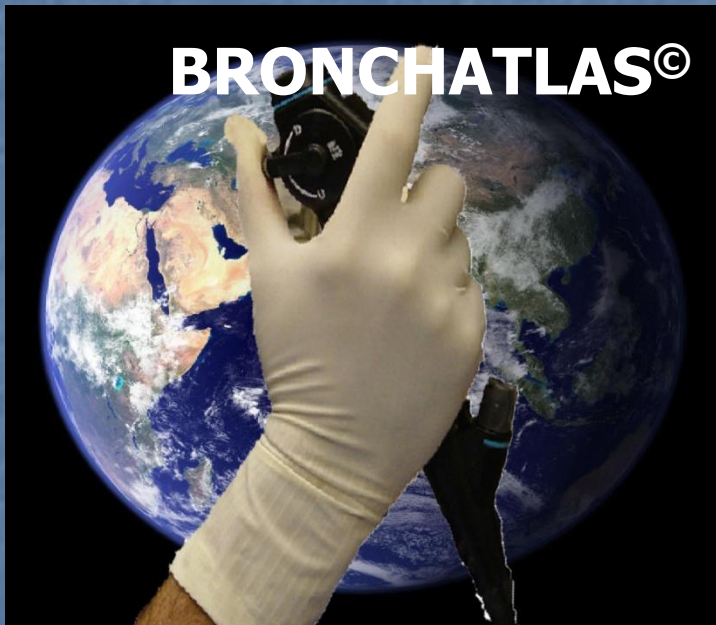


2C: Normal Anatomy of The Bronchial Tree

Series of Web-based Bronchoscopic Images



Prepared By
Bronchoscopy International

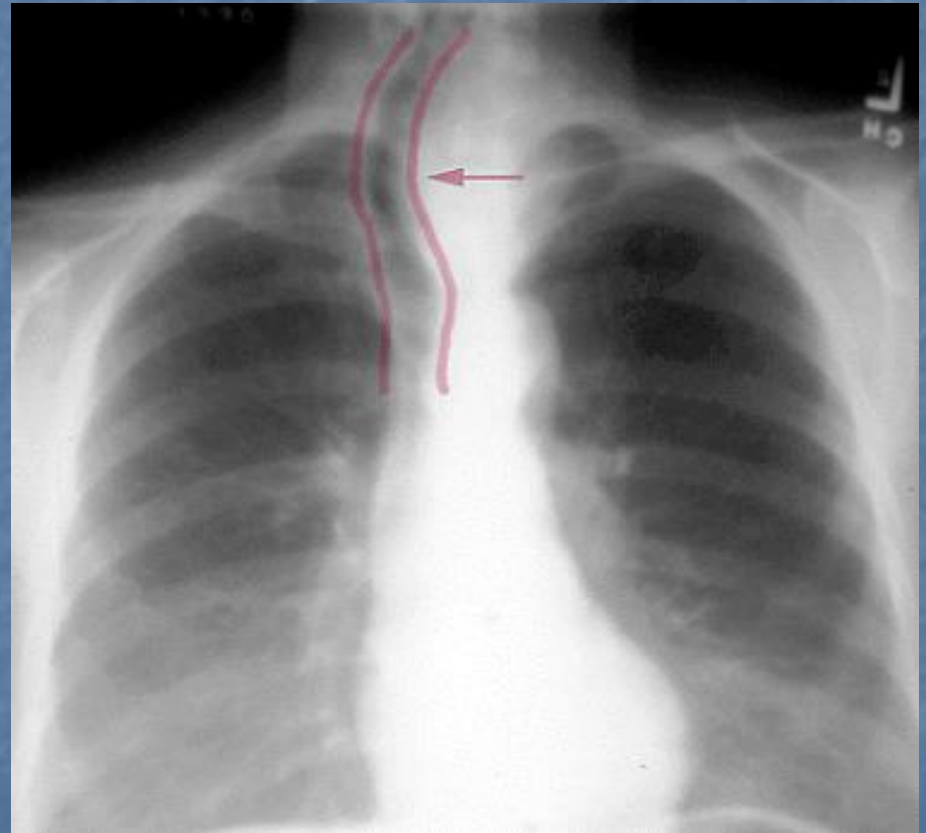
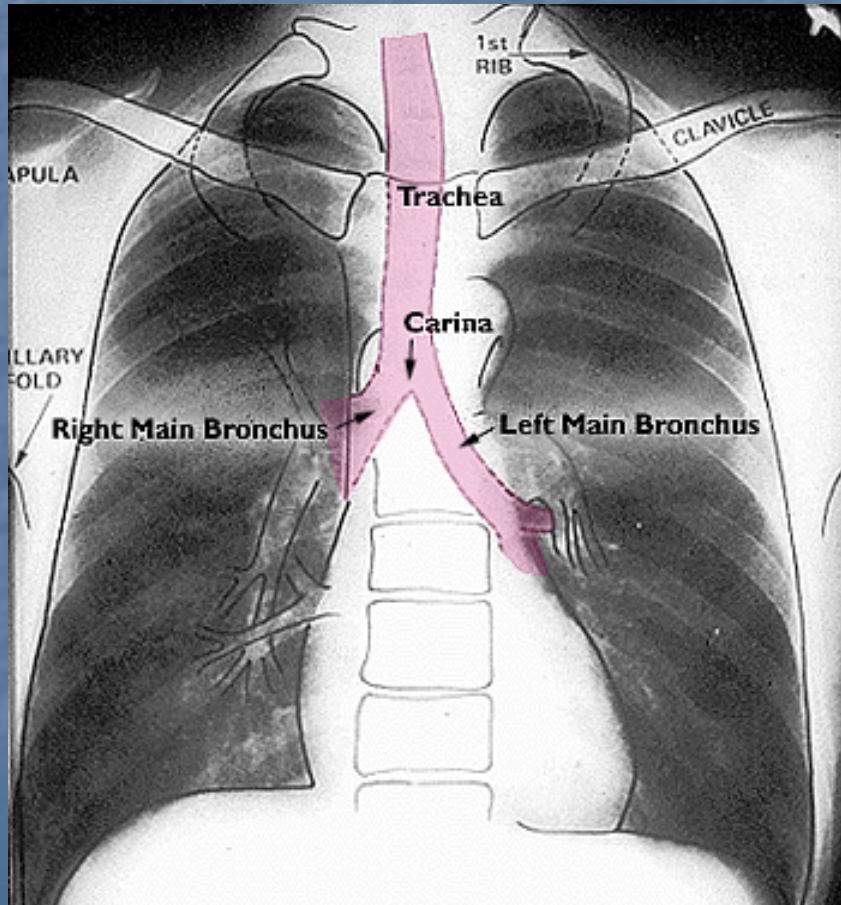
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Tracheobronchial anatomy

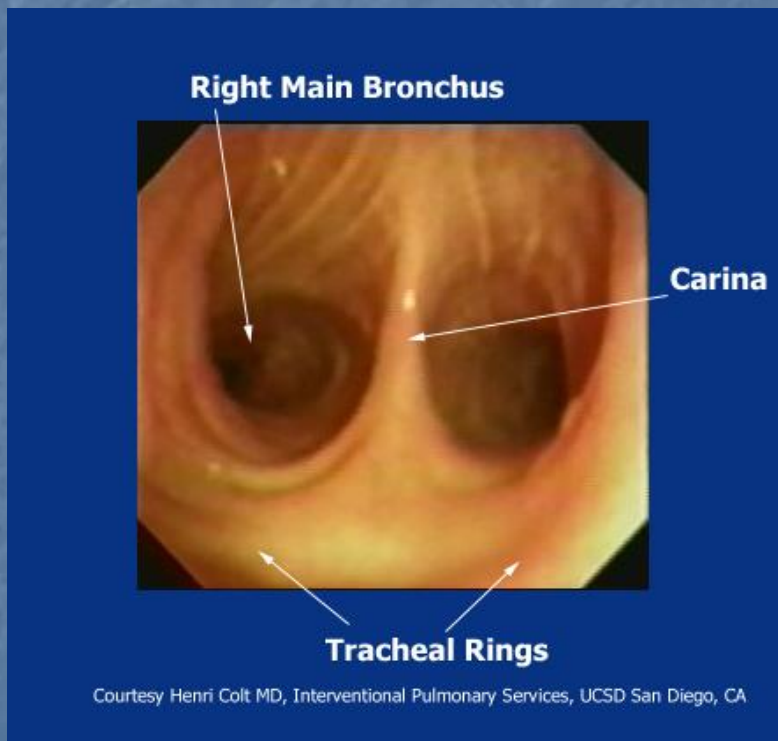
From www.vh.org



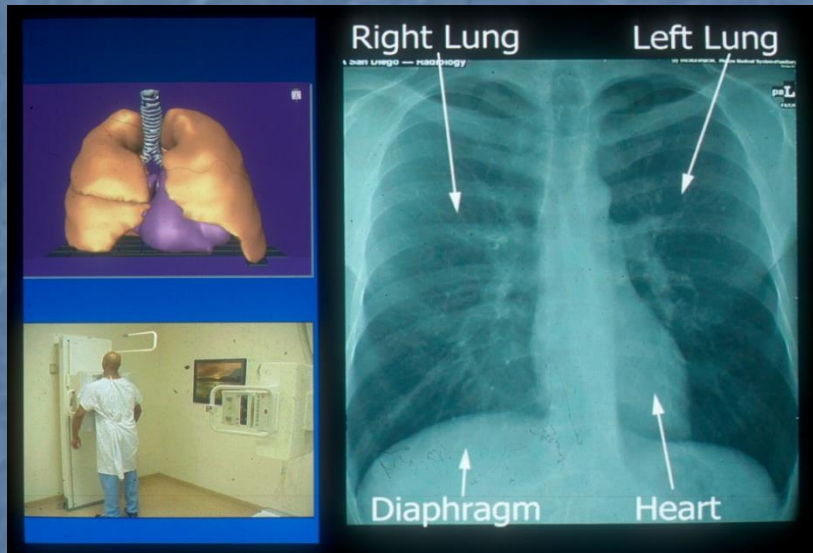
Tracheal Displacement Due to Goiter

Main carina:

Concepts of anterior and posterior



Lobar and segmental anatomy



RUL

RML

RLL

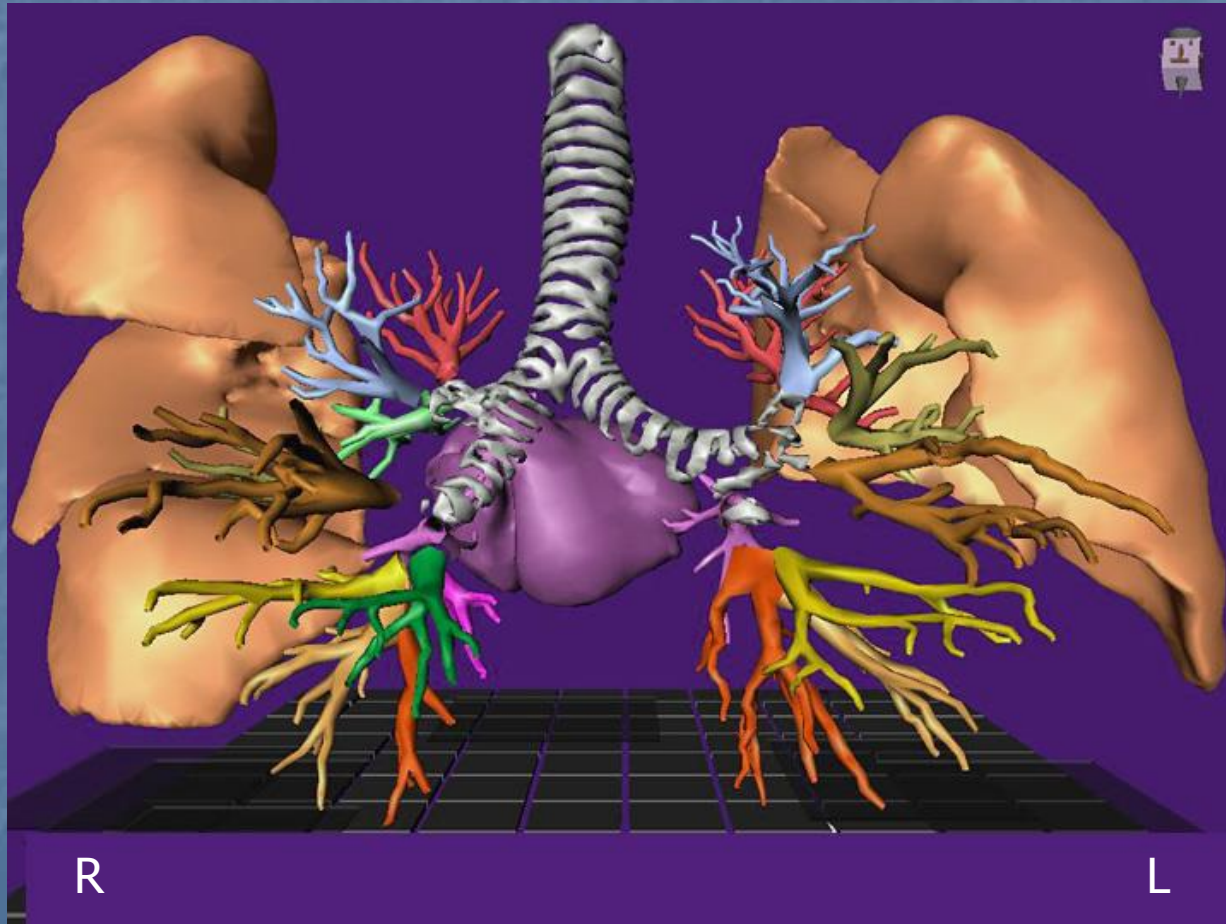
LUL-Lingula

LLL

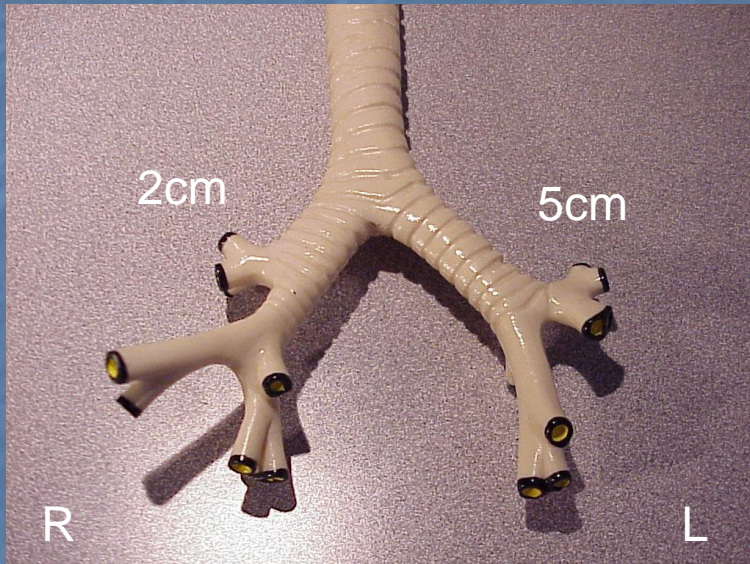
Lobar and segmental anatomy

3 Lobes

2 Lobes



Lobar and segmental anatomy



Inverted Y Simulating Main Carina



Courtesy Henri Colt MD,
Interventional Pulmonary Services, UCSD San Diego, CA

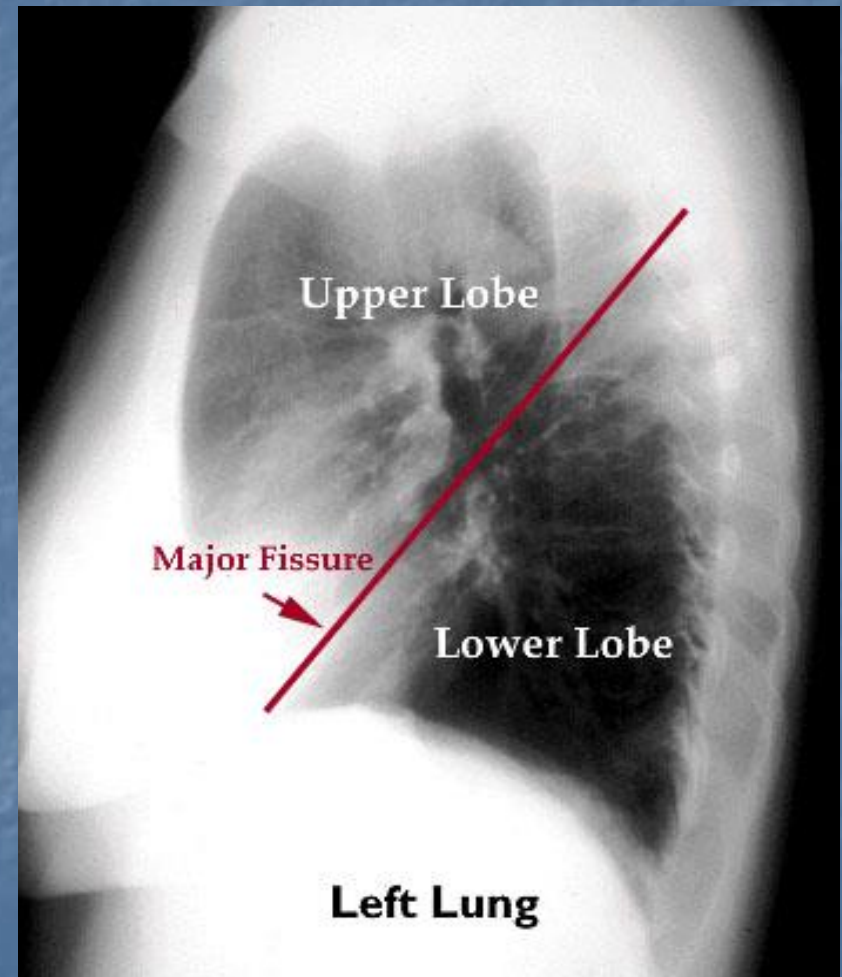
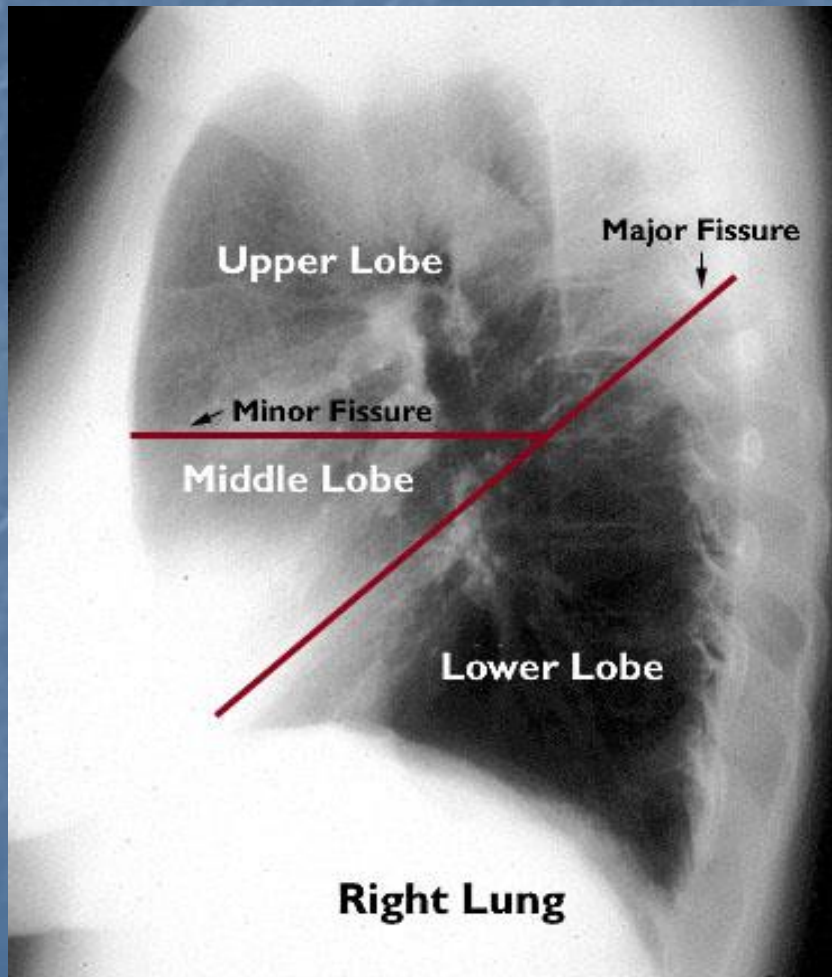


Normal Right Bronchial Tree Cast

Courtesy Joseph Tomashefski MD,
Metro Health Center, Cleveland, OH

Lobar Anatomy : as seen on xray

Modified from : www.vh.org

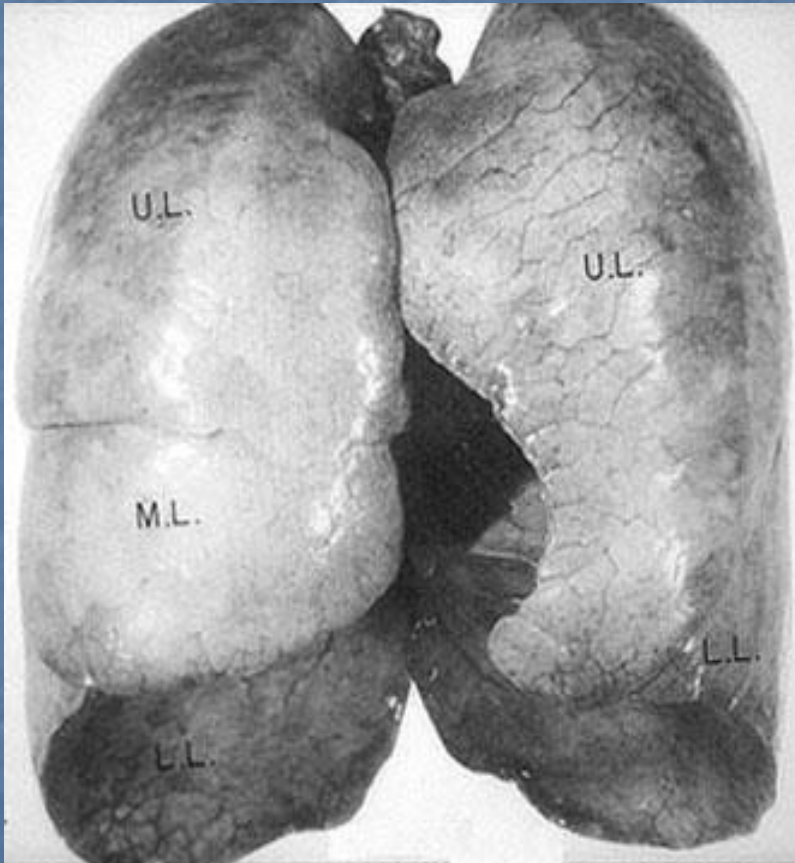


Minor fissure: from R hilum to the 6th rib
11/1/2014

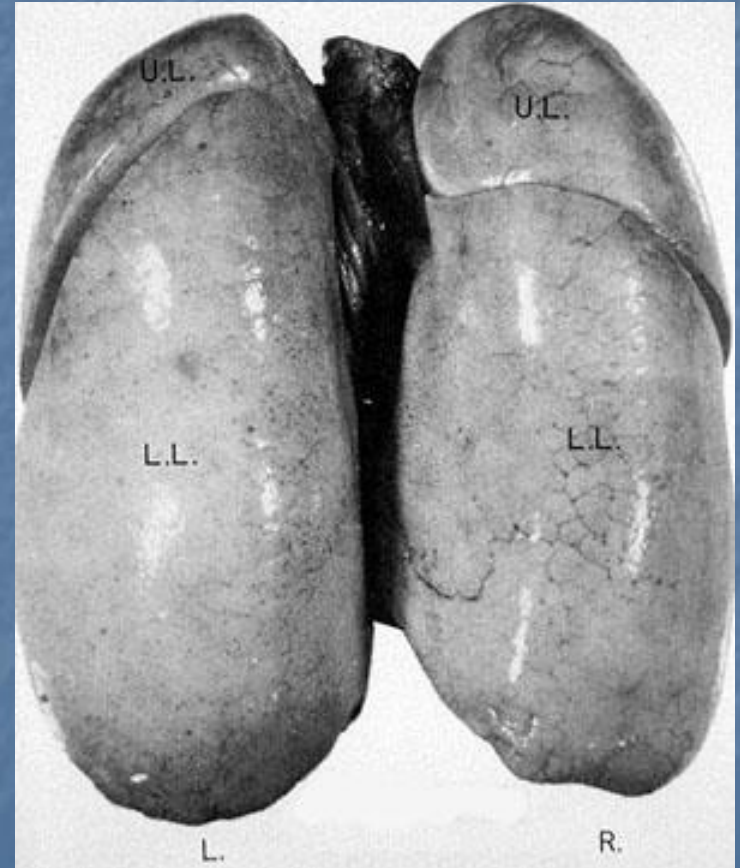
Major fissure: from T4-T5 to the diaphragm
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Lobar Anatomy

Modified from: www.vh.org



Anterior Projection of the Lungs



Posterior Projection of the Lungs

Pathology correlates



Note Vertical RMB

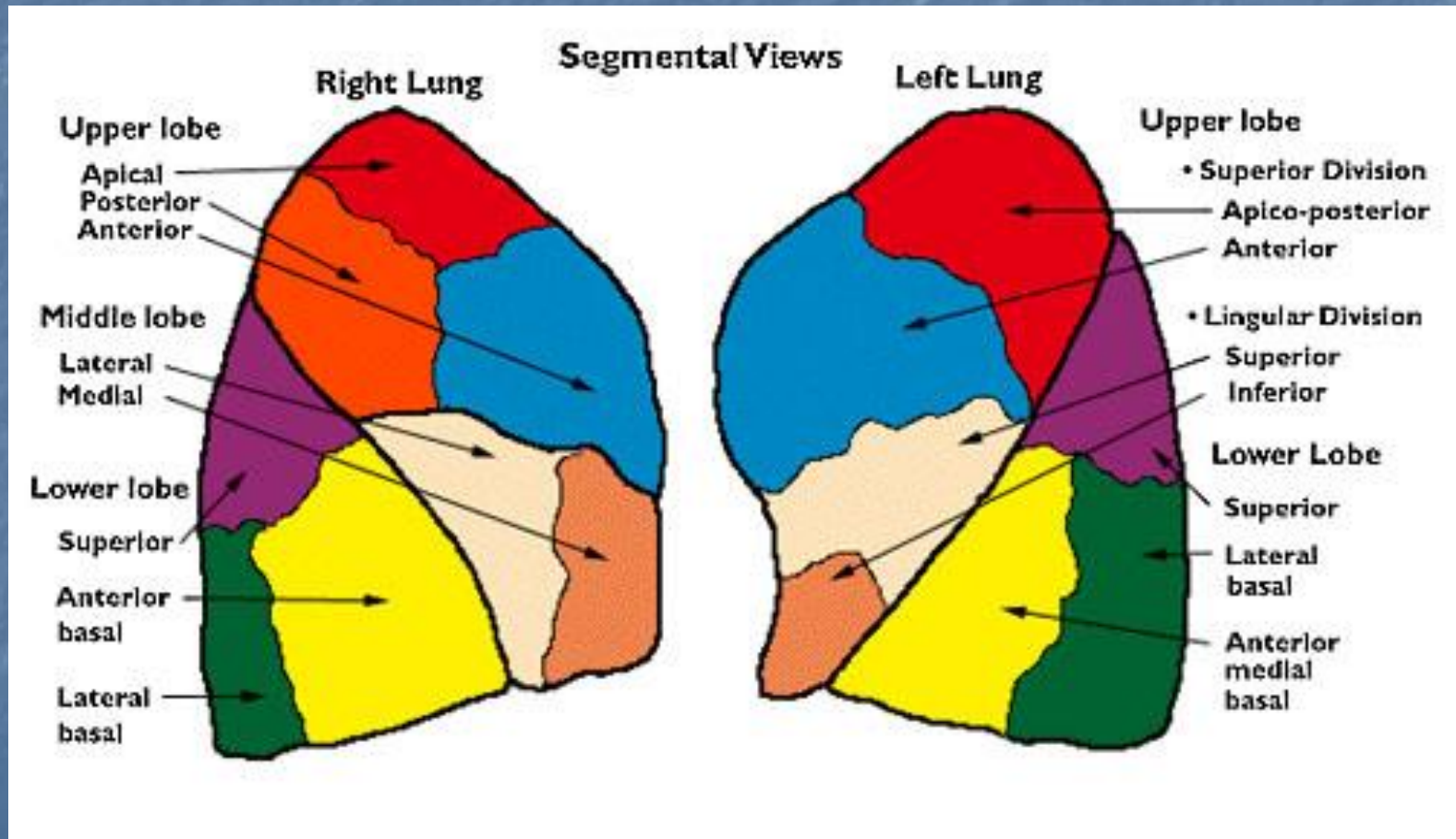
Tumor RLL

Posterior View: Lung Cancer in Right Lower Lobe

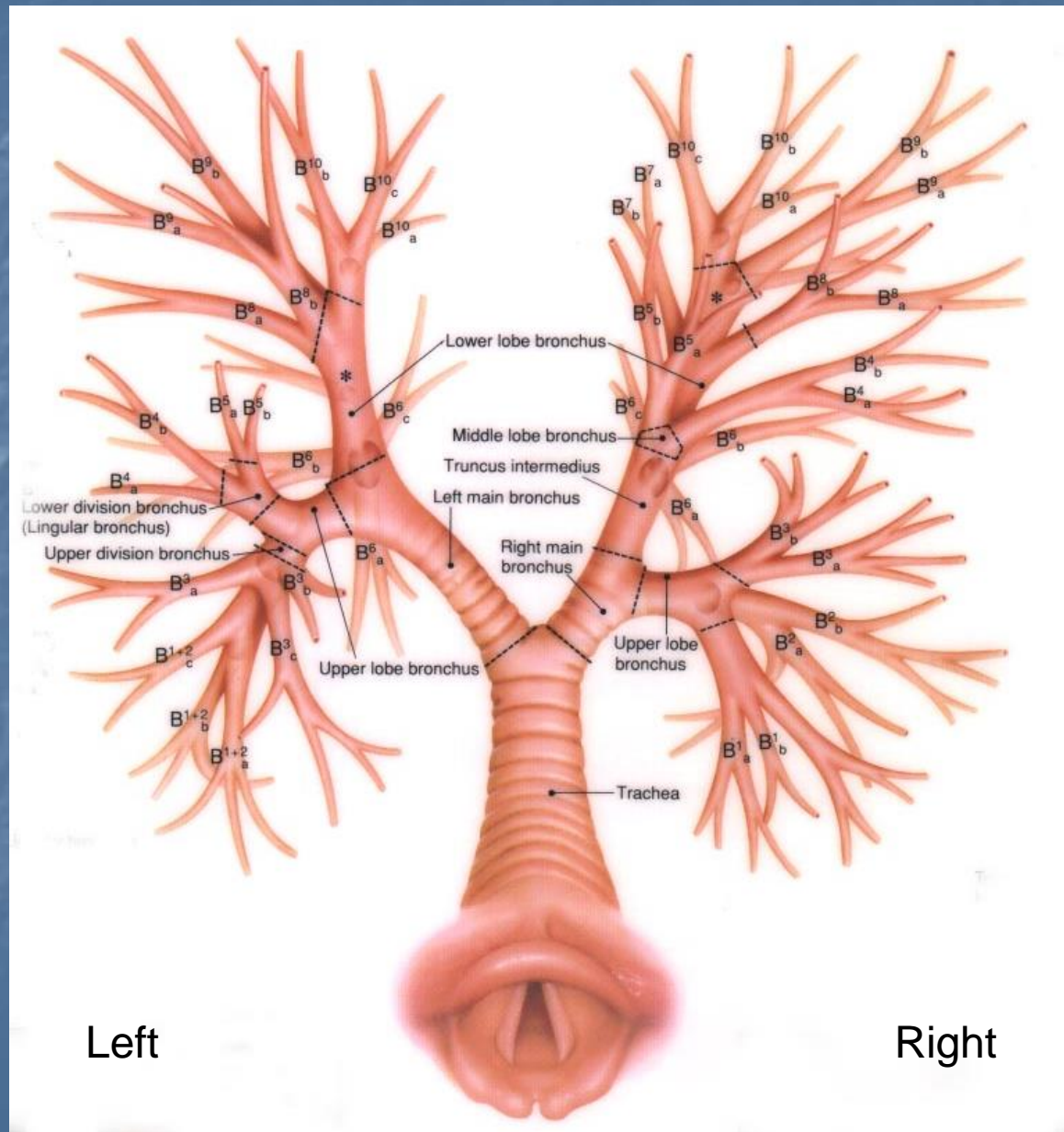
Courtesy Eunhee Yi MD, Curator, Averill A. Liebow
Pulmonary Pathology Collection, San Diego, CA

Segmental anatomy

Excerpted from www.vh.org



Lobar and segmental anatomy



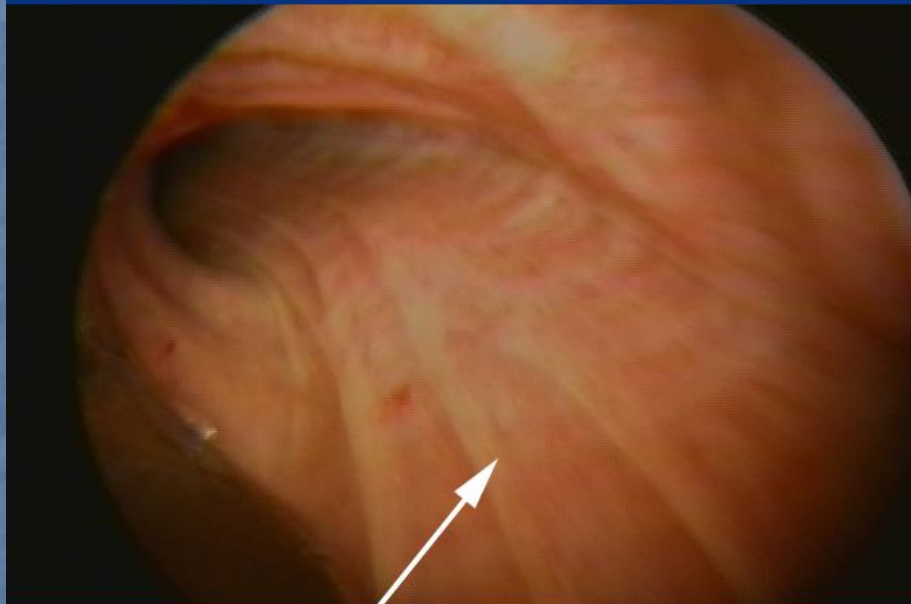
From Oho and
Matsukawa

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Horizontal and vertical main bronchi

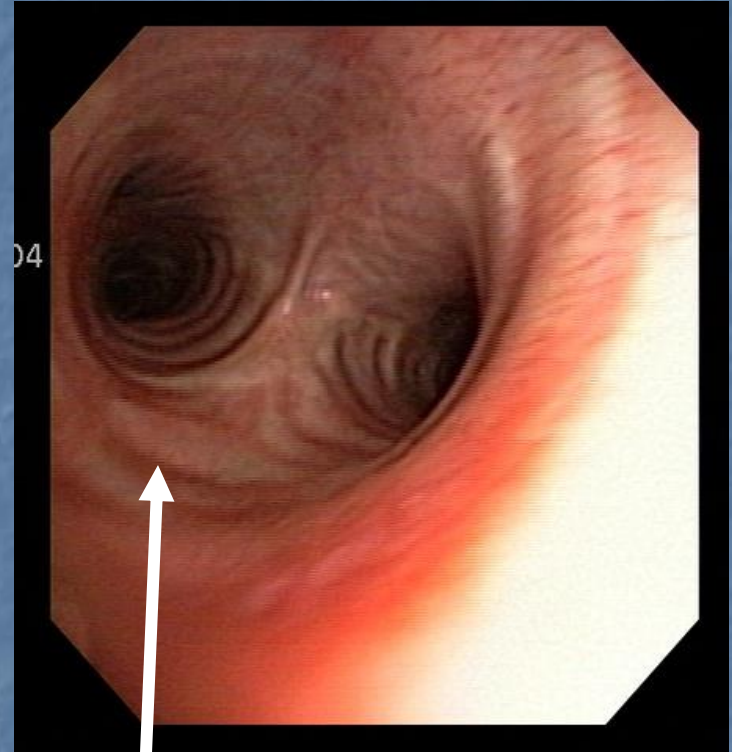
Focus on Right Main Bronchus

Horizontal Take-Off Left Main Bronchus



Posterior Membrane

Seen from head of patient



Vertical Right main bronchus

Seen from in front of patient

Right bronchial anatomy



The right main bronchus is 2 cm long on average and has an internal diameter of 10-16 mm. This is slightly larger than the diameter of the left main bronchus.

The bronchus intermedius of the right bronchial tree is actually quite short, extending for 1.0-2.5 cm until its anterior wall extends into and becomes the middle lobe bronchus. Its posterior wall extends into and becomes the right lower lobe bronchus.

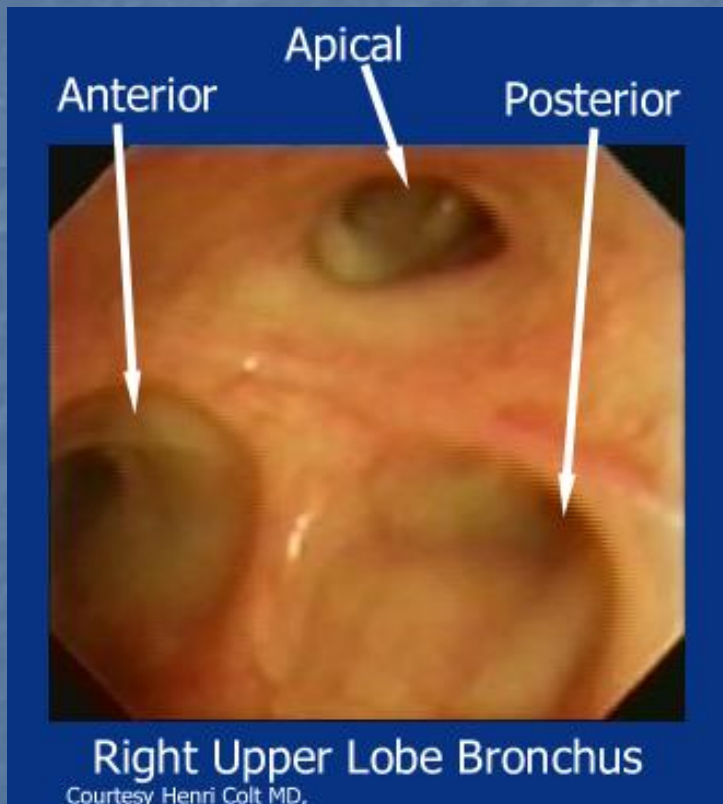
Volume loss caused by pleural effusion, atelectasis, elevated right hemidiaphragm, as well as traction or torsion from a fibrotic or scarred upper lobe often cause shortening of this bronchus.

The Right Bronchial Tree: Classification

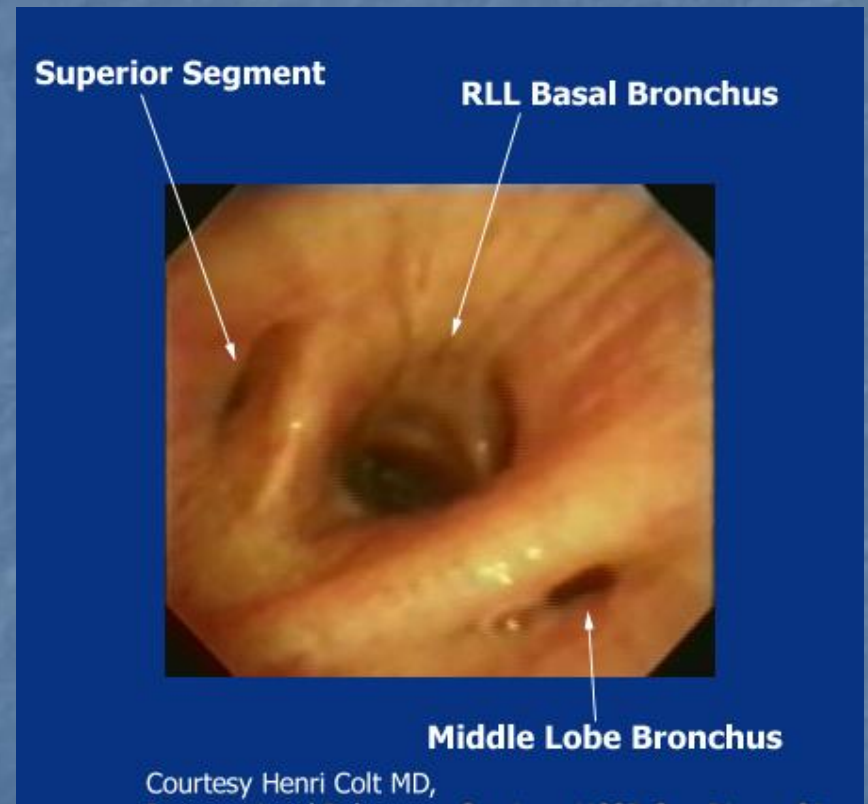
JACKSON-HUBER NOMENCLATURE	BOYDEN SURGICAL ANATOMY	JAPANESE BRONCHOSCOPY SYSTEM
<i>Right Upper lobe</i>		
Apical	B¹	B¹
<i>Anterior</i>	<i>B²</i>	<i>B₃</i>
<i>Posterior</i>	<i>B₃</i>	<i>B²</i>
<i>Right middle lobe</i>		
Lateral	B⁴	B⁴
Medial	B⁵	B⁵
<i>Right lower lobe</i>		
Superior	B⁶	B⁶
Medial basal	B⁷	B⁷
Anterior basal	B⁸	B⁸
Lateral basal	B⁹	B⁹
Posterior basal	B¹⁰	B¹⁰

Note: The Boyden surgical anatomical focus refers to the anterior and posterior segments of the upper lobe as B2 and B3 (Anatomical Focus 1983;206:103-114). This nomenclature IS NOT USED by bronchoscopists, who prefer the Japanese System using anterior as B3 and posterior as B2

Right upper lobe bronchus and bronchus intermedius



RB 3, RB 1, RB 2



RB 6

RB 4 and 5

The Right main bronchus

- The right main bronchus is short and vertical, rapidly dividing into
 - The right upper lobe bronchus which in turn divides into
 - The apical bronchus
 - The anterior bronchus
 - The posterior bronchus

The right middle lobe and lower lobe bronchus

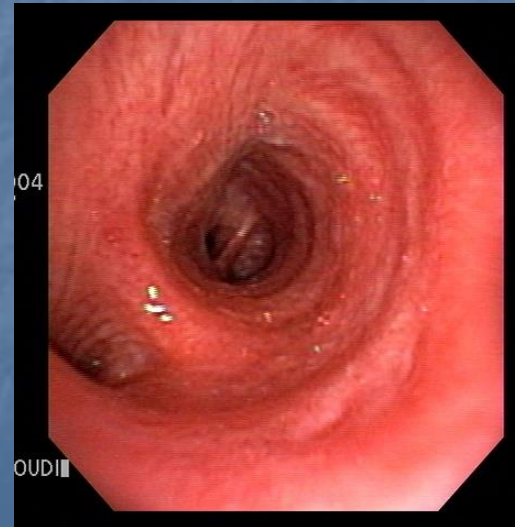
- Distally just beyond the bronchus intermedius, another division occurs into :
 - The Middle lobe bronchus with its anterior direction, dividing into a medial and lateral segmental bronchus.
 - The Right lower lobe bronchus

Anatomy: secondary carina: right side



On the right, the carina between the right middle lobe bronchus and the bronchus to the right lower lobe is named the right carina 2 or RC-2,

The carina dividing the right upper lobe from the bronchus intermedius is called the right carina 1 or RC-1.



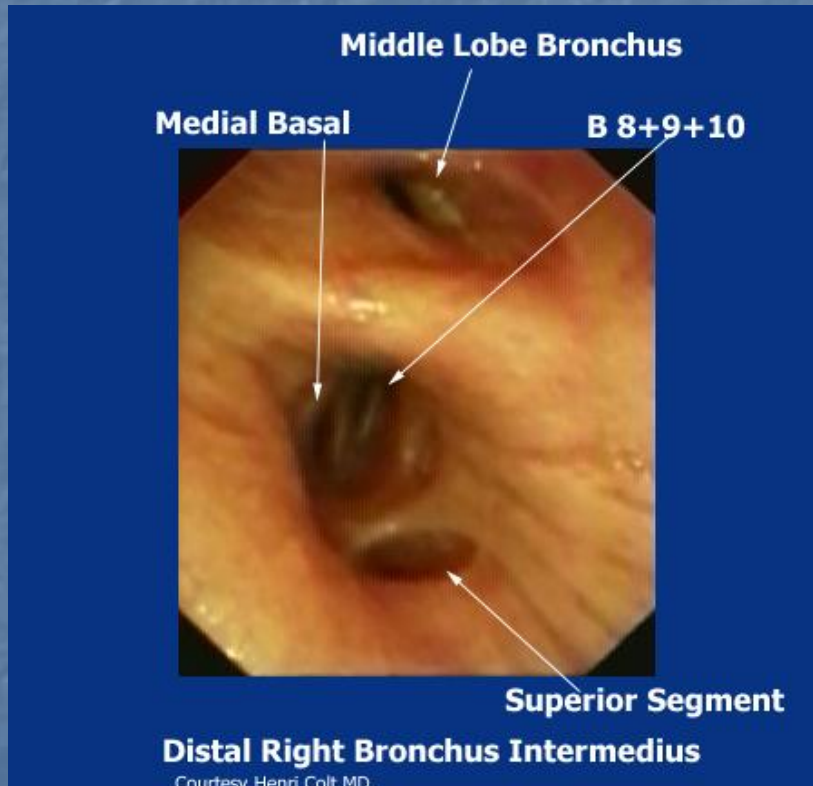
The right lower lobe bronchus

- The right lower lobe bronchus divides immediately into a superior segmental bronchus (jsut across from the right middle lobe bronchus), and
 - A medial basal segmental bronchus a bit more distally and along its medial wall.
- Finally dividing into three lower lobe bronchi (Three musketeers):
 - Antero-basal
 - Latero-basal
 - Postero-basal

Bronchus intermedius and Right lower lobe bronchus

RB 7

B 4, 5



B 6



RB6



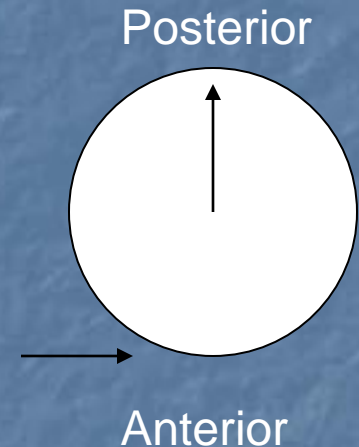
RB7

RB 8, 9
and 10



Using the figure below, and imagining the interior of the airway as a clock face and using the carina as the central reference point. Where is the superior segment of the lower lobe bronchus?

- A) 3 o'clock
- B) 7 o'clock
- C) 5 o'clock
- D) 9 o'clock

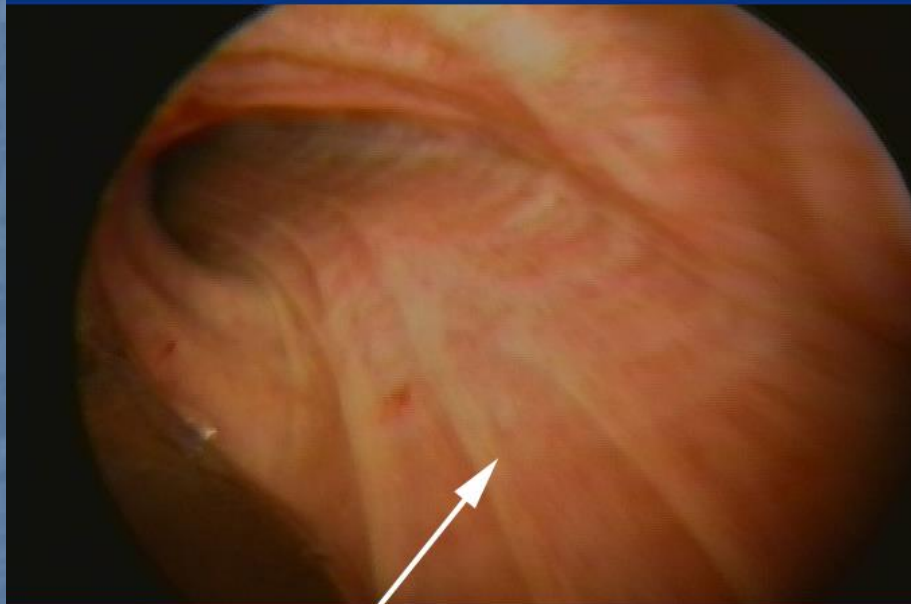


Click here for correct answer: **D**

Horizontal and vertical main bronchi

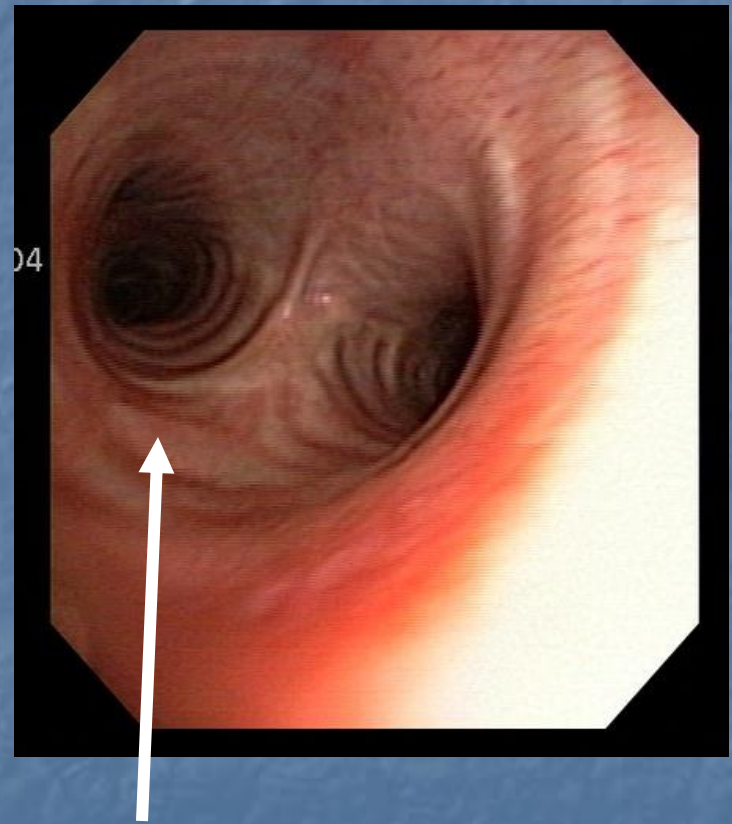
Focus on Left main bronchus

Horizontal Take-Off Left Main Bronchus



Posterior Membrane

Seen from head of patient



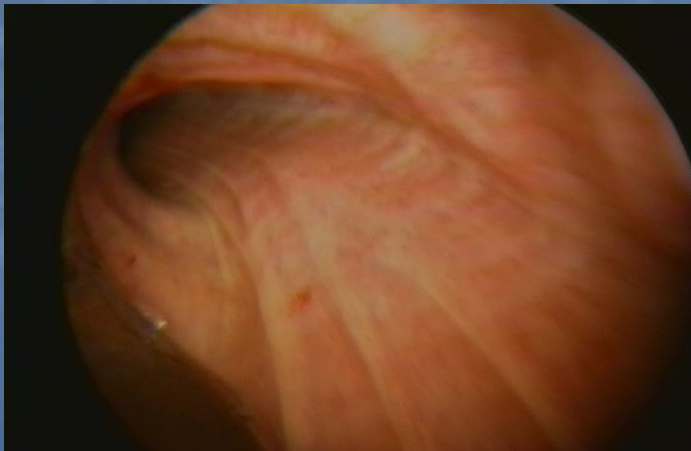
Vertical Right main bronchus

Seen from in front of patient

Left bronchial Anatomy



The left main bronchus is usually 4-5 cm long. its lumen is narrow and relatively horizontal. The usual length of the left lower lobe bronchus beyond the origin of the superior segmental bronchus is 1 cm.



Left Bronchial Tree

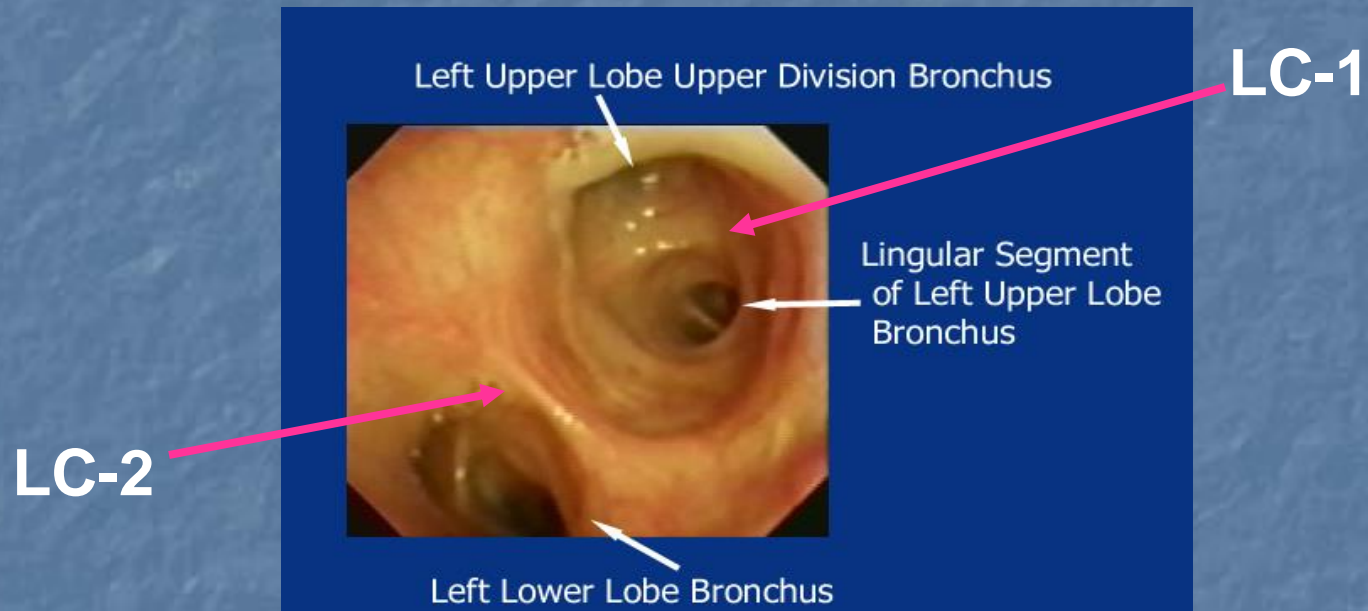
Classification and nomenclatures

JACKSON-HUBER	JAPANESE SYSTEM
<i>Left upper lobe</i>	
Upper division	
Apical-posterior	B¹ & 2
Anterior	B³
<i>Lingular/division</i>	
Superior	B⁴
Inferior	B⁵
<i>Left lower lobe</i>	
Superior	B⁶
Anteromedial	B^{7&8}
Lateral basal	B⁹
Posterior basal	B¹⁰

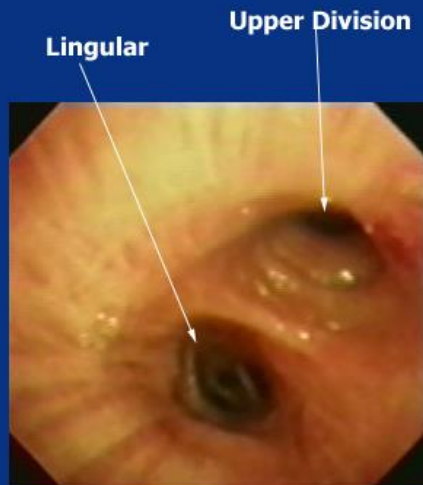
The Left main bronchus

- Divides into a upper and lower lobe bronchus
- The upper lobe bronchus divides into a upper division and lingular bronchus
- The lingular bronchus divides into a superior and inferior segmental bronchus

Left upper lobe bronchus



Left upper lobe bronchus: Upper division and Lingula



Left Upper Lobe Bronchus

Courtesy Henri Colt MD,
Interventional Pulmonary Services, UCSD San Diego, CA



**Left Upper Lobe
Upper Division Bronchus**

Courtesy Henri Colt MD,



Courtesy Henri Colt MD,
Interventional Pulmonary Services, UCSD San Diego, CA

LB 1-2, LB 3

Lingula

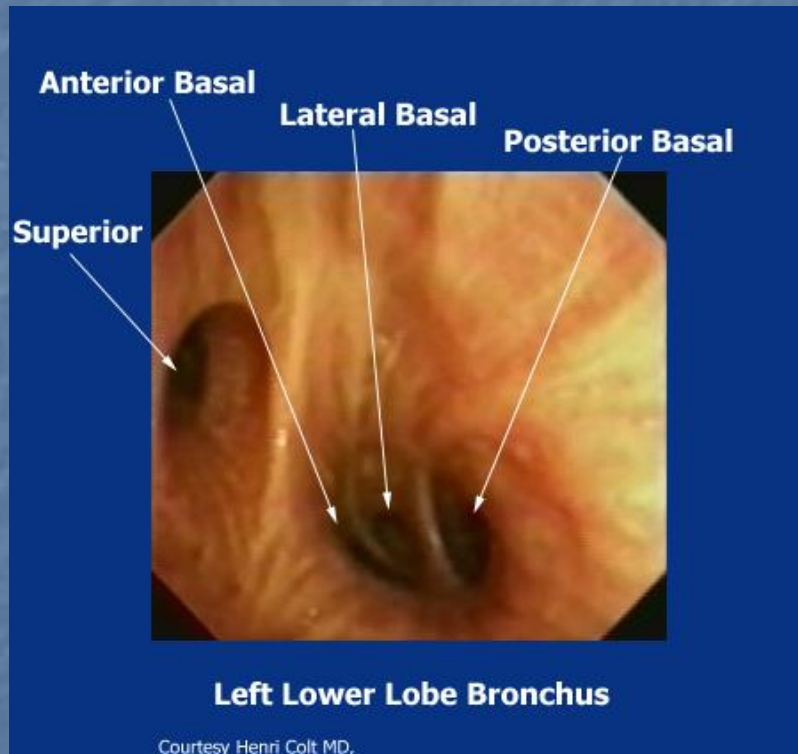
Superior segment
LB 4, LB 5

Inferior segment

The Left lower lobe bronchus

- The left lower lobe bronchus is longer than the right lower lobe bronchus, and there is a greater distance between its superior segment and its basal pyramid bronchi (three musketeers).
- The basal pyramid bronchi are in mirror shape compared to those on the right, and the medial basal segmental bronchus is usually but not always absent.

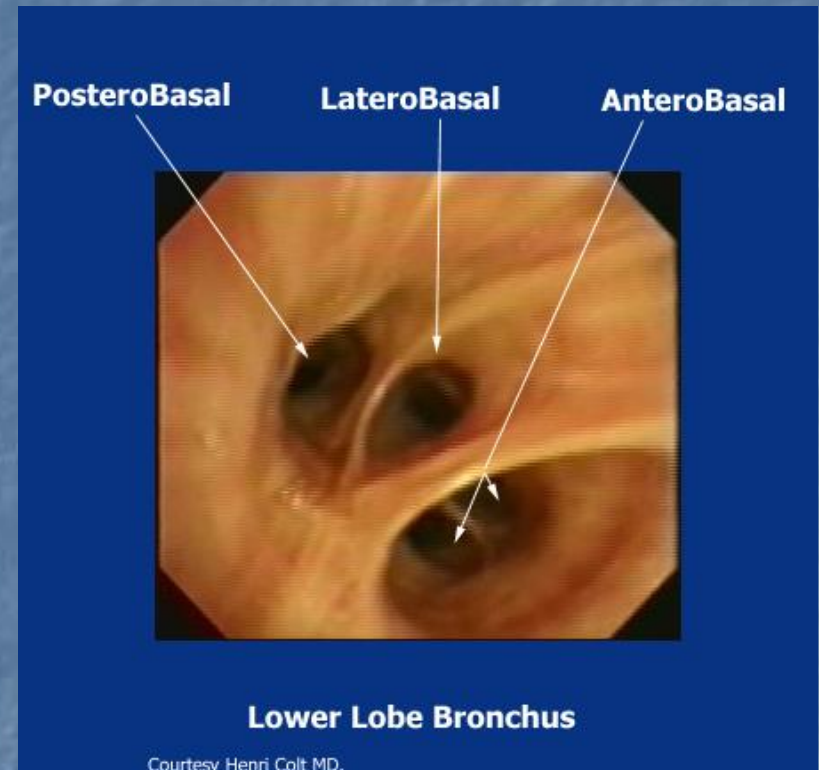
Left lower lobe bronchus



From the head

LB 6, LB 8, LB 9, LB 10

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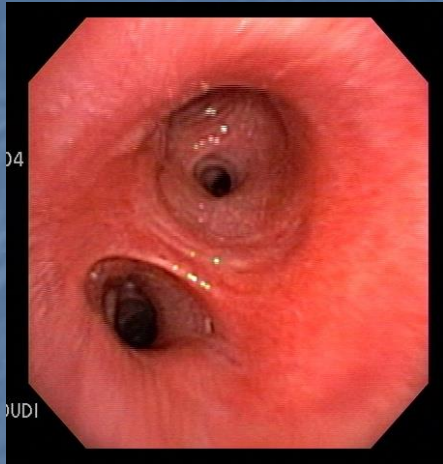


From the front

LB 10, LB 9, LB 8

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Anatomy: secondary carina left side



The carina separating the anterior segment of the upper division of left upper lobe bronchus from the lingula is termed LC-1.

From in front



On the left, the carina separating the lingular segment of the left upper lobe from the left lower lobe bronchus is called LC-2.




All of the following approximate airway dimensions are correct except

- A) The usual length of the left lower lobe bronchus beyond the origin of the superior segment is 1 cm.
- B) The usual length of the right upper lobe bronchus is 1.0 cm.
- C) The usual length of the left main bronchus is 4-5 cm. It bifurcates sharply from the midline of the trachea at an angle of 45 degrees.
- D) The usual length of the right main bronchus is 1.0 cm. It bifurcates at an angle of 25 degrees from the midline of the trachea.

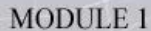
Click here for correct answer: **D**

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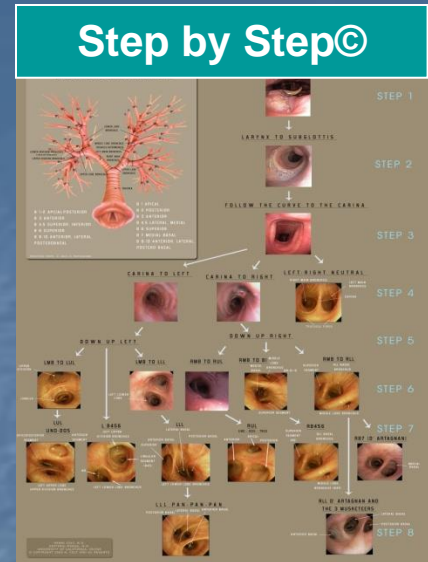
The Essential Bronchoscopist



MODULE 1



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Thank you