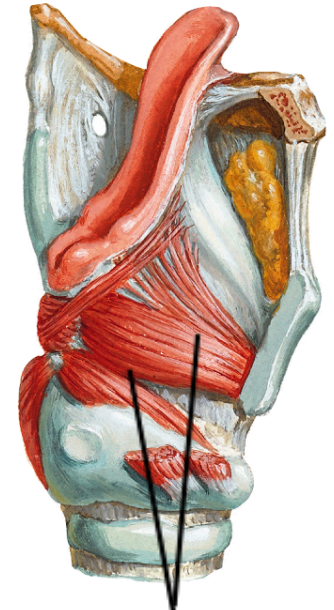


Source: Netter's Atlas of Human Embryology, Larry R Cochard



Cricothyroid
(4th arch)

Source: Netter atlas of Anatomy



Intrinsic muscles of
larynx (6th arch)

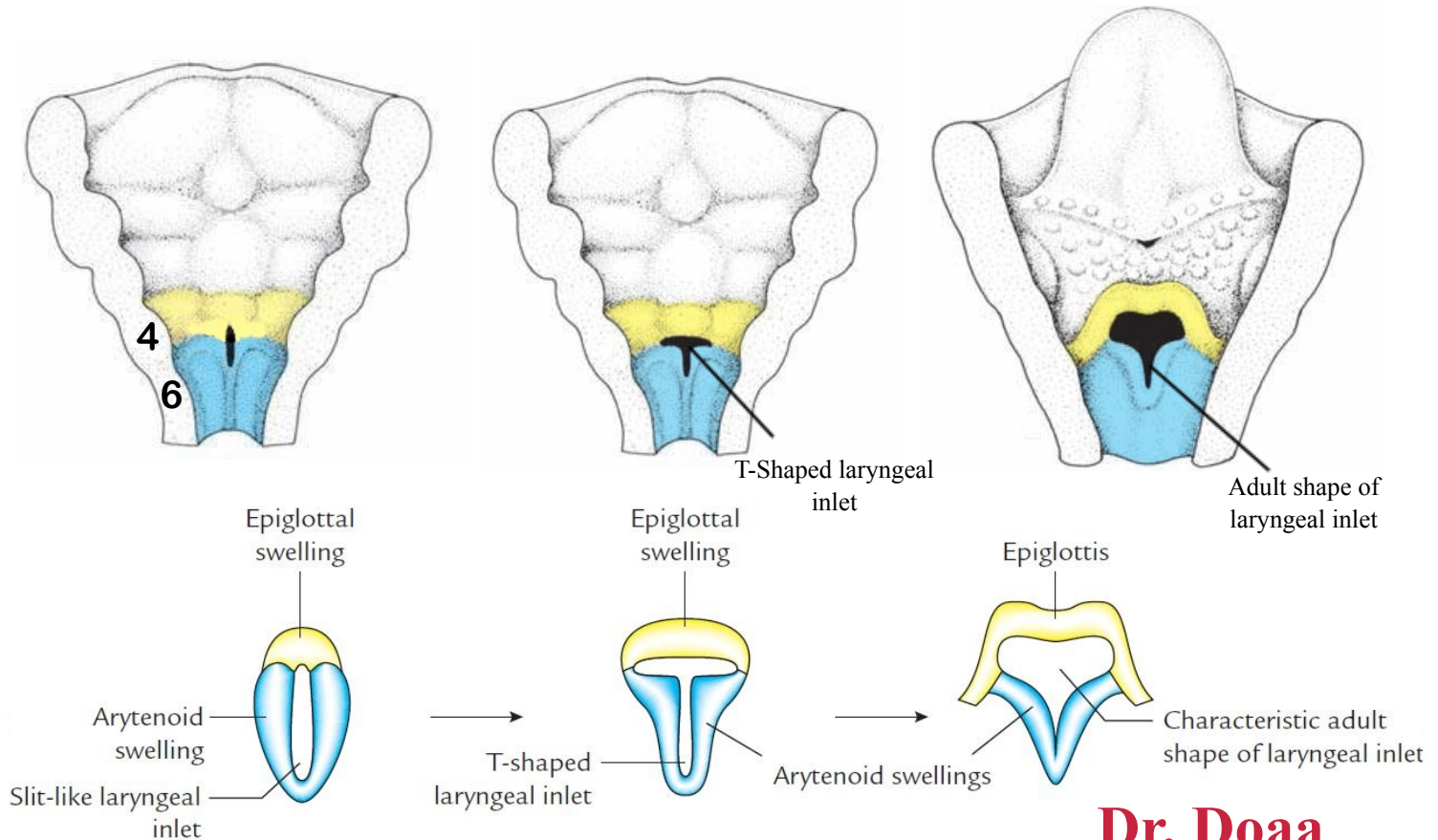
Cartilages (Mesenchyme)

Upper ½ of thyroid cartilage => 4th arch
Lower ½ of thyroid cartilage + rest of laryngeal cartilages => 6th arch

Muscles (Mesenchyme)

Cricothyroid => 4th arch (ELN)
Intrinsic muscles of larynx => 6th arch (RLN)

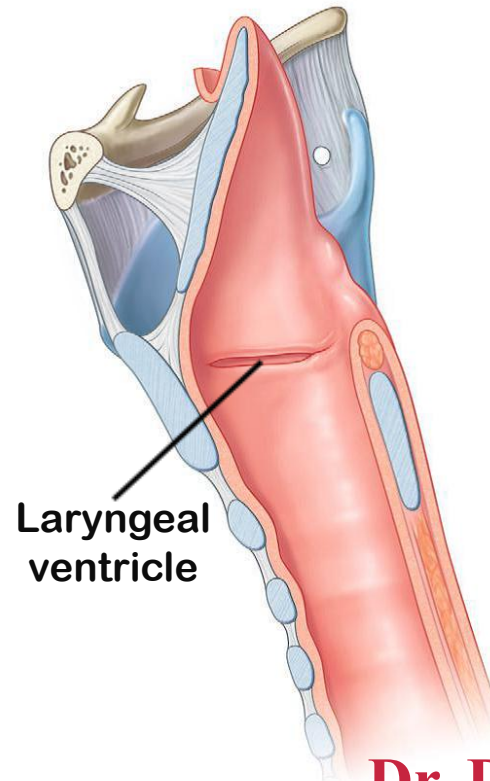
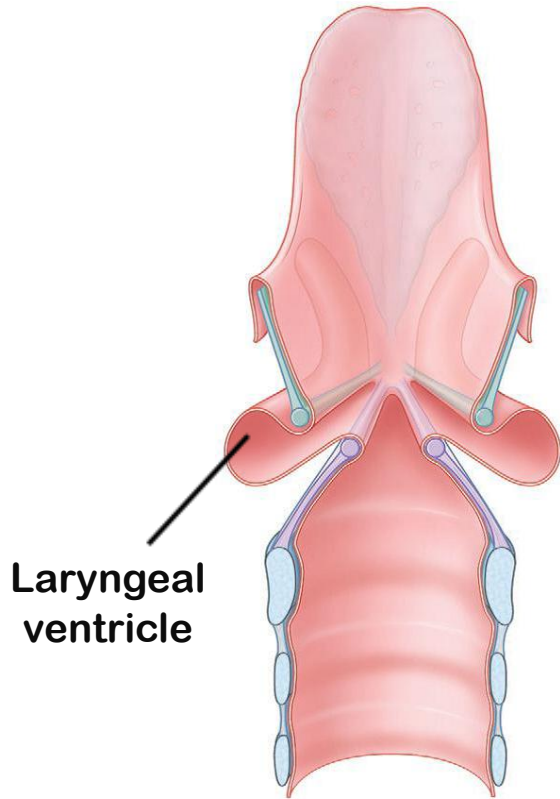
Change in the shape of laryngeal inlet



Dr. Doaa

Because of rapid proliferation of the mesenchyme of the 4th & 6th arches, the laryngeal orifice changes in appearance from a sagittal slit to T shaped opening.

Formation of laryngeal ventricles



Dr. Doaa

Shuaib

The laryngeal epithelium proliferates rapidly, resulting in a temporary occlusion of the lumen.

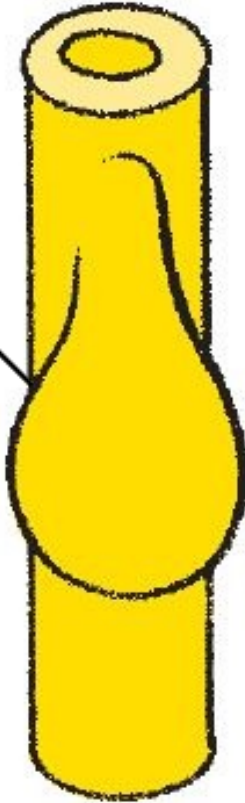
Subsequently, vacuolization and recanalization produce a pair of lateral recesses (laryngeal ventricles)

The background is a textured, golden-yellow color. In the center, there are several concentric, light-colored circles. In the top-left and bottom-right corners, there are stylized, light-yellow floral or leaf-like motifs.

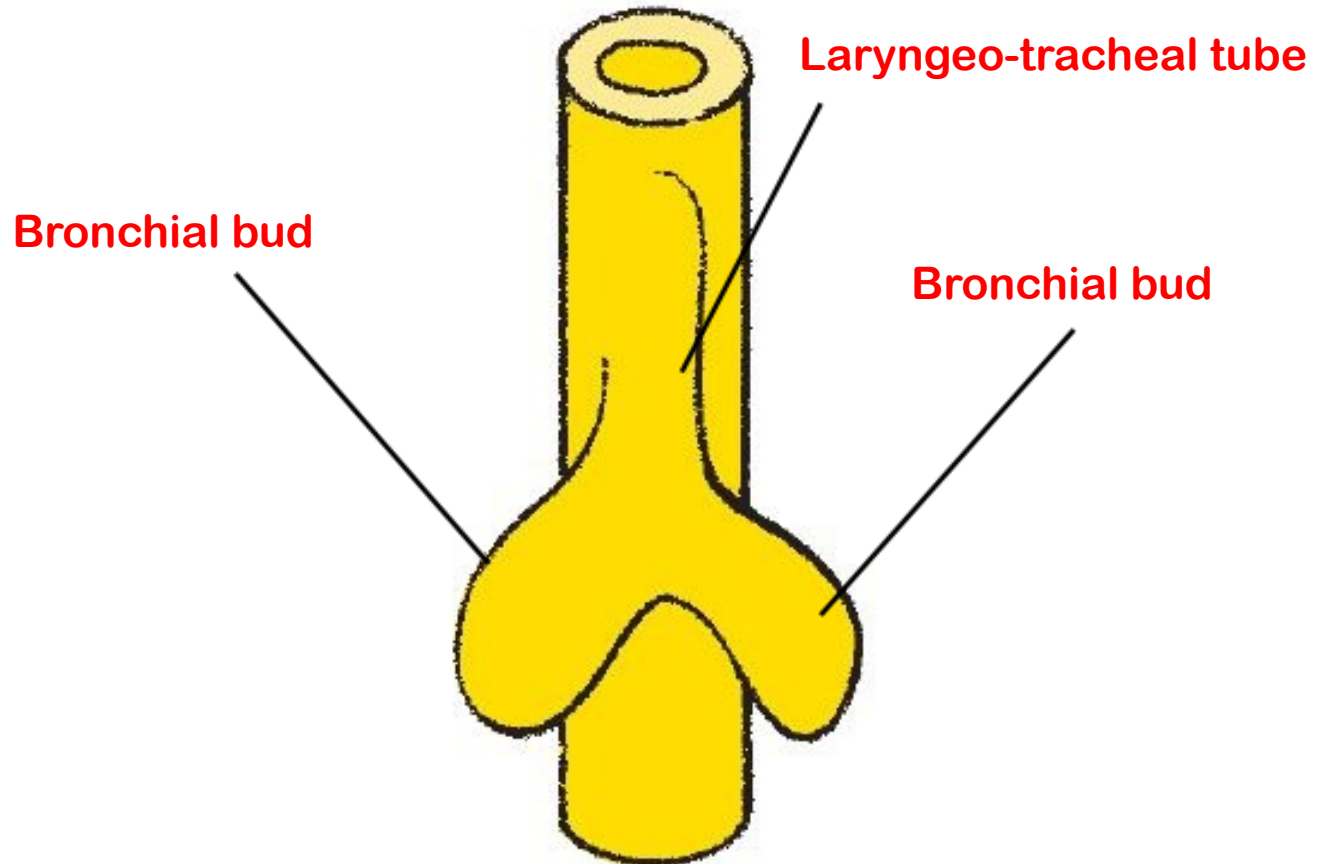
Bronchial tree

Bronchial tree

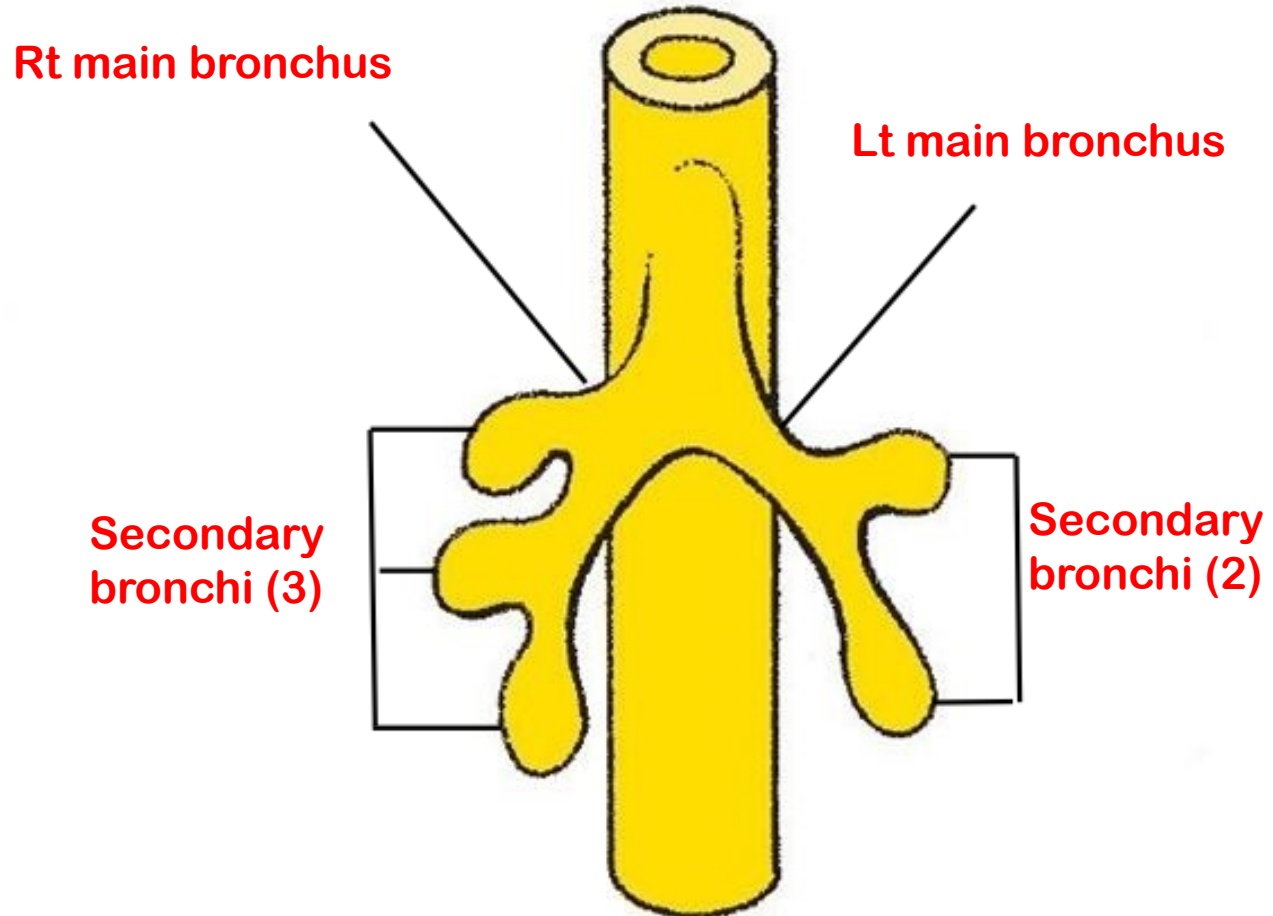
Respiratory
diverticulum



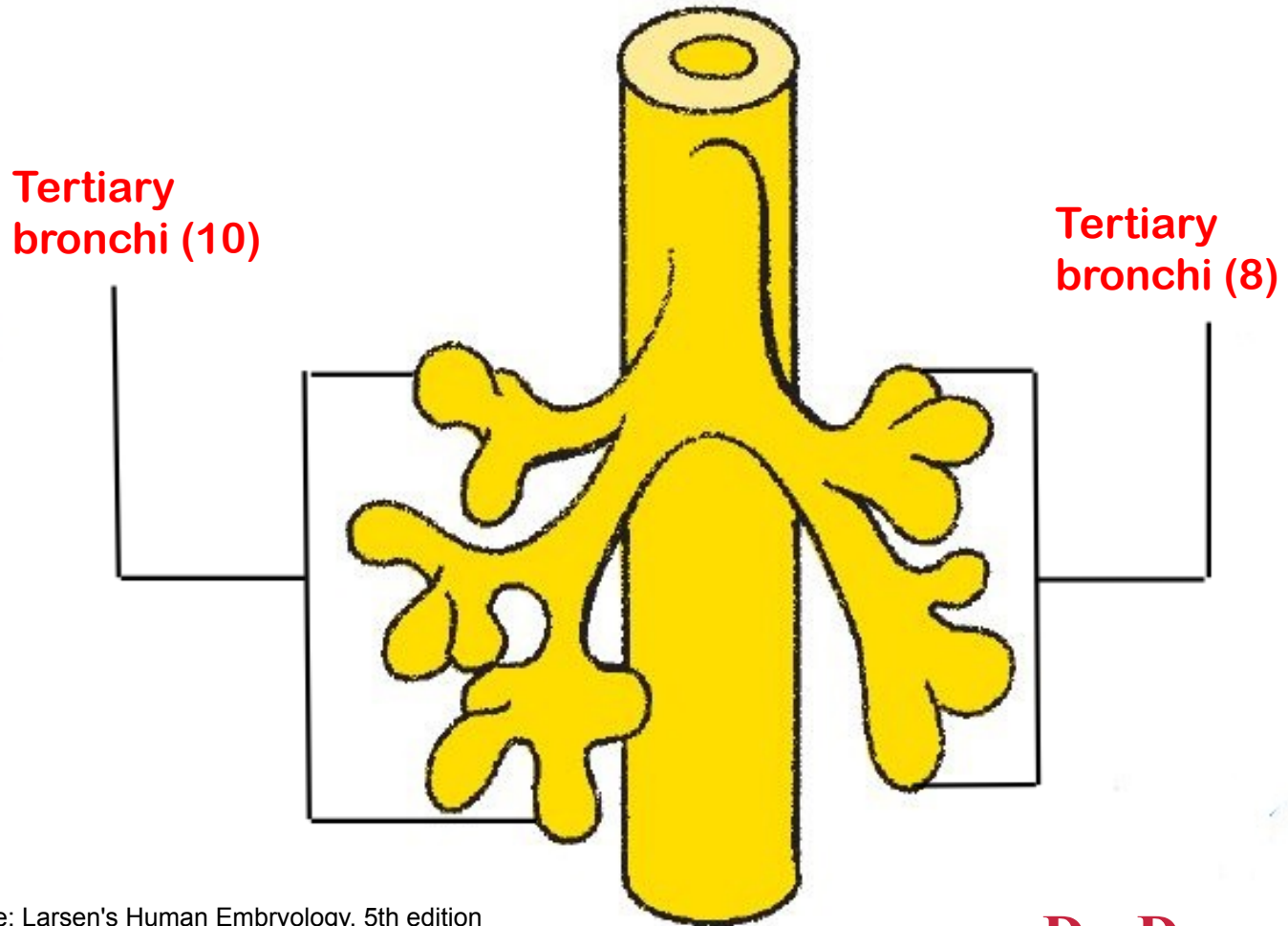
Bronchial tree



Bronchial tree

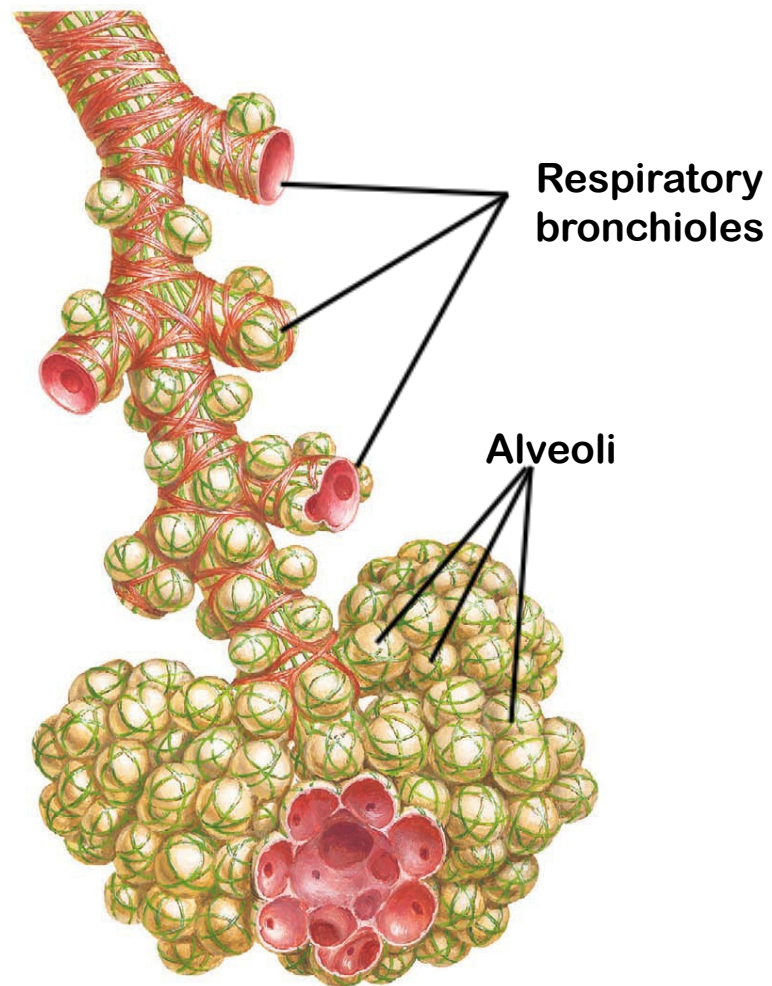
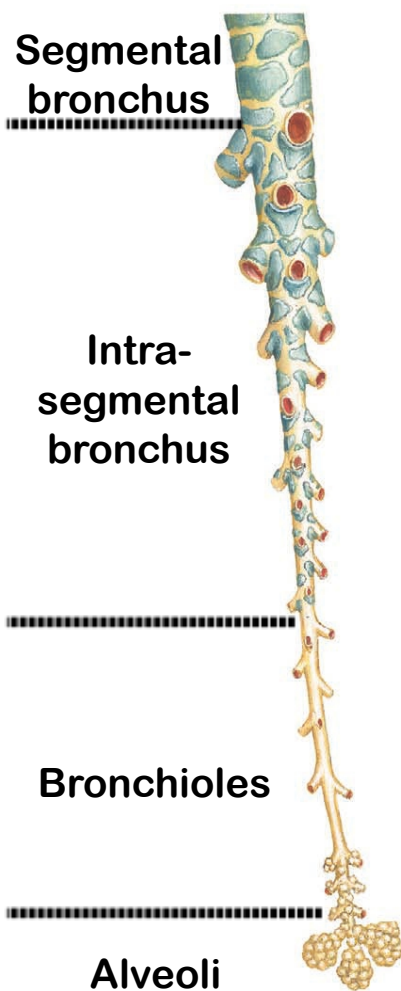


Bronchial tree



Source: Larsen's Human Embryology, 5th edition

Dr. Doaa



Source: Netter's Atlas of Human Embryology, Updated Edition- Larry R Cochard

Dr. Doaa

**17 generations of subdivisions occur before birth
6 more generations are formed after birth.**

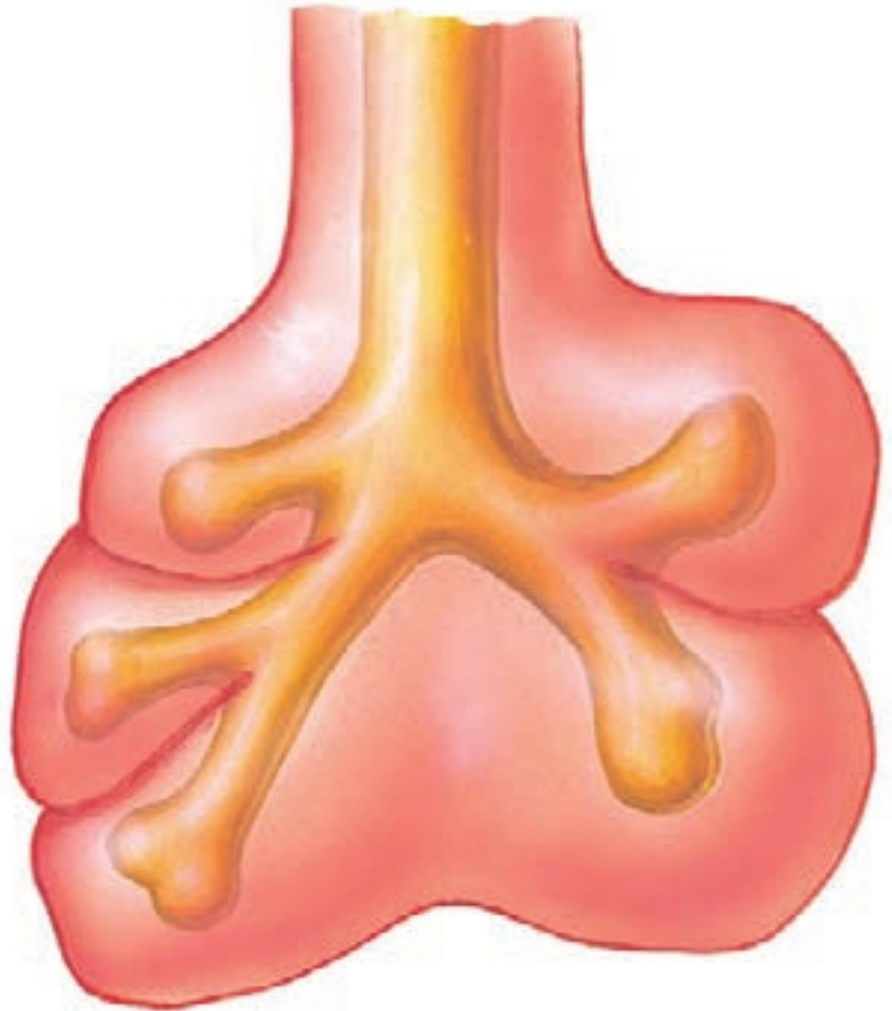
Shuaib



Other coats of the respiratory system

Splanchnic mesoderm

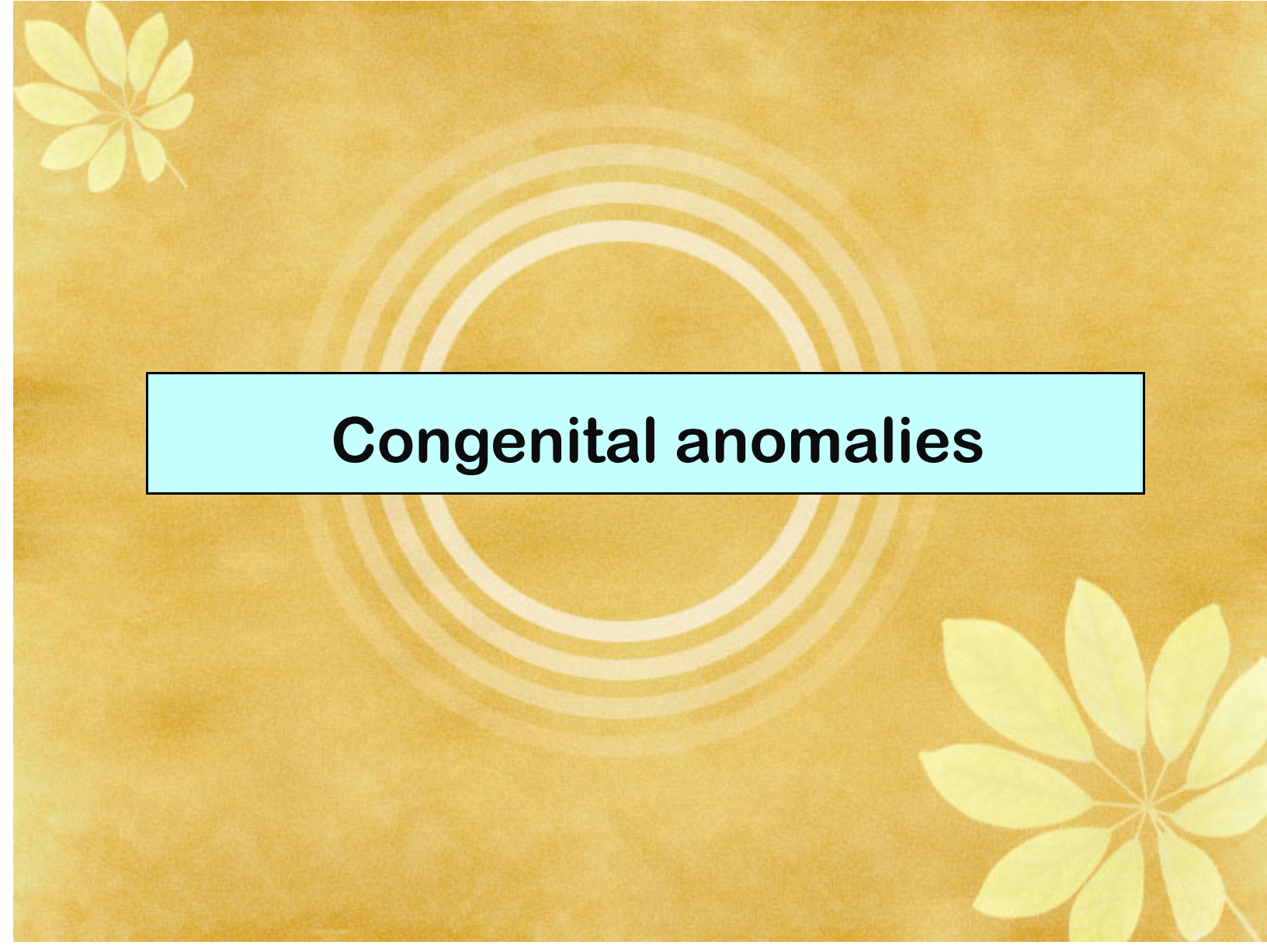
- Muscles
- Cartilages
- CT
- vessels



Dr. Doaa

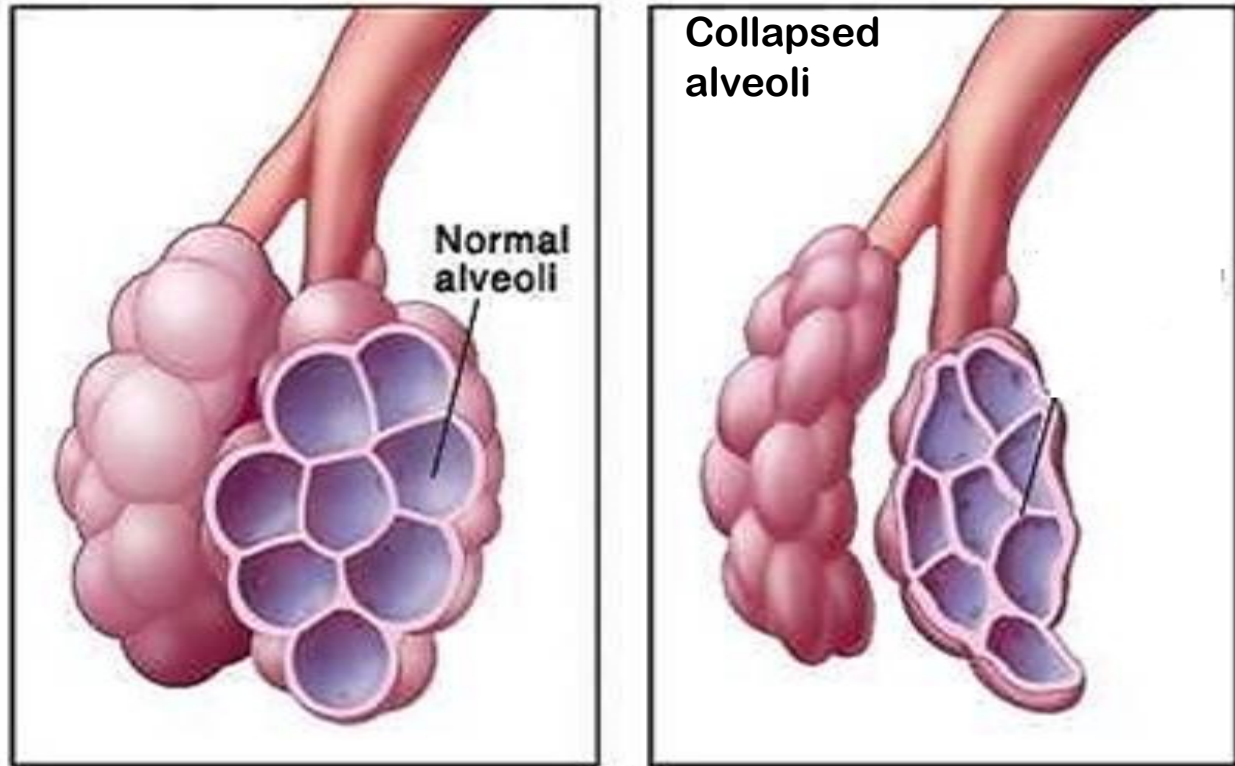
Source: Netter's Atlas of Human Embryology, Updated Edition- Larry R Cochard

Formation of the Trachea, Bronchi and Lungs

The background is a textured, warm-toned surface. In the center, there are several concentric, light-colored circles. In the top-left and bottom-right corners, there are stylized, light-colored floral or leaf-like motifs.

Congenital anomalies

1. Respiratory distress syndrome

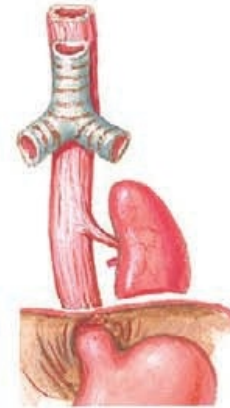
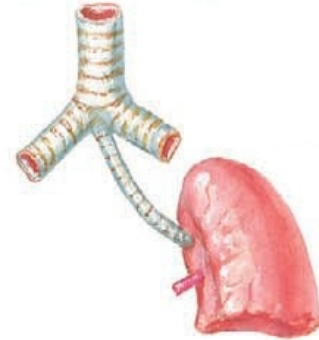
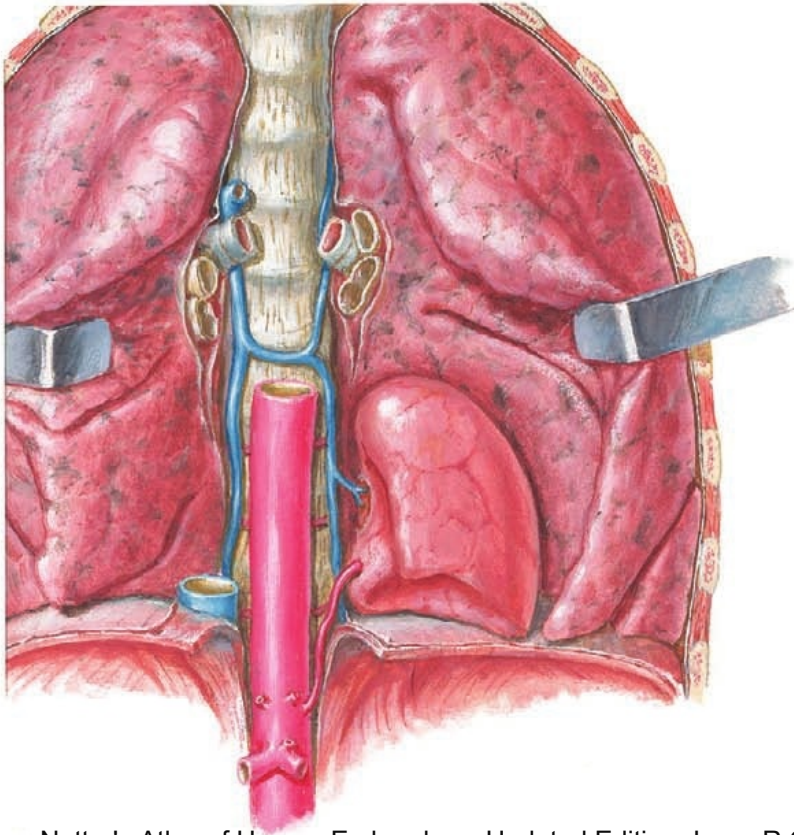


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Failure of the alveoli to ventilate due to absence of the surfactant

2. Ectopic lung lobes



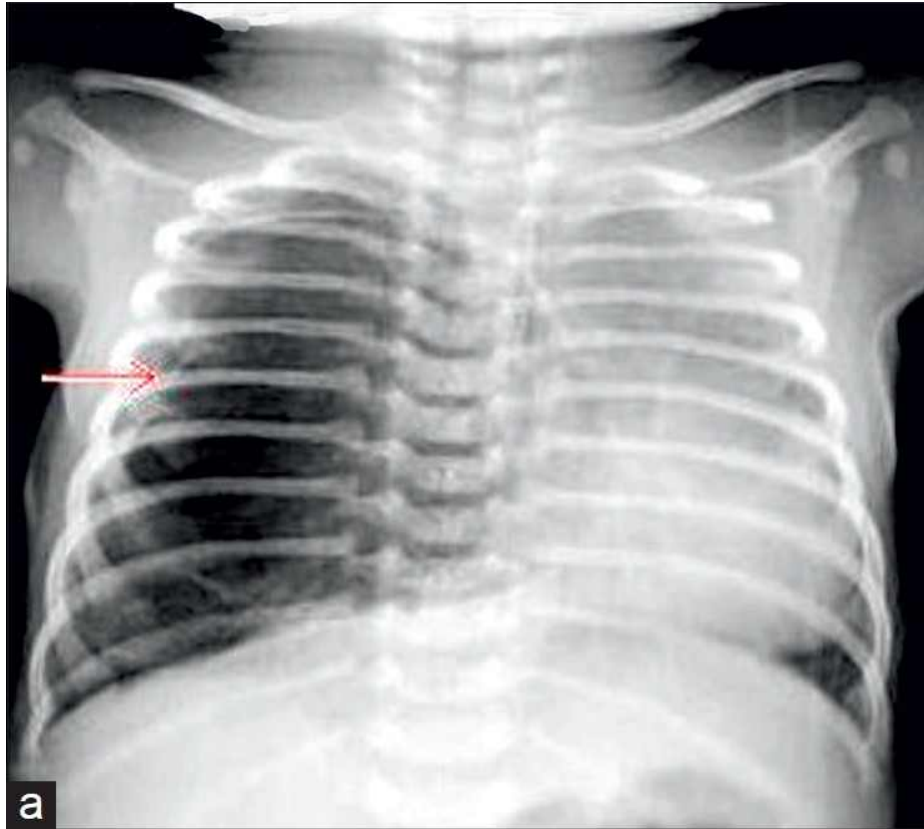
Source: Netter's Atlas of Human Embryology, Updated Edition- Larry R Cochard

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Arising from the trachea or esophagus

3. Congenital cysts of the lung

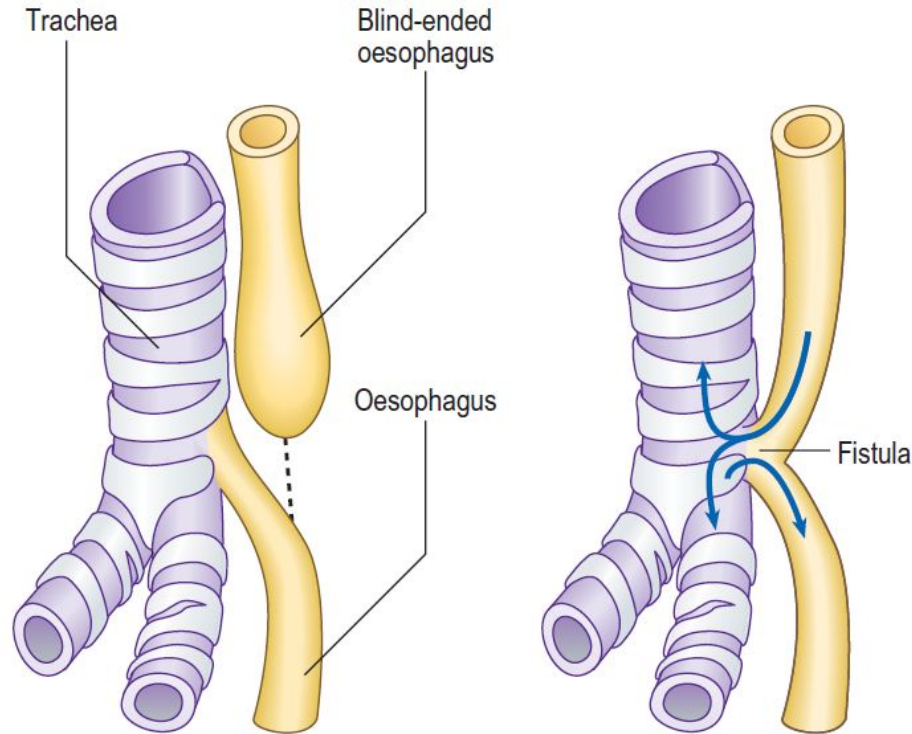


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Dilation of terminal or larger bronchi.

4. Esophageal atresia with or without tracheo-esophageal fistula



Source: Langman's Medical Embryology (12th Edition)

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Faulty partitioning of foregut by tracheoesophageal septum

VACTERL association: **V**ertebral defects, **A**nal atresia, **C**ardiac defects, **T**racheo-esophageal fistula, **R**enal anomalies and **L**imb abnormalities

Shuaib



Thank you



