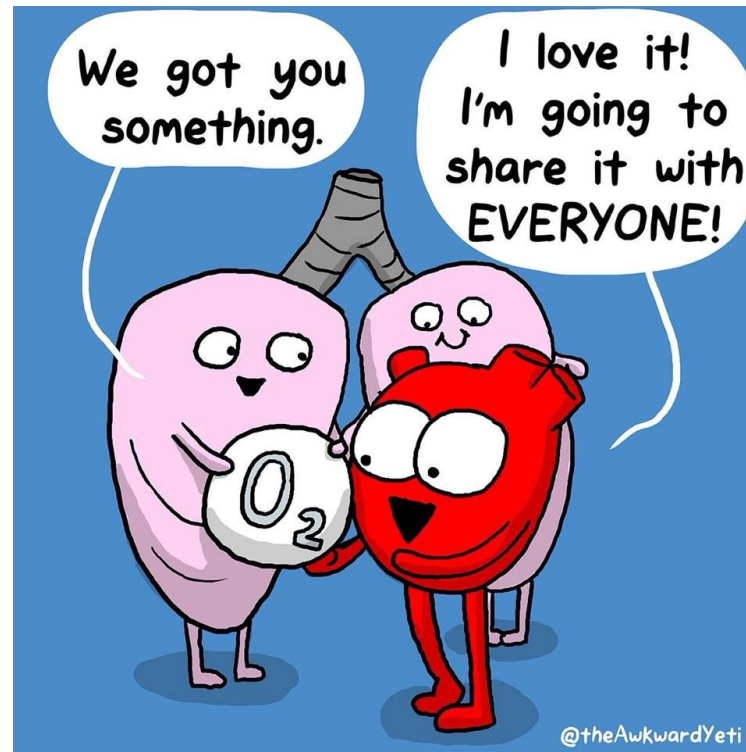


Atmungssystem, Stimmbildung, Brustwand, Anatomie und Mechanik der Atembewegungen



Emese Pálfi

Semmelweis Universität

Anatomisches, Histologisches und Embryologisches Institut

Atmungssystem (*Apparatus respiratorius*)

Gastransport zu und von der Zellen.

Jede Teilen funktionieren als Atemwege (zB.: Luftröhre, Bronchusbaum), nehmen teil in Reinigung (zB.: Nasenhöhle), oder können Luftvibration verursachen (Kehlkopf).

Atemwege:

-obere:

Nasenhöhle (*Cavum nasi*)

Nasennebenhöhle (*Sinus paranasalis*)

Rachen (*Naso-, oro-, laryngopharynx*)

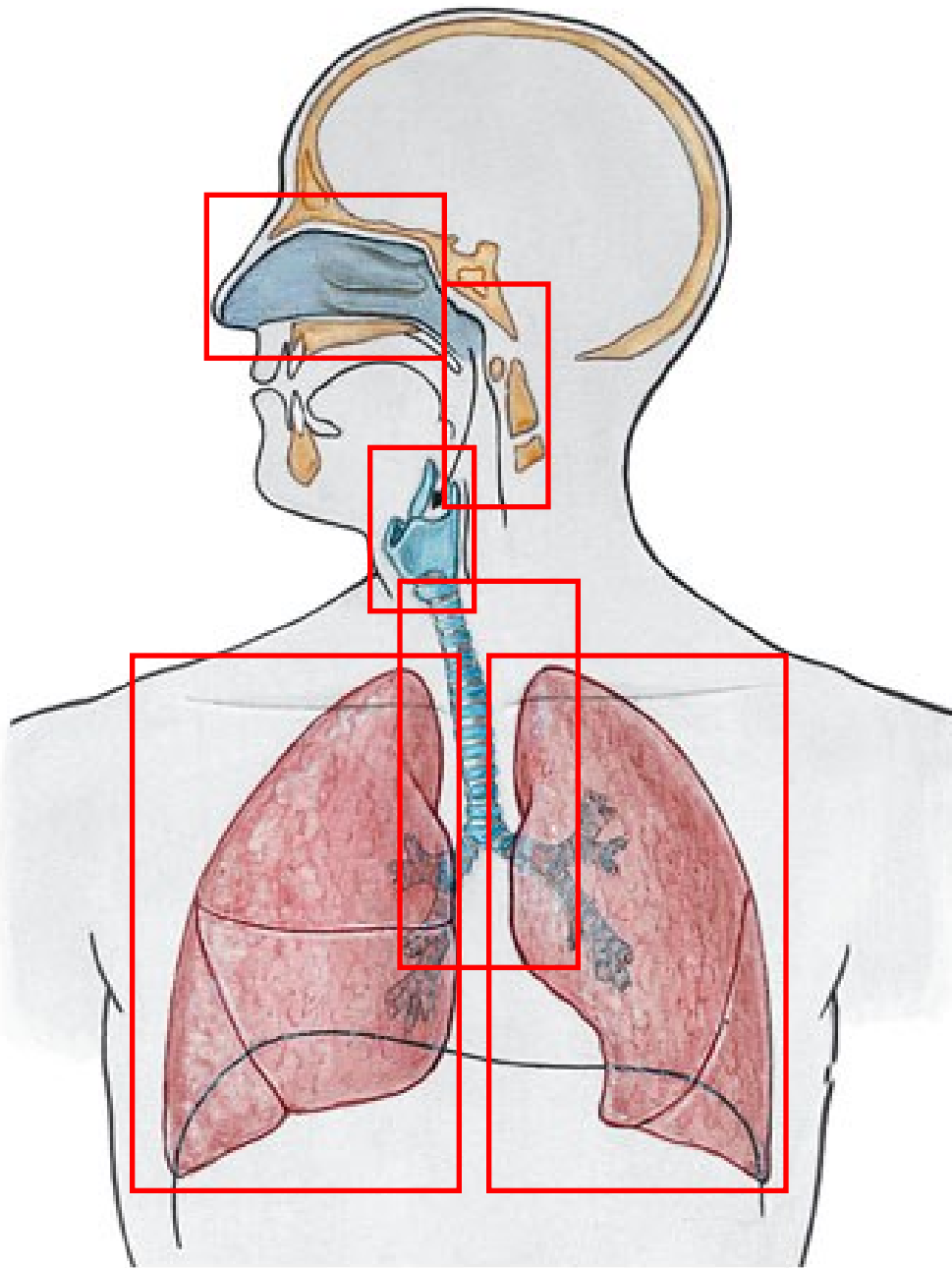
-untere:

Kehlkopf (*Larynx*)

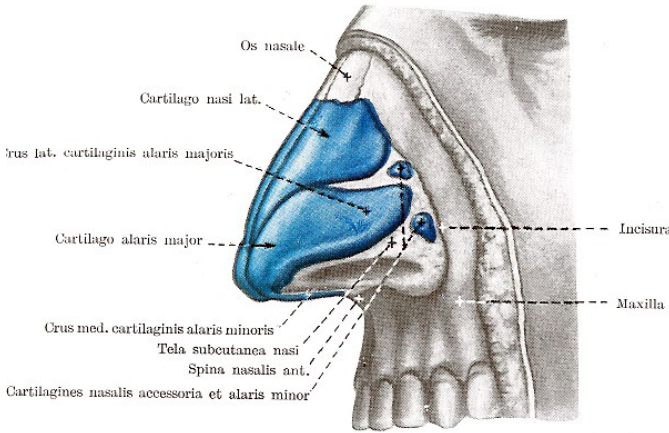
Luftröhre (*Trachea*)

Hauptbronchus (*Bronchus principalis dexter et sinister*)

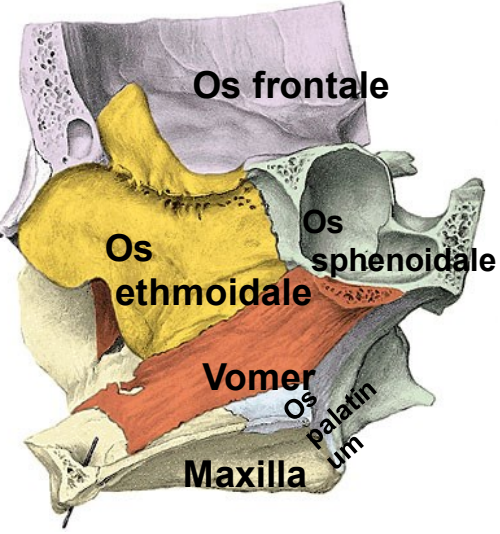
Bronchusbaum (*Bronchi lobares, Bronchi segmentales, Bronchchen, Bronchiolen*)



Äußere Nase (*Nasus externus*)

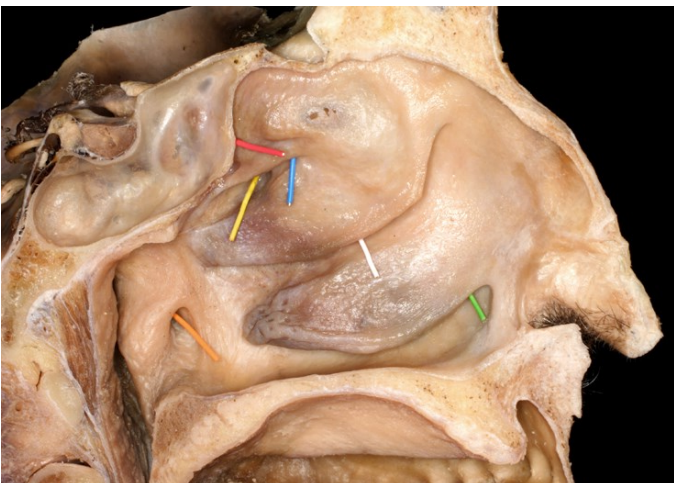
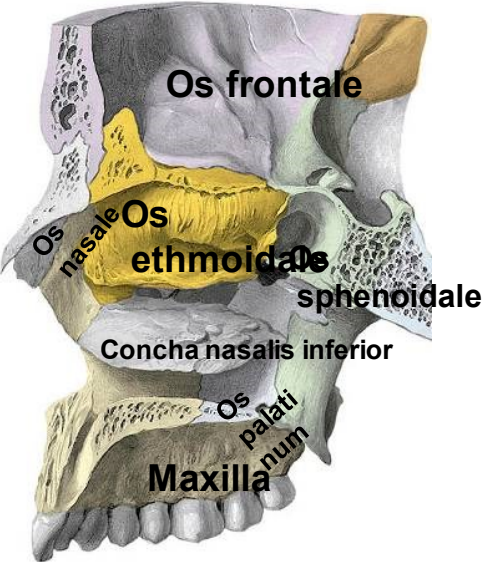
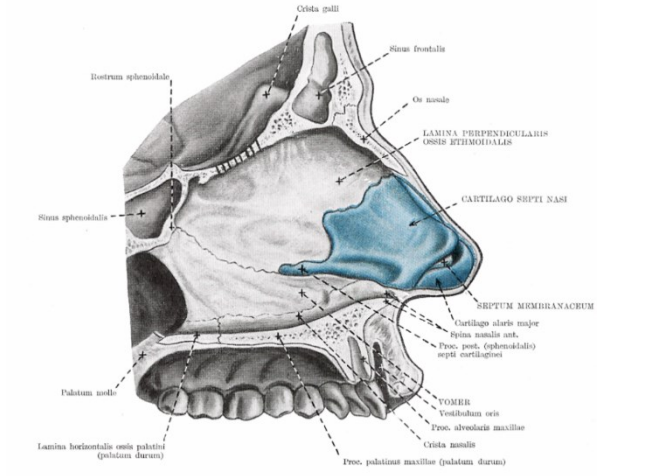
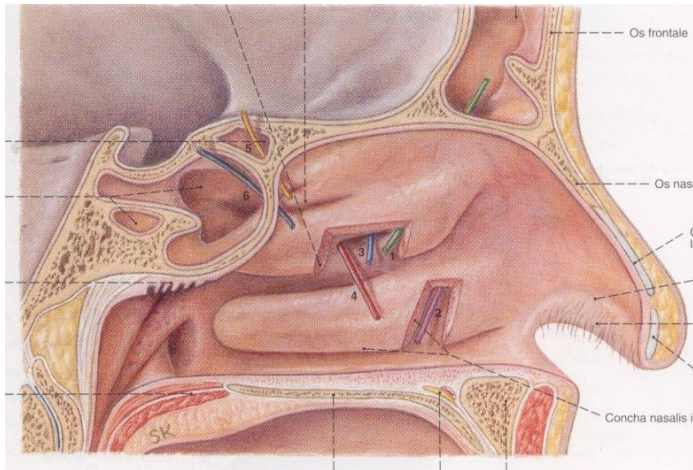


Nasenhöhle (*Cavum nasi*)

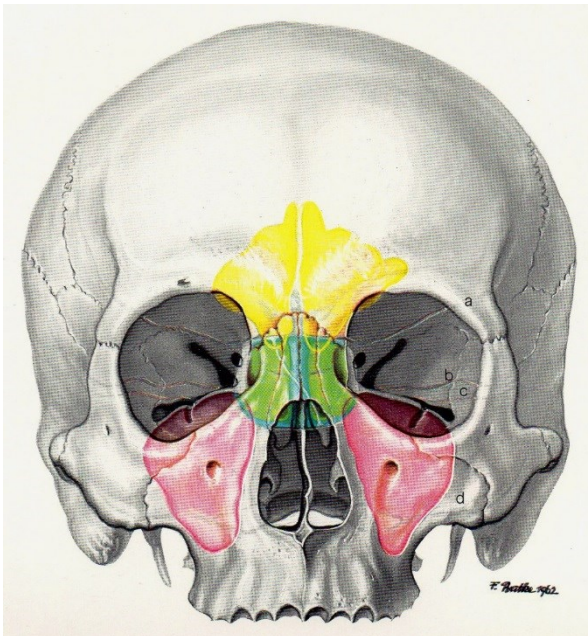
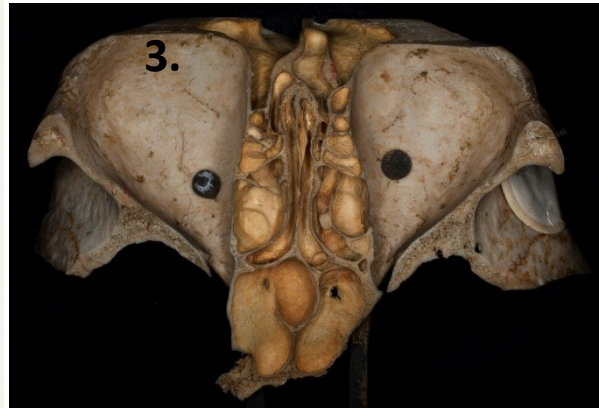
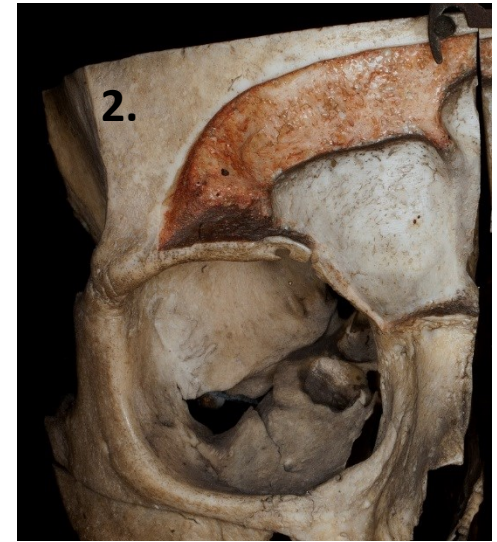
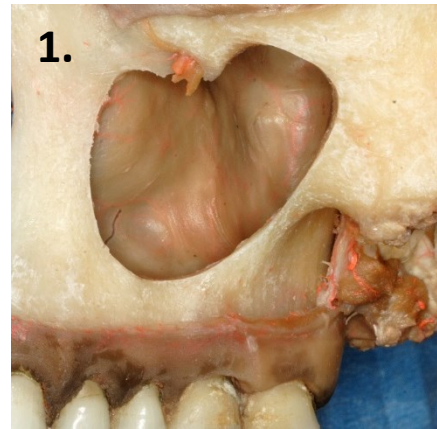
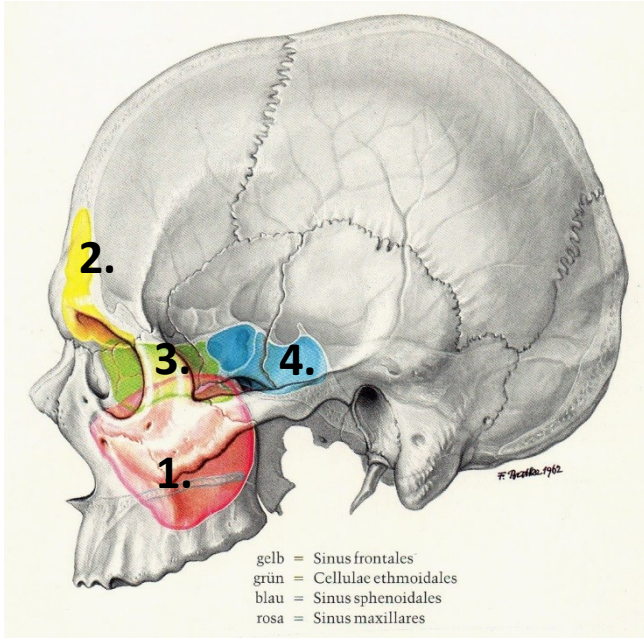


Nasengänge (*Meati nasales*)

- Meatus nasi superior*
- Meatus nasi medius*
- Meatus nasi inferior*
- Meatus nasi communis*



Nasennebenhöhlen (*Sinus paranasales*)



Blutversorgung und Innervation der Nasenhöhle



Äste von A. carotis
externa

Tiefe Venen des Gesichts

N. Trigeminus
(sensorisch)

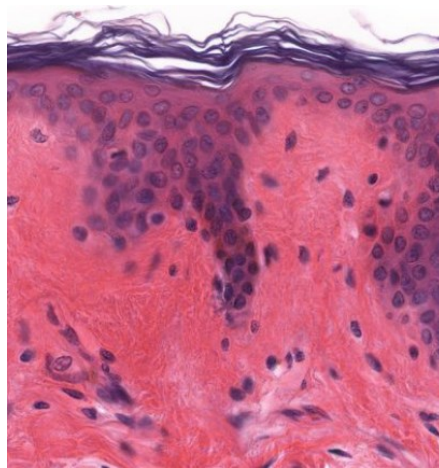
N. Facialis
(sekretomotorisch)

Schleimhaut der Nasenhöhle

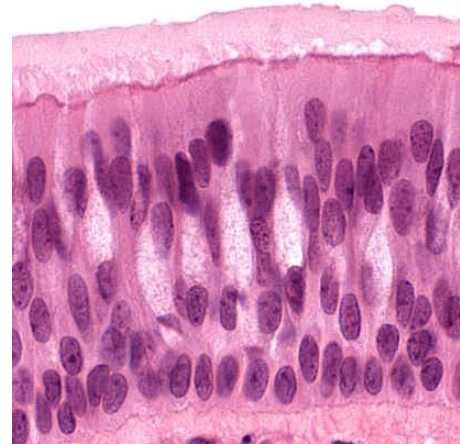
Nasenvorhof (*Vestibulum*): mehrschichtiges unverhorntes Plattenepithel

Atmungsbereich (*Regio respiratoria*): mehrreihiges hochprismatisches Flimmerepithel

Riechbereich (*Regio olfactoria*): Sinnesepithel



80 μm



40 μm

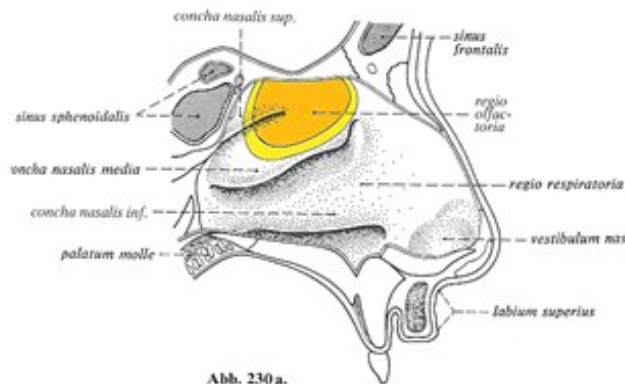


Abb. 230 a.

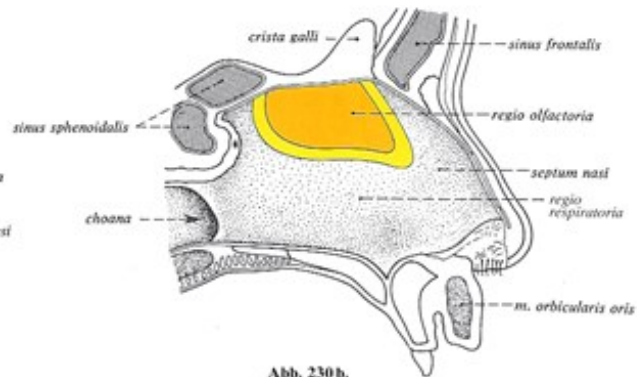
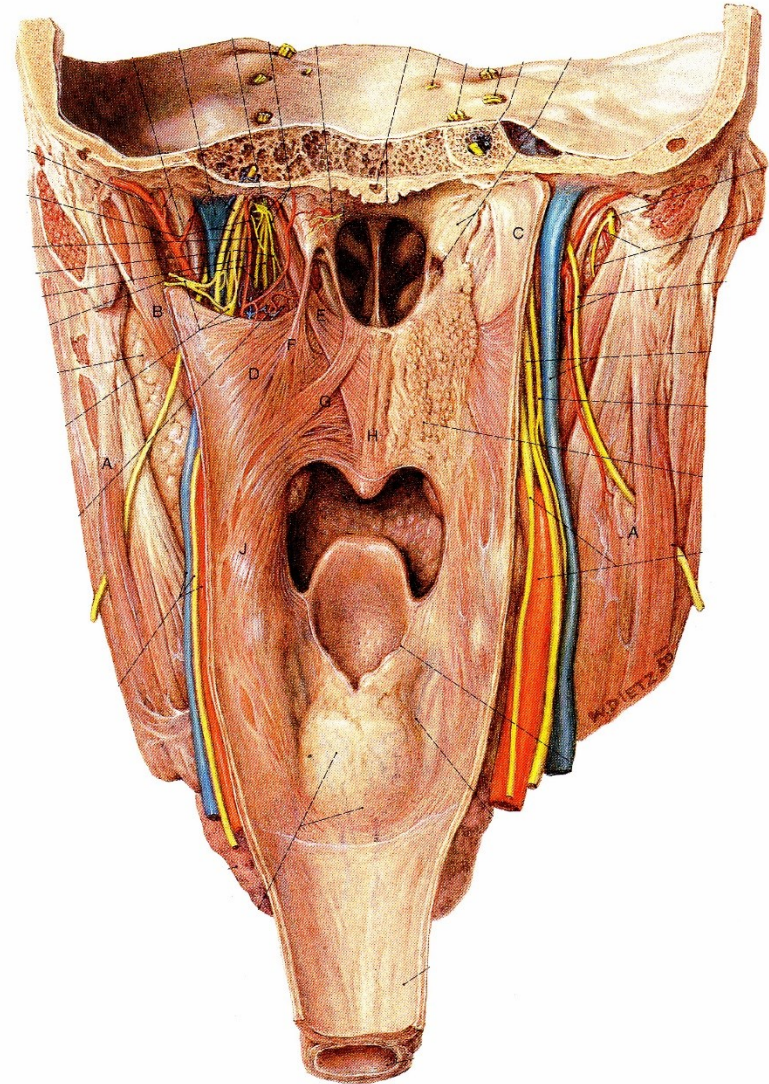
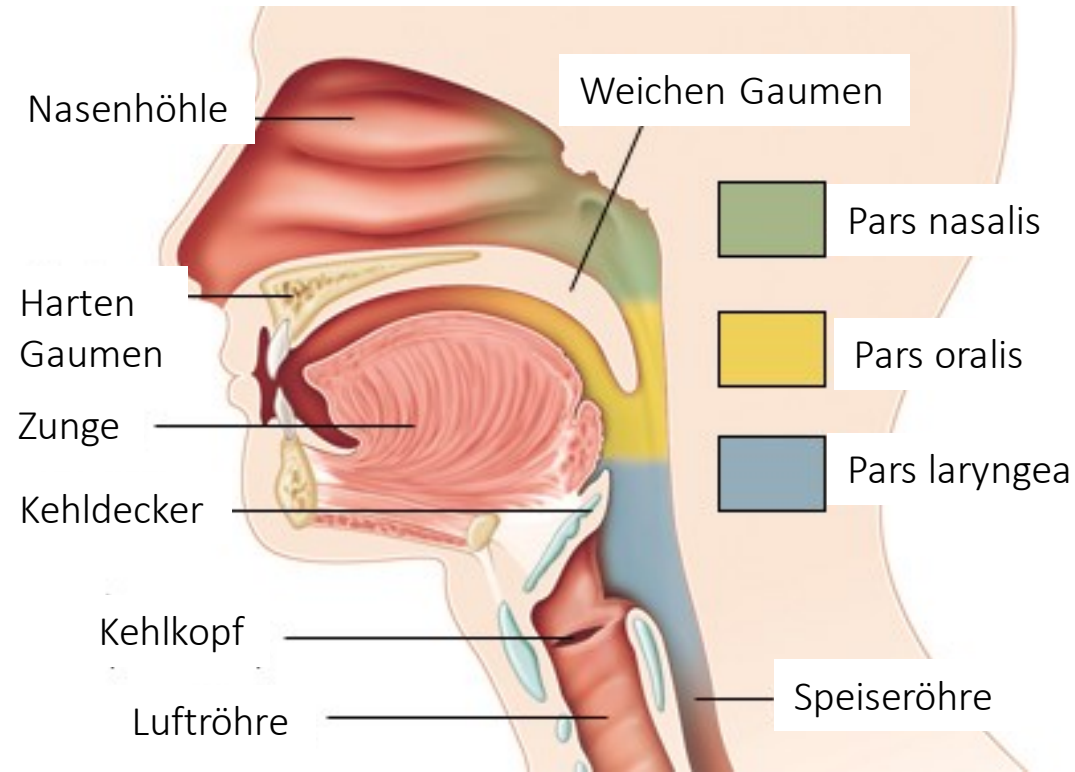
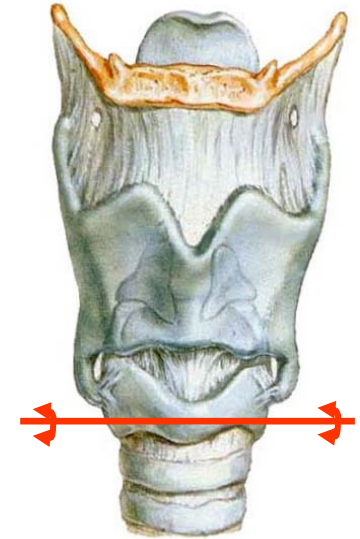
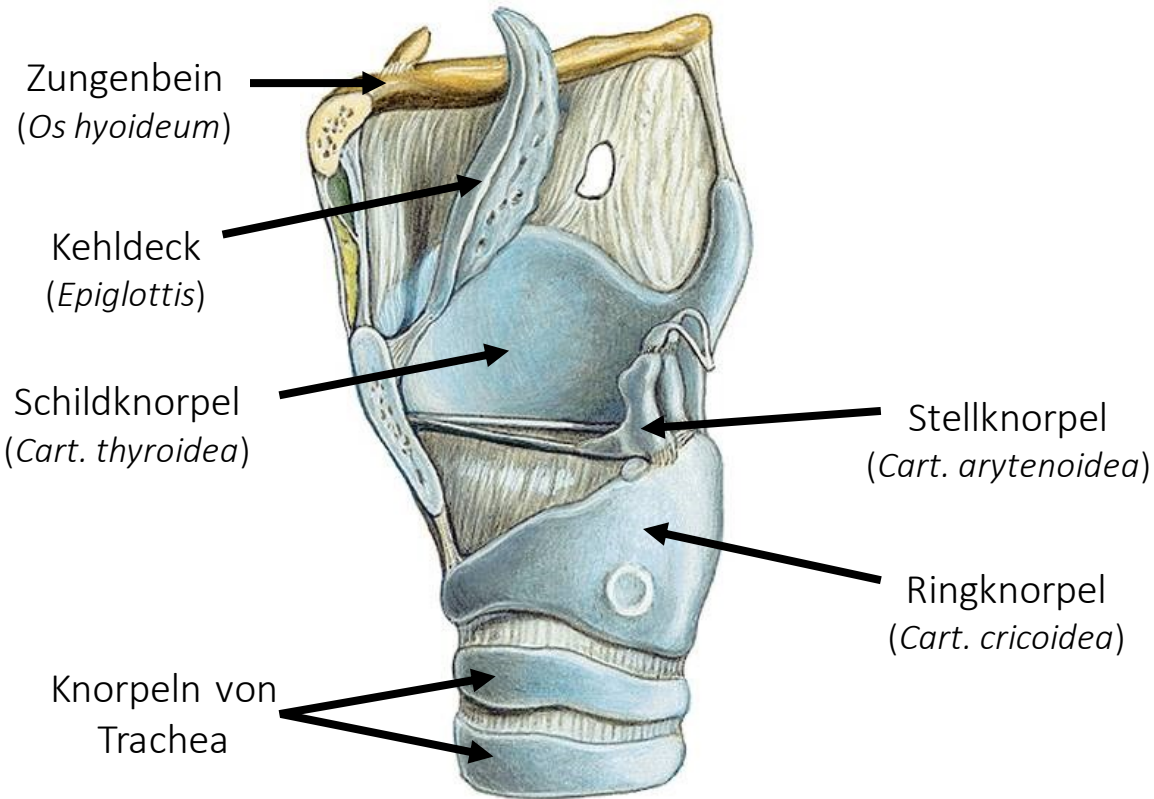


Abb. 230 b.

Rachen (*Pharynx*)

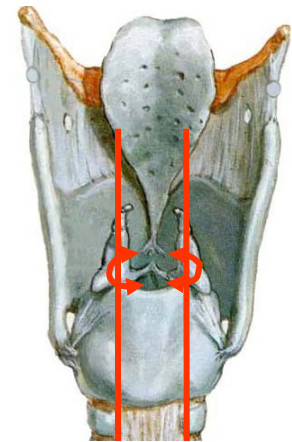


Kehlkopf (*Larynx*)



Articulatio cricothyroidea

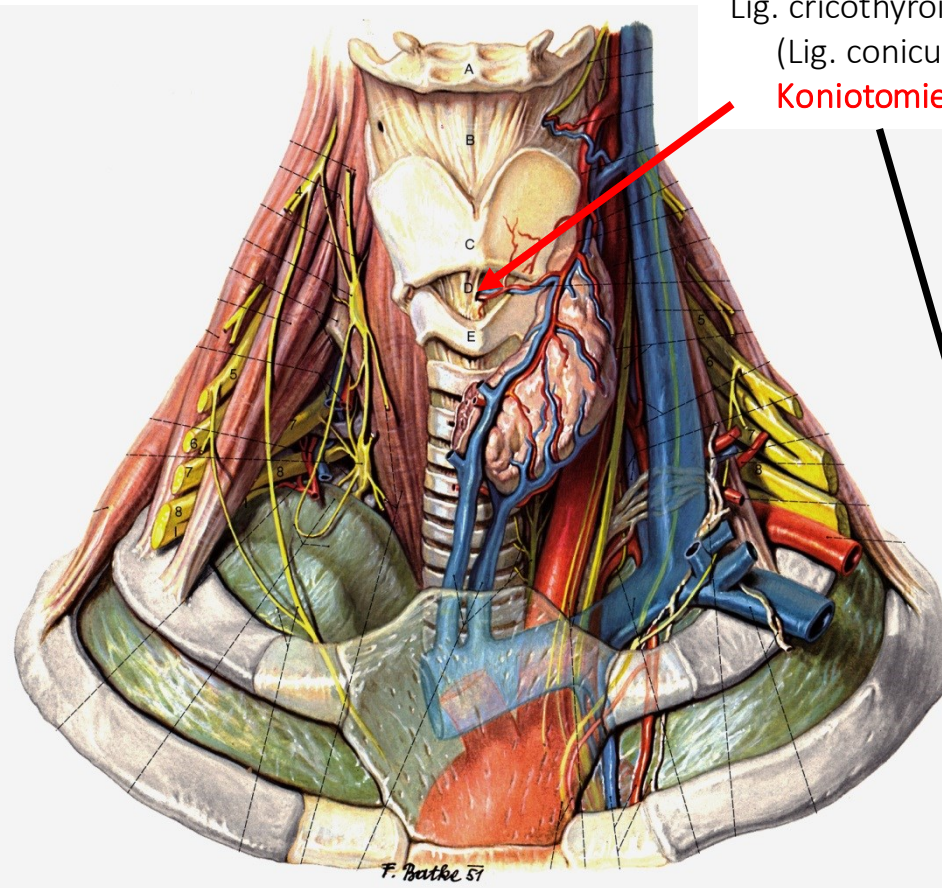
Scharniergelenk



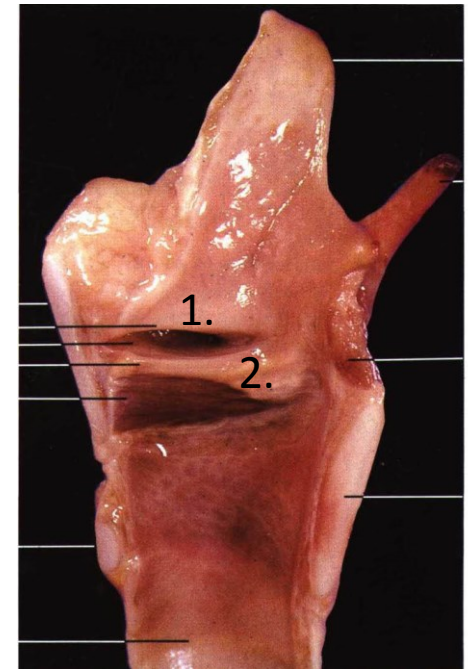
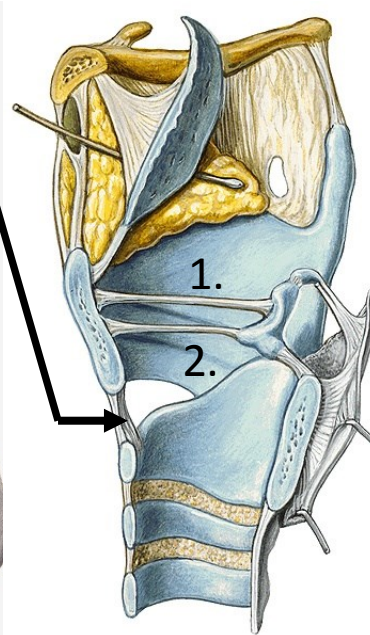
Articulatio cricoarytenoidea

Radgelenk

Kehlkopfbänder



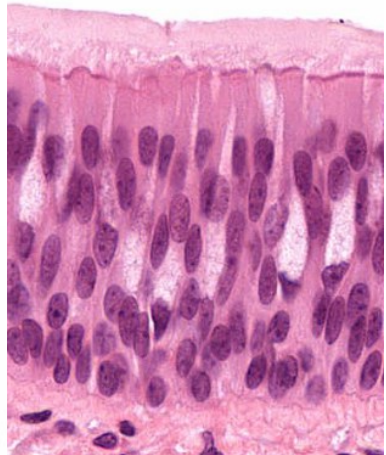
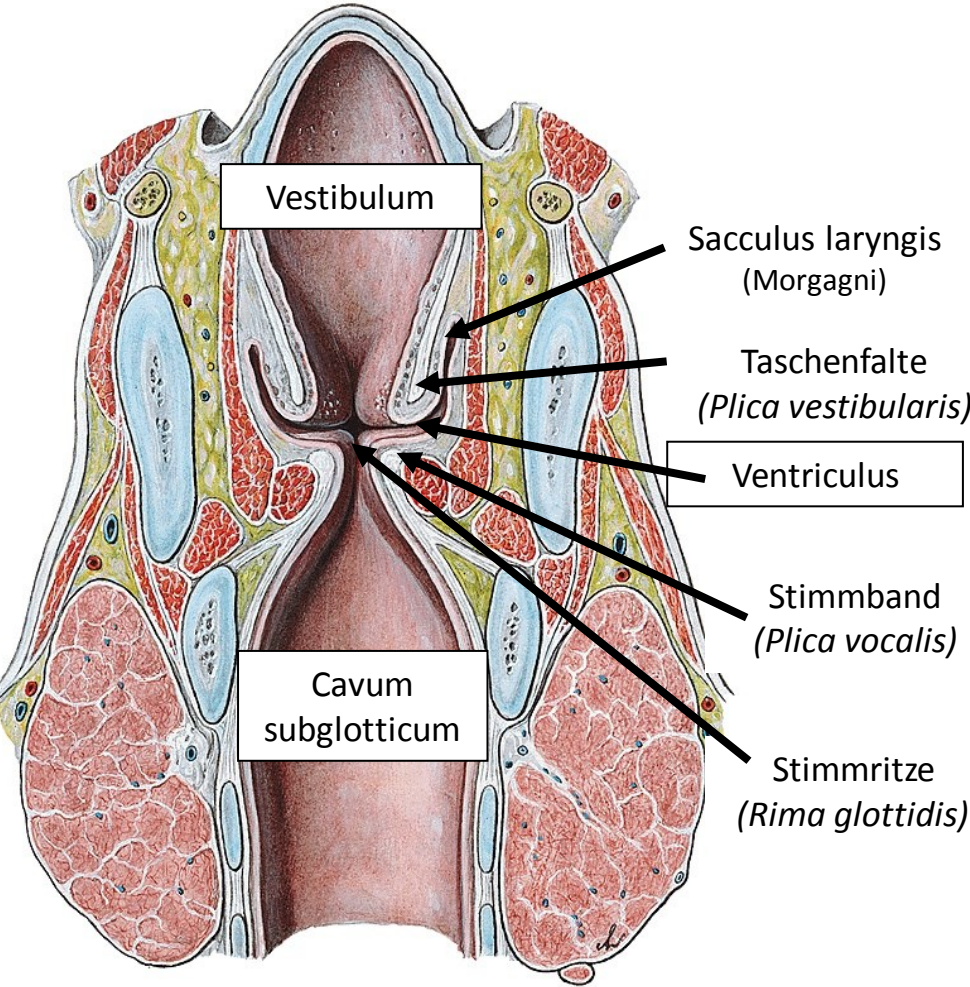
Lig. cricothyroideum
(Lig. conicum)
Koniotomie!!!



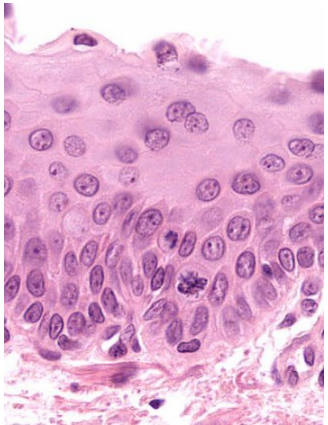
1. Taschenfalte (Lig. vestibulare)

2. Stimmfalte (Lig. vocale)

Kehlkopfschleimhaut



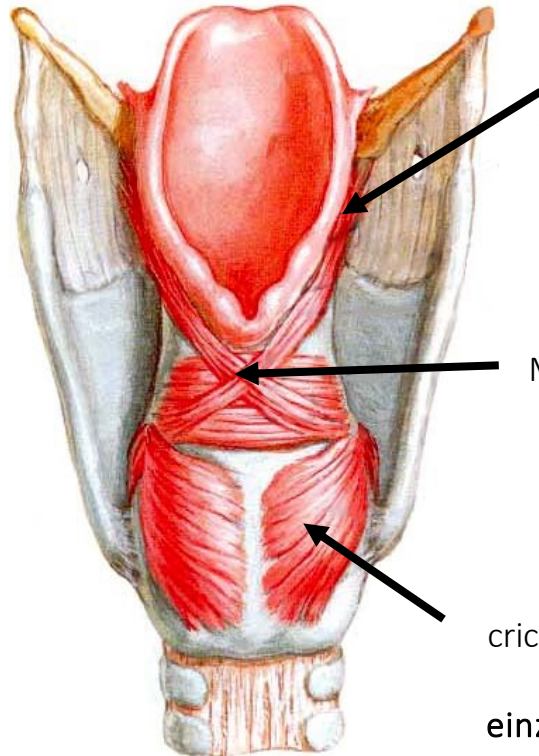
Mehrröhiges hochprismatisches Flimmerepithel



Plica vocalis
mehrsichtiges unvernhorntes Plattenepithel

Kehlkopfmuskeln und Stimmgebung

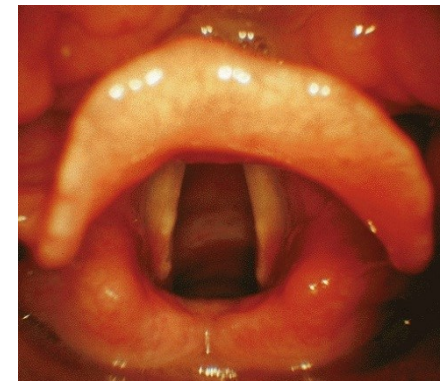
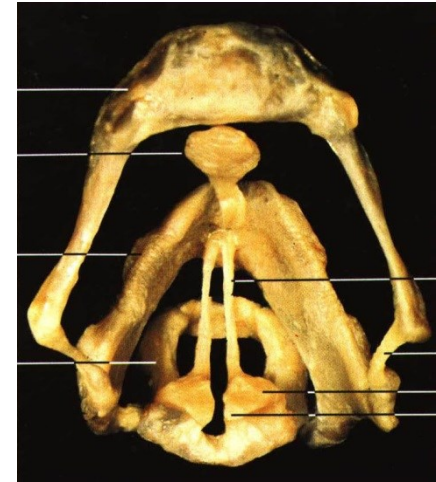
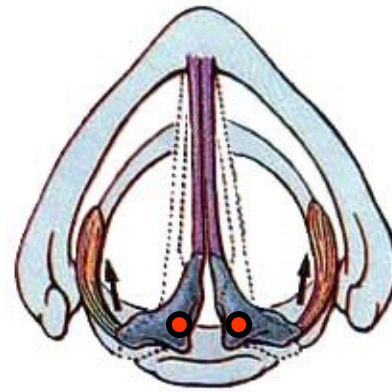
Stimmritze (*Rima glottidis*)



Musc.
thyroarytenoideus
verengt den
Kehlkopfeingang

Musc. arytenoideus
schließt die
Stimmritze

Musc.
cricothyroideus
post.
**einzig Öffner der
Stimmritze**
Lehmung - Luftnot

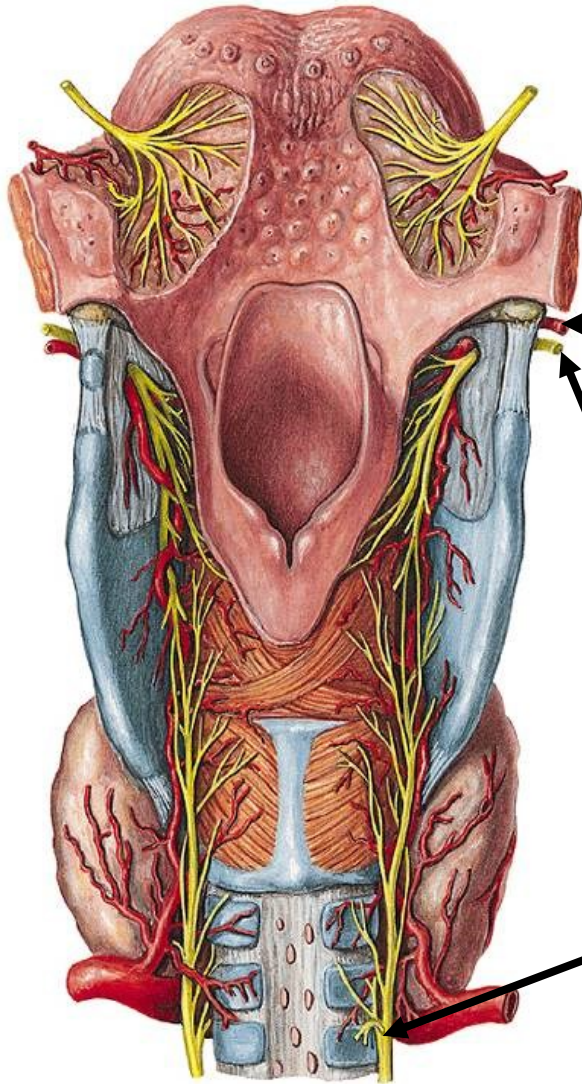


Musc. cricothyroideus – spannt das Stimmband

Musc. cricoarytenoideus lat. – schließt die Stimmritze

Musc. vocalis – spannt das Stimmband

Blutversorgung und Innervierung des Kehlkopfs



A. laryngea sup. (a. thyroidea sup.)

A. laryngea inf. (a. thyroidea inf.)

V. laryngea sup.

V. laryngea inf.

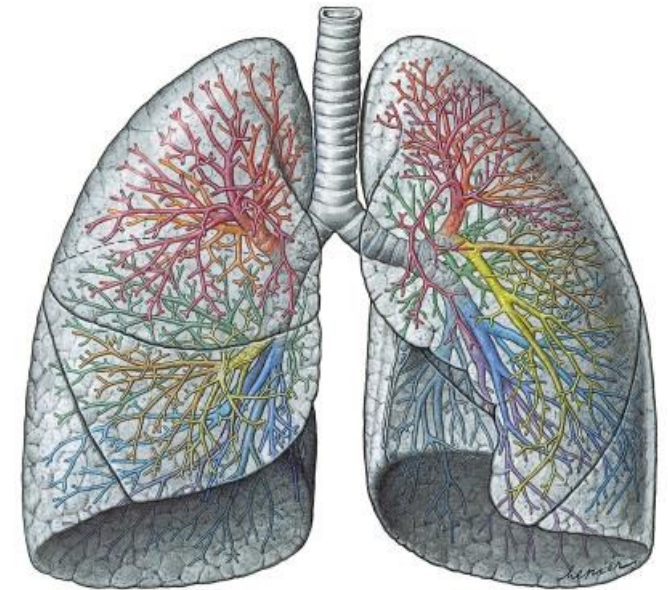
N. laryngeus sup.

N. laryngeus inf. (N. laryngeus recurrens)

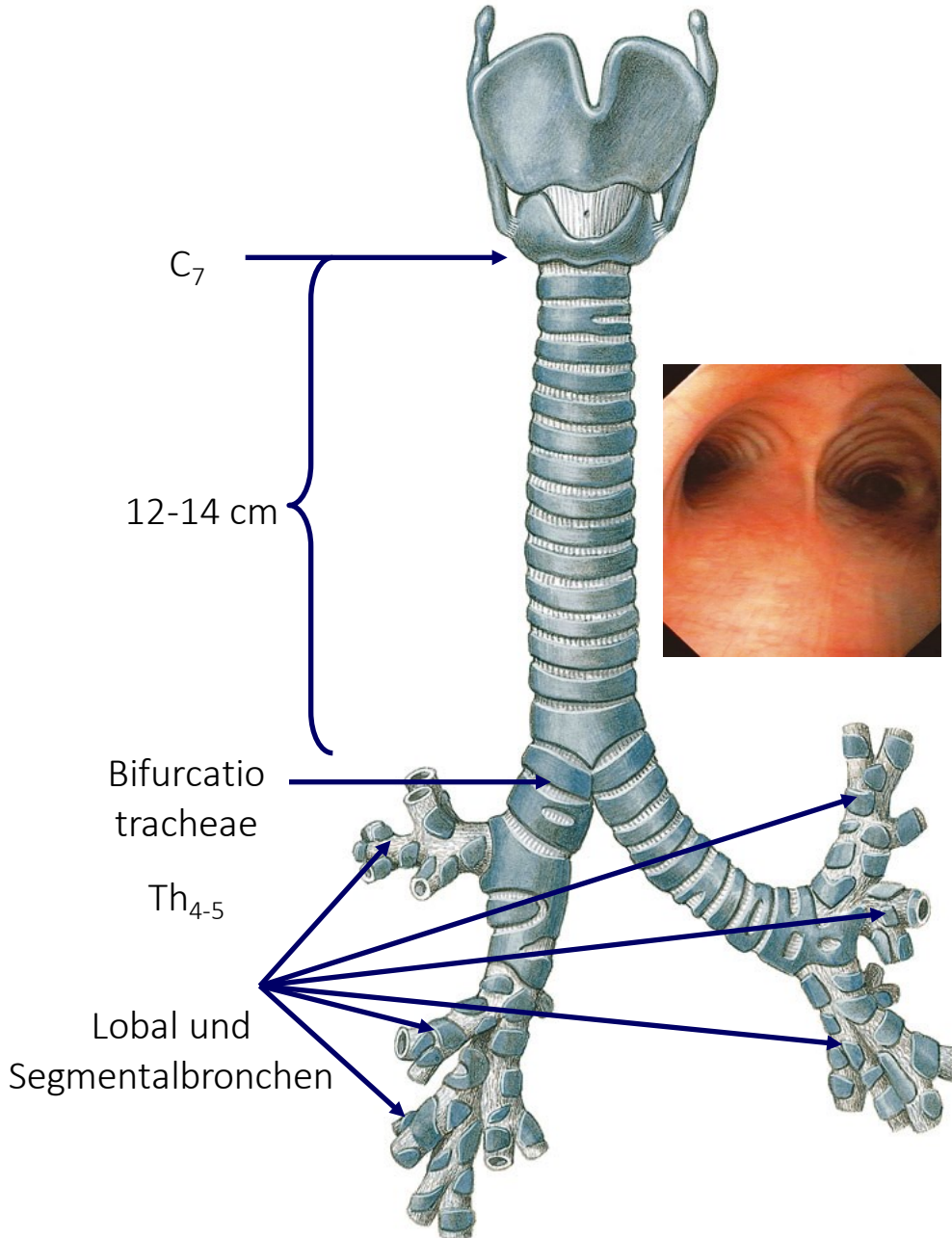
Vegetative Innervierung: N. vagus, Tr. sympathicus

Luftröhre (*Trachea*) und Bronchialbaum (*Arbor bronchialis*)

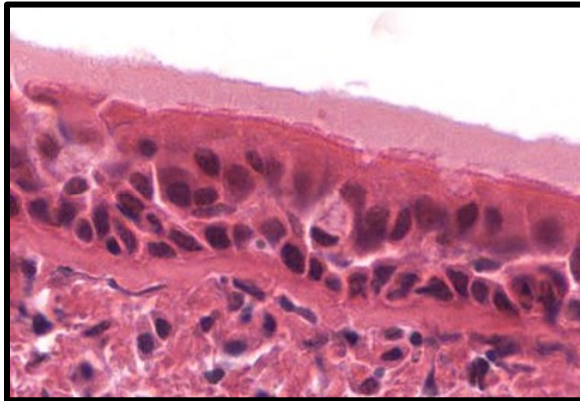
dichotomische Verzweigungen



Trachea → Bronchus principalis → Bronchus lobaris → Bronchus segmentalis

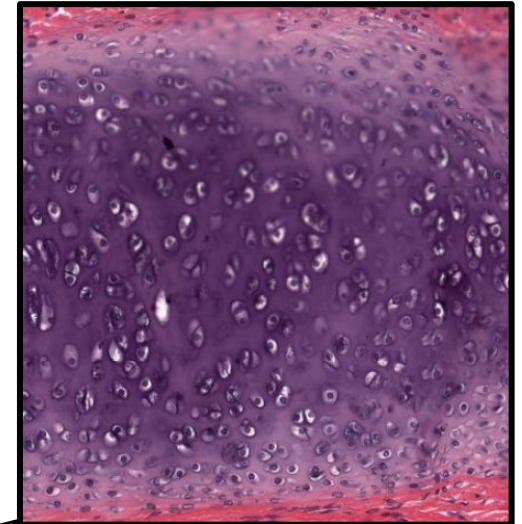


Histologie der Luftröhre



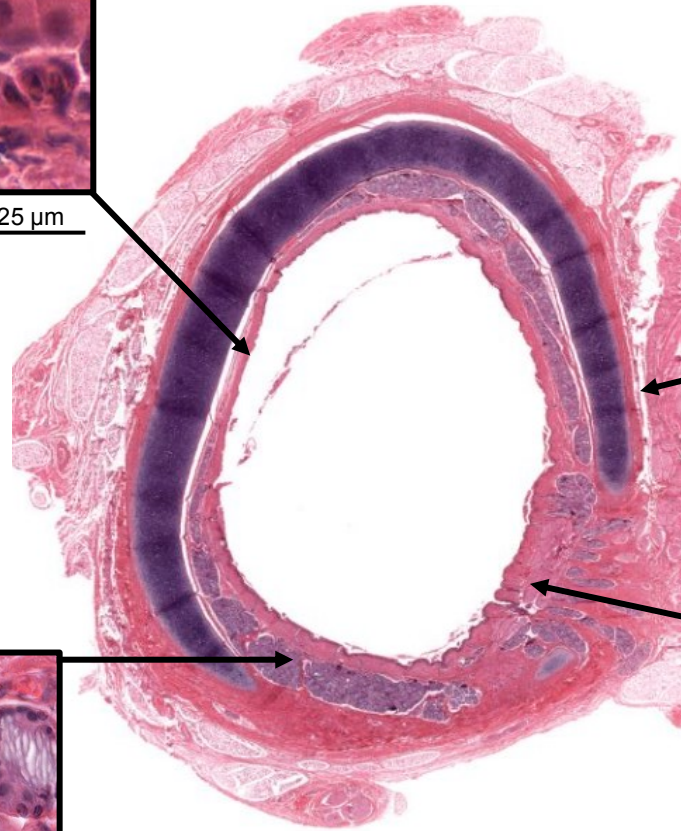
25 μ m

mehrröhiges
hochprismatisches
Flimmerepithel

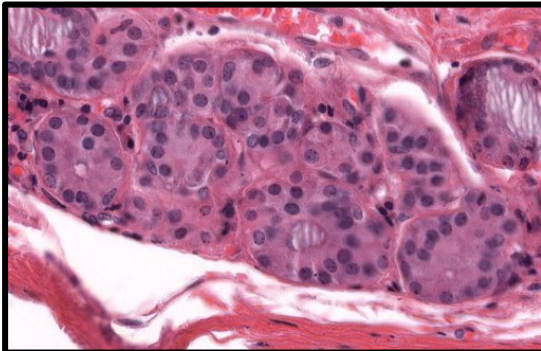


100 μ m

hyaliner Knorpel
C-förmig

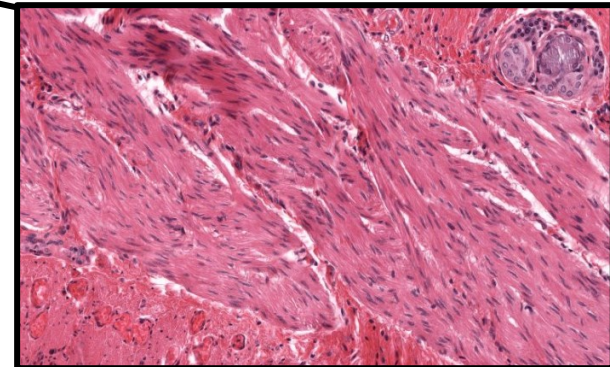


muköse Drüsen



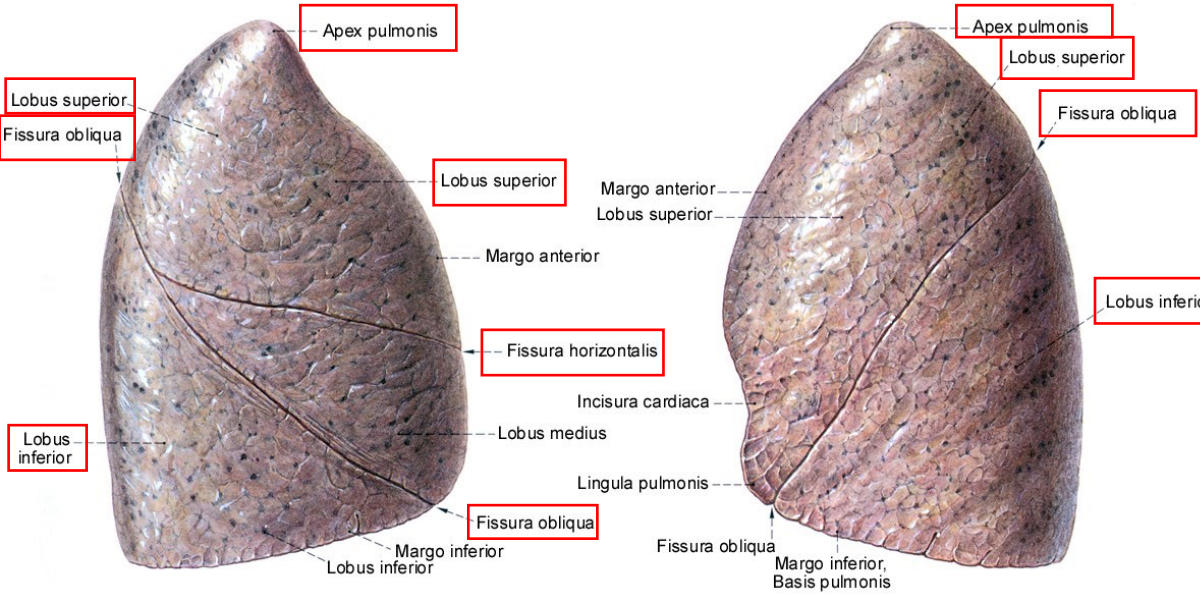
100 μ m

glatte Muskulatur



100 μ m

Lunge (Pulmo)



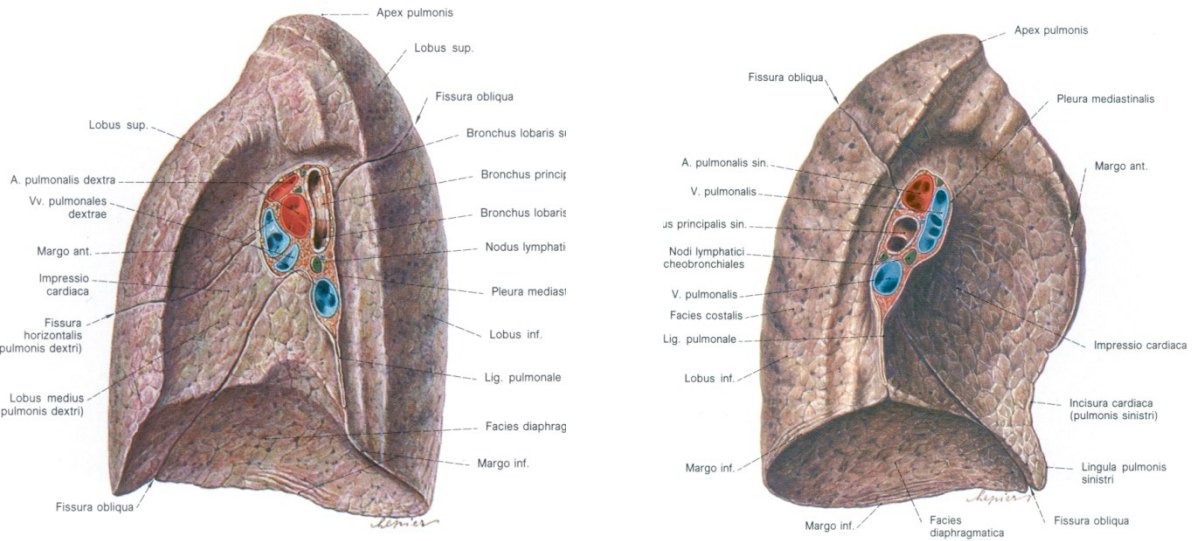
Lungenspitze (*Apex pulmonis*)
Einschnitten

Fissura obliqua
Fissura horizontalis

Lappen

Lobus superior
Lobus medius
Lobus inferior

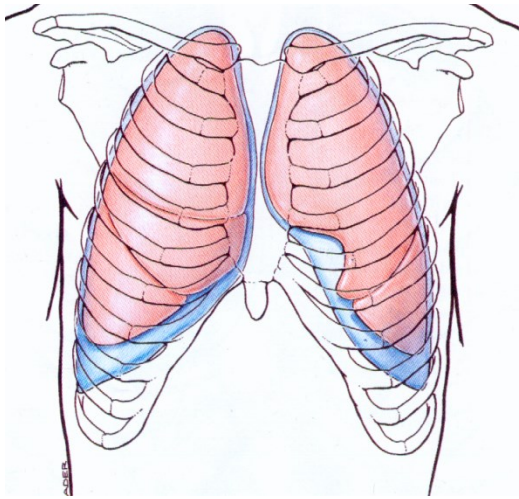
Lungenbasis (*Facies diaphragmatica*)
Seitenfläche (*Facies costalis*)



Lungenpforte (*Hilus pulmonis*)
Eindrücke

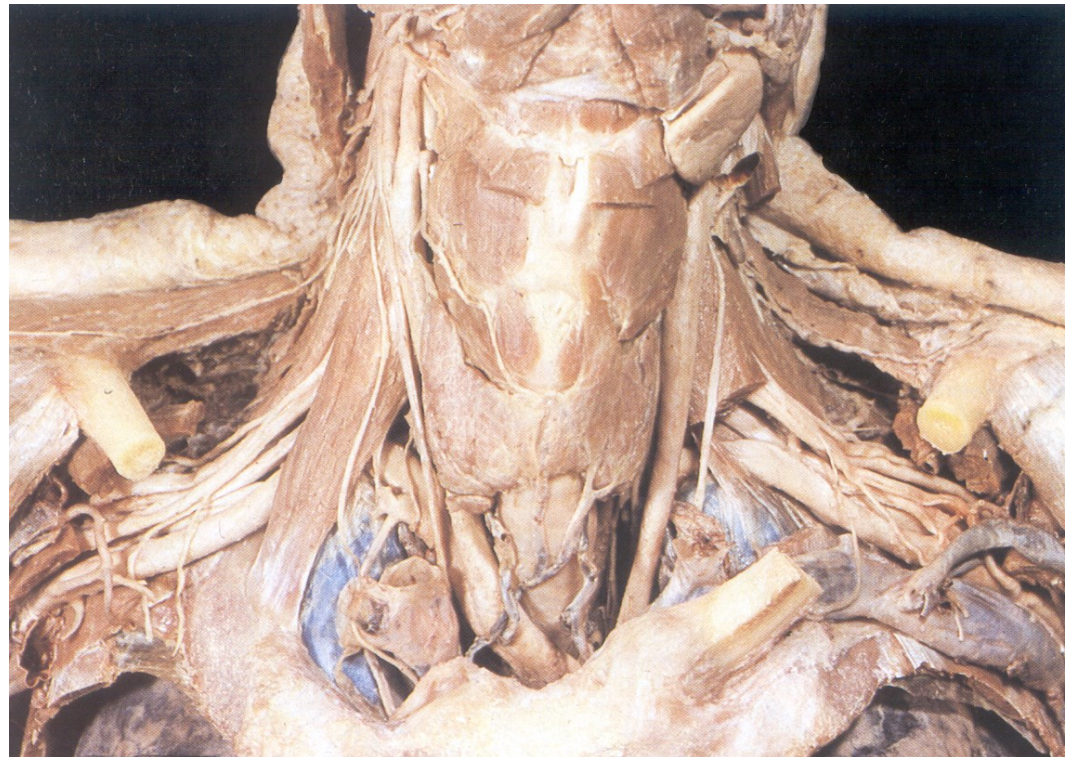
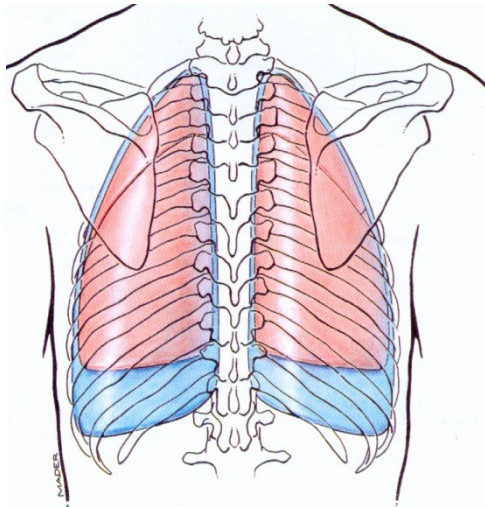
Impressio cardiaca
Impressio costalis
Impressio VCS
Impressio v. azygos
Impressio aortae

Brustfell (Pleura)

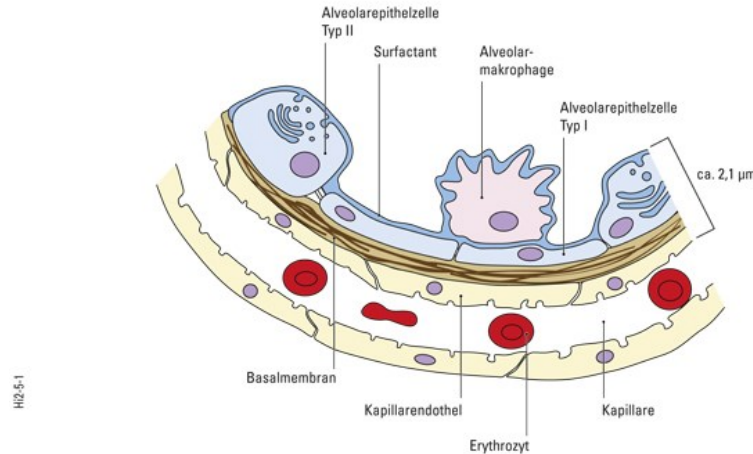
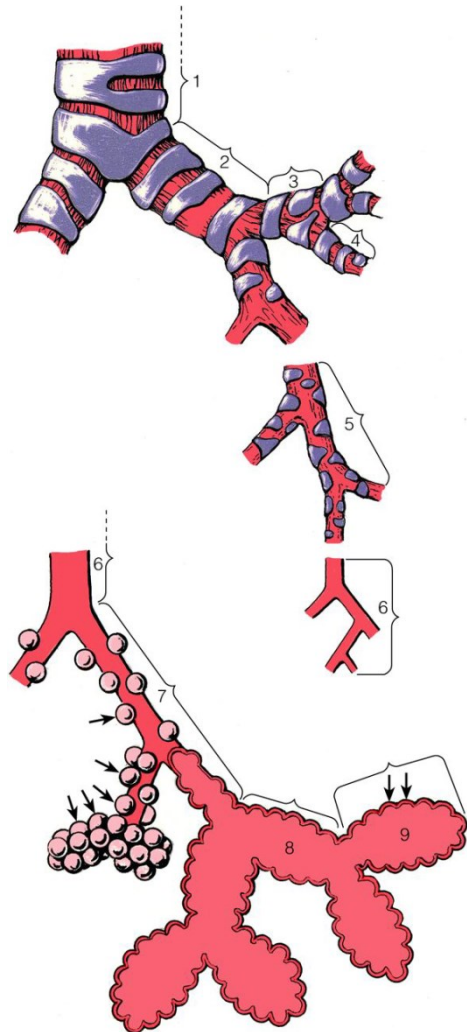


Parietale (*Pleura costalis, mediastinalis, diaphragmatica*)
und viszerale (*Pleura pulmonalis*) Blatt
Flüssigkeit (*Liquor pleurae*)

Pneumothorax
Pleuraerguss



Feinbau der Lunge

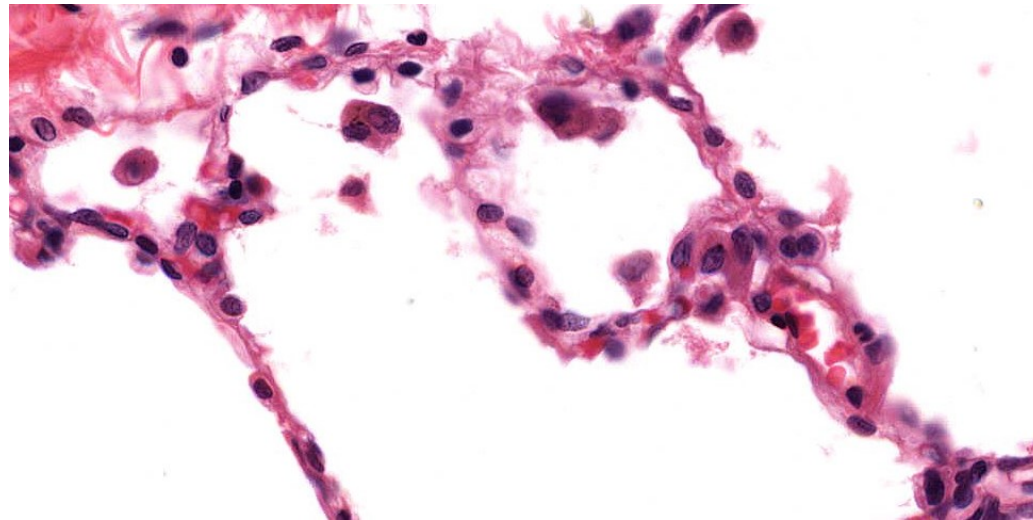


H2-5-1

MEDI-LEARN Skript Histologie 2 – Abbildung 5 – Seite 14
Histologie der Alveolen und Blut-Luft-Schranke

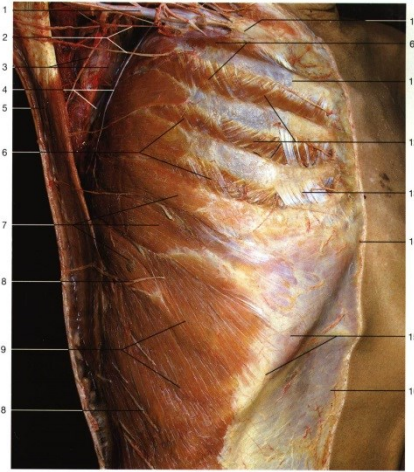
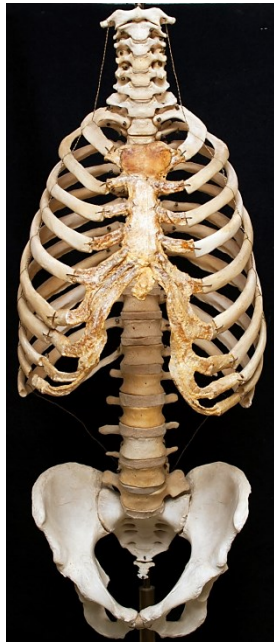
www.medi-learn.de/histo2-5

- Alveolen – Gasaustausch
- Blut-Luft Schranke
- Pneumozyten/Deckzellen (weniger als $0,1 \mu\text{m}$ dick)

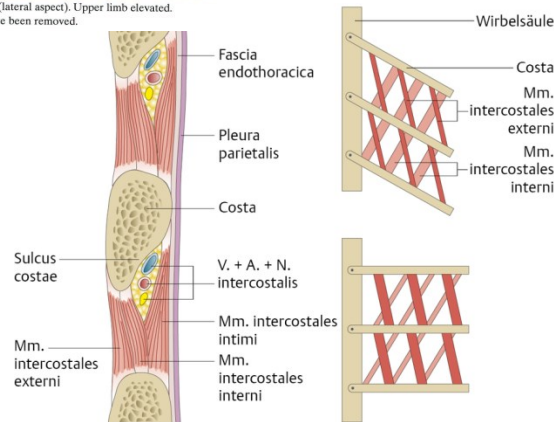
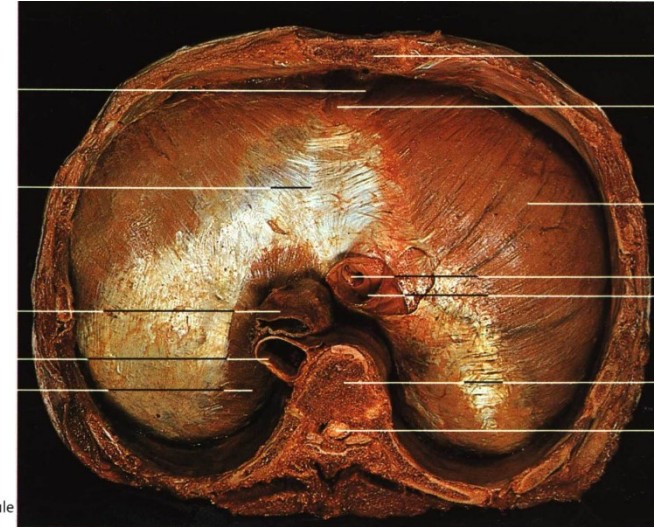


40 μm

Brustwand und Atembewegungen



Muscles of the thorax, superficial layer (lateral aspect). Upper limb elevated.
Pectoralis major and minor muscles have been removed.



Brustkorb

Brustbein (*Sternum*)

Rippen (*Costae*)

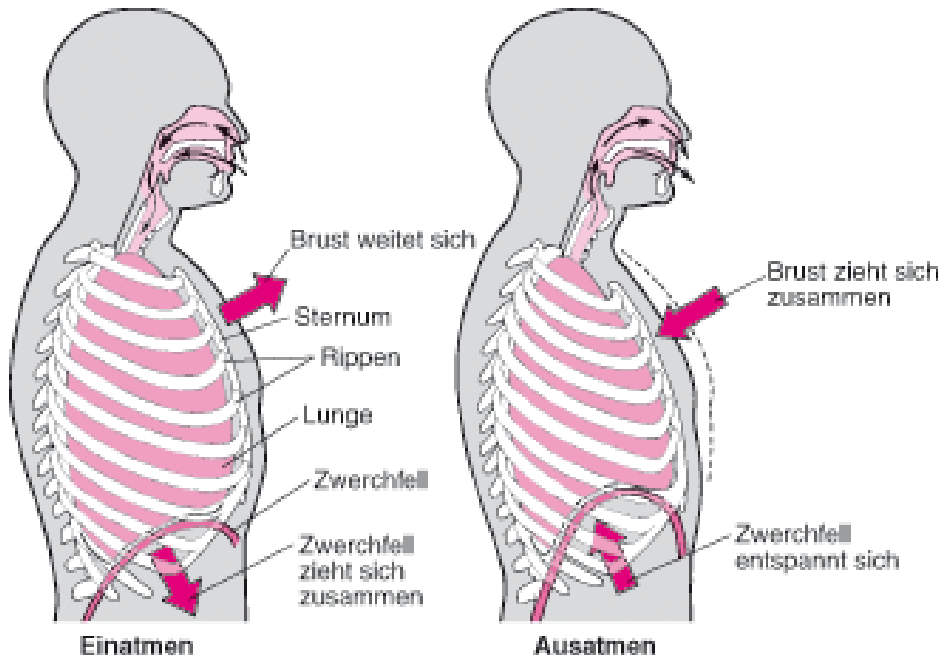
Wirbeln (*Vertebrae*)

Muskeln zwischen die Rippen

Musc. intercostales interni

Musc. intercostales externi

Zwerchfell (*Diaphragma*)



Hilfsmuskeln:

M. pectoralis major

M. serratus anterior

Luftnot:

Streckte Armen

Nasenflügel bewegen bei Atmung

M. sternocleidomastoideus ist gestreckt

Danke für die Aufmerksamkeit!

Literaturübersicht

Dr. Orsolya Kántor: Trachea, tüdő, pleura

Dr. Krisztina Minkó: Légzőrendszer

Yokochi: Color atlas of Anatomy

Kahle, Leonhardt, Plater: Taschenatlas der Anatomie

Faller: Anatomie in stichworten

<http://surfingworld.tk/bei/die-atmung-bei-der-varikose.html>

www.histologyguide.com

<https://www.lifeline.de/symptome/atembeschwerden-atemgeraeusche-id62600.html>