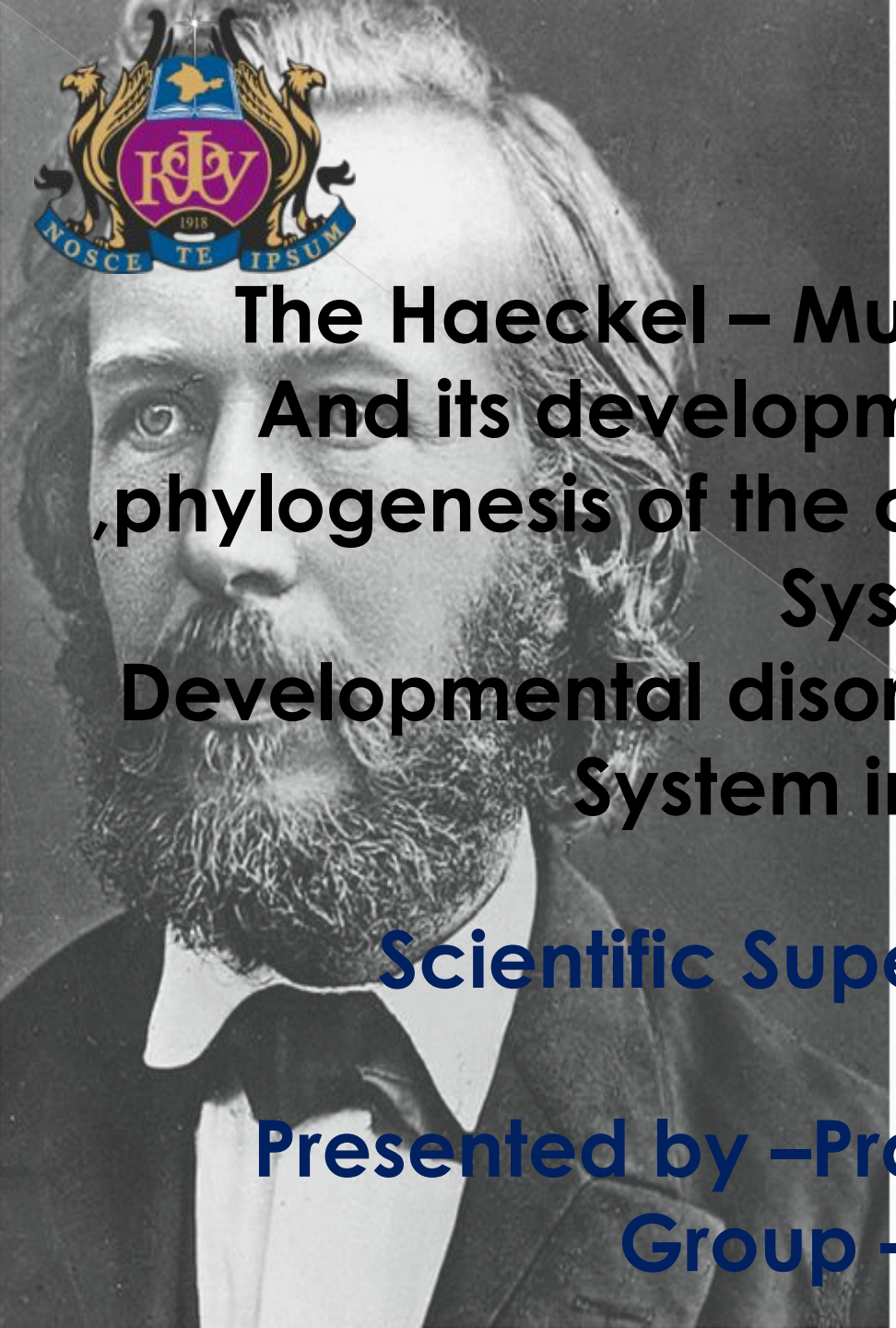


The Haeckel – Muller biogenetic law And its development A.N.Severstov ,phylogenesis of the chord avian respiratory System. Developmental disorders of the respiratory System in humans.

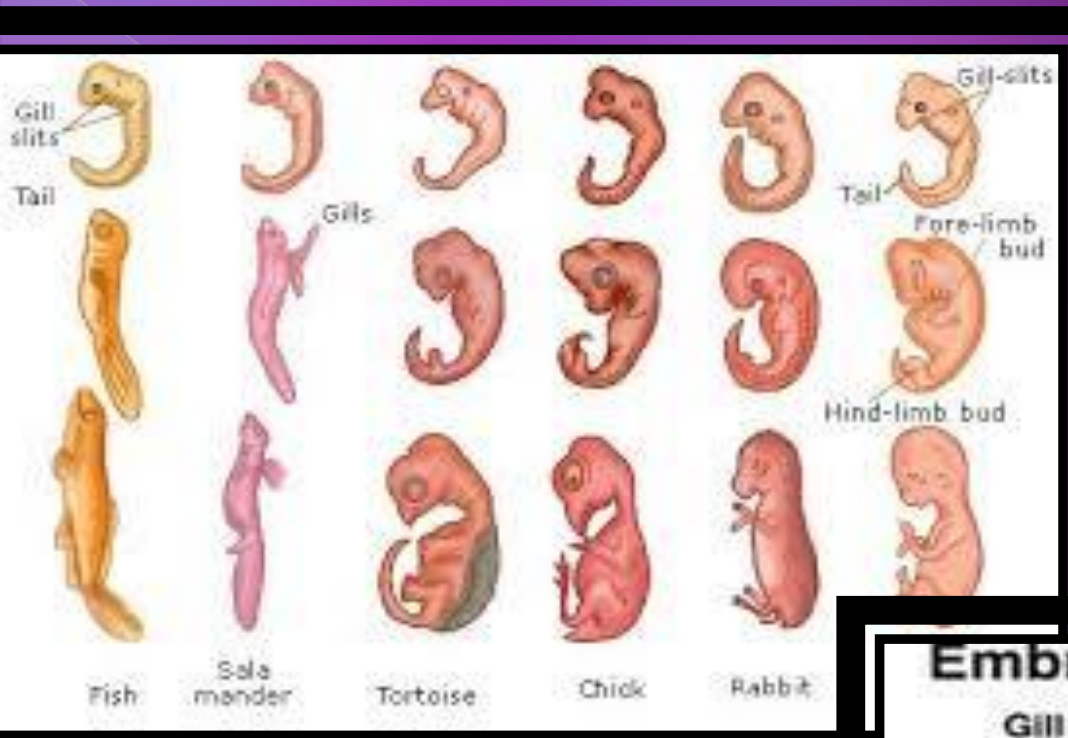
Scientific Supervisor – Svetlana Smirnova

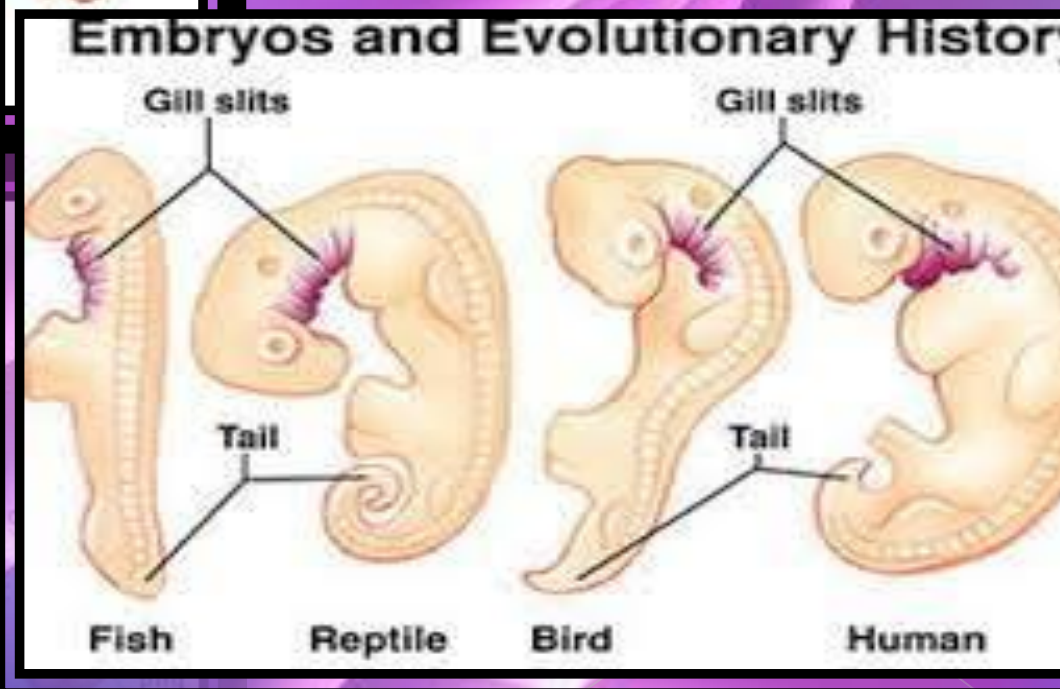
Presented by –Pratima Raj & Raj Patel

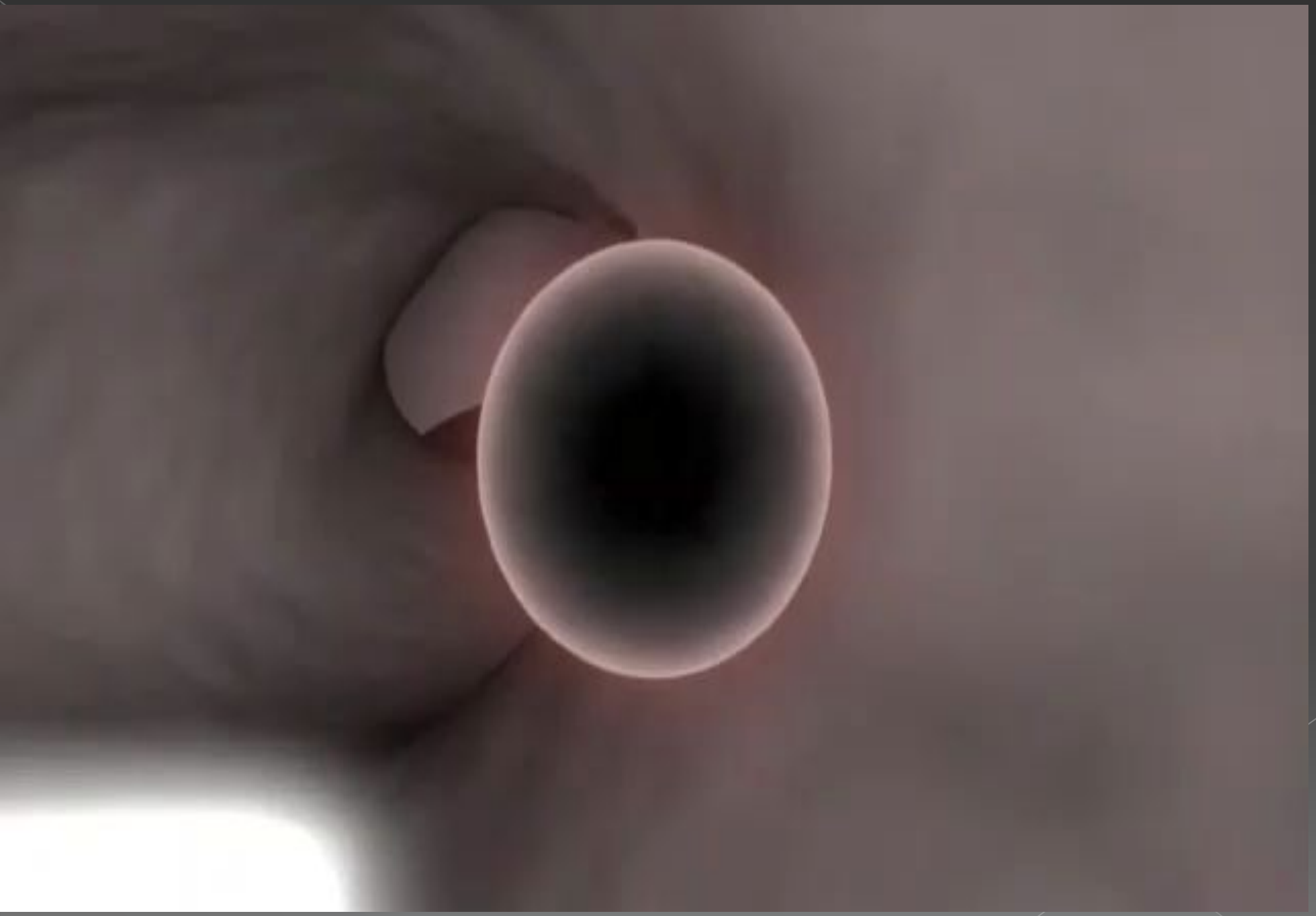
Group – LA2 192 B

HAECKEL-MULLER BIOGENETIC LAW

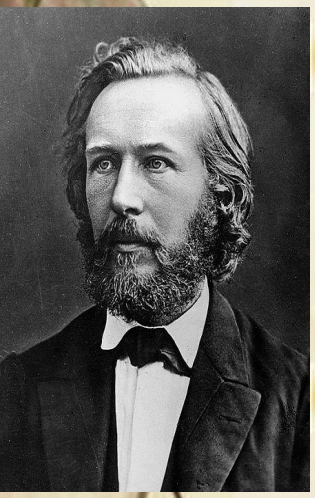
The biogenetic law is a theory of **development** and **evolution** proposed by Ernst **Haeckel** in Germany in **the** 1860s. It is one of several recapitulation theories, which posit that **the** stages of **development** for an animal embryo are **the** same as other animals' adult stages or forms.


Gill slits
Tail
Gills
Gill-slits
Tail
Fore-limb bud
Hind-limb bud
Fish
Sala mander
Tortoise
Chick
Rabbit


Embryos and Evolutionary Histor
Gill slits
Gill slits
Tail
Tail
Fish
Reptile
Bird
Human



Haeckel's Recapitulation Theory



- "Ontogeny recapitulates phylogeny"
- An individual organism's biological development (ontogeny) parallels and summarizes the evolutionary development of the species (phylogeny)
- Theory has been discredited since the early 20th century.
- While ontogeny and phylogeny are closely related and intertwined, there is by no means a one-to-one relationship between them.


Haeckel's Embryos
Icons of Evolution
Curriculum Modules

Ontogeny repeats phylogeny ?

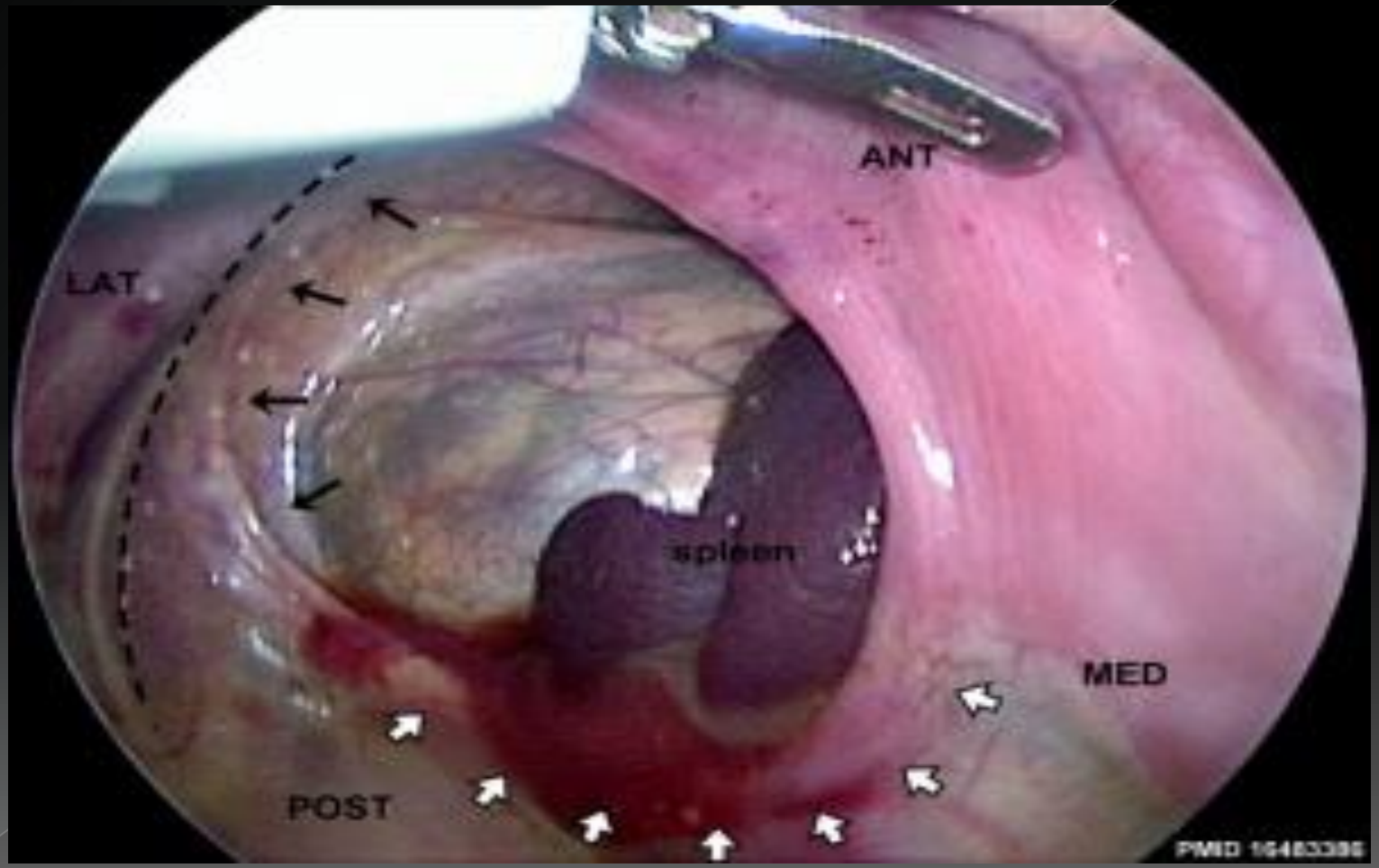
Ontogeny recapitulates phylogeny" is a catchy phrase coined by Ernst Haeckel, a 19th century German biologist and philosopher to **mean** that the development of an organism (**ontogeny**) expresses all the intermediate forms of its ancestors throughout evolution (**phylogeny**).

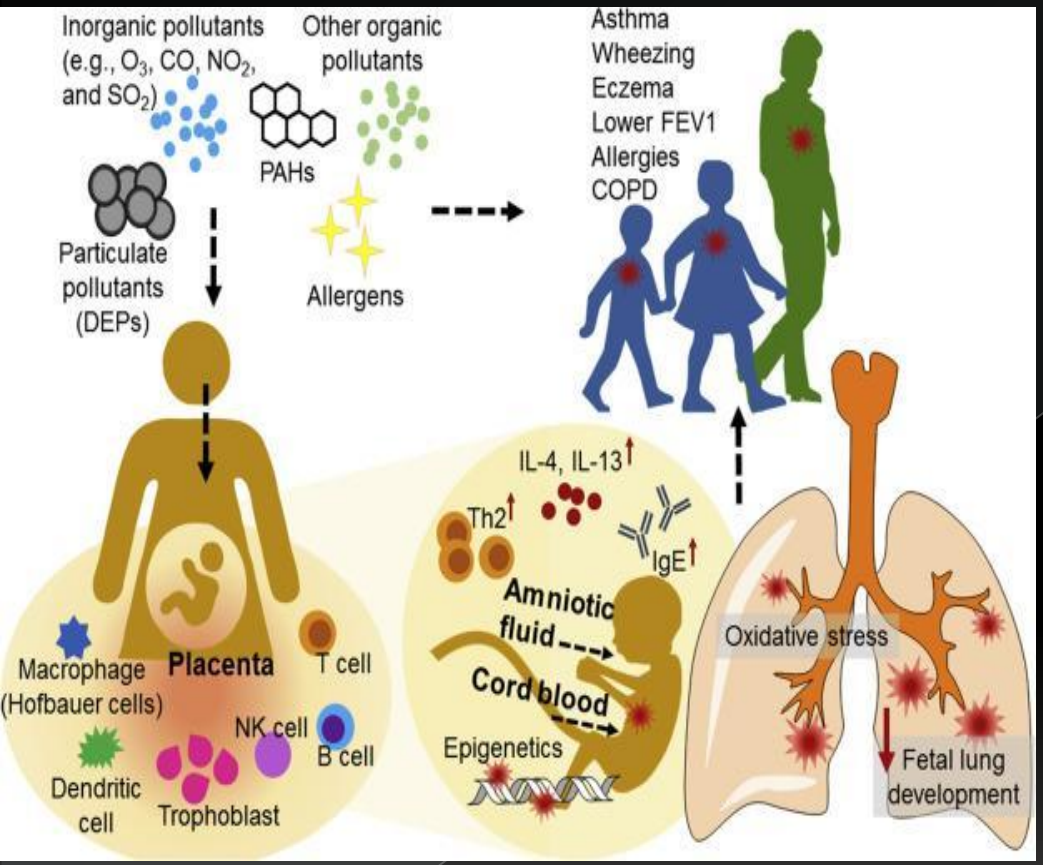
Developmental disorders of respiratory system in human

Common Respiratory Diseases

- Asthma. ...
- Chronic Obstructive Pulmonary Disease (COPD) ...
- Chronic Bronchitis. ...
- Emphysema. ...
- Lung Cancer. ...
- Cystic Fibrosis/Bronchiectasis. ...
- Pneumonia. ...
- Pleural Effusion.

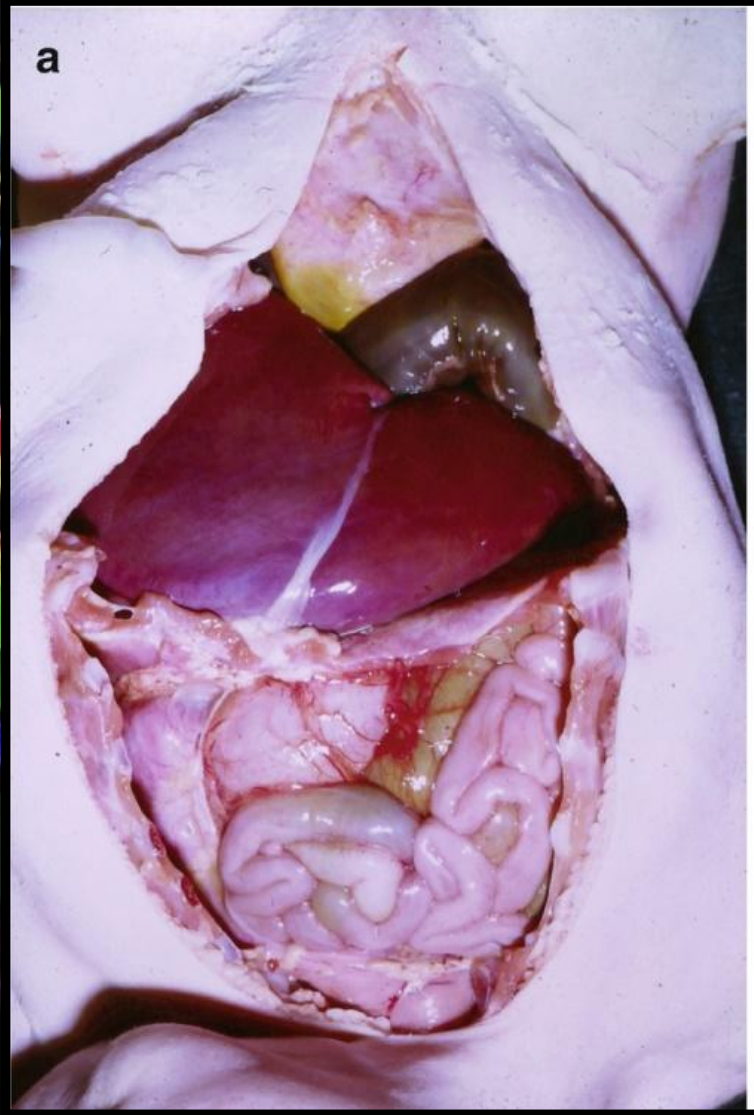
Embryology of abnormalities in human respiratory system





Abnormalities of the respiratory system include not only lung development but also the upper respiratory tract, the supporting musculoskeletal system and the vascular and neural system. In addition, some respiratory problems arise from prematurity of birth or difficulty with the birth process itself.

The functional part of the respiratory system, the alveoli, continue to develop the postnatal period and through childhood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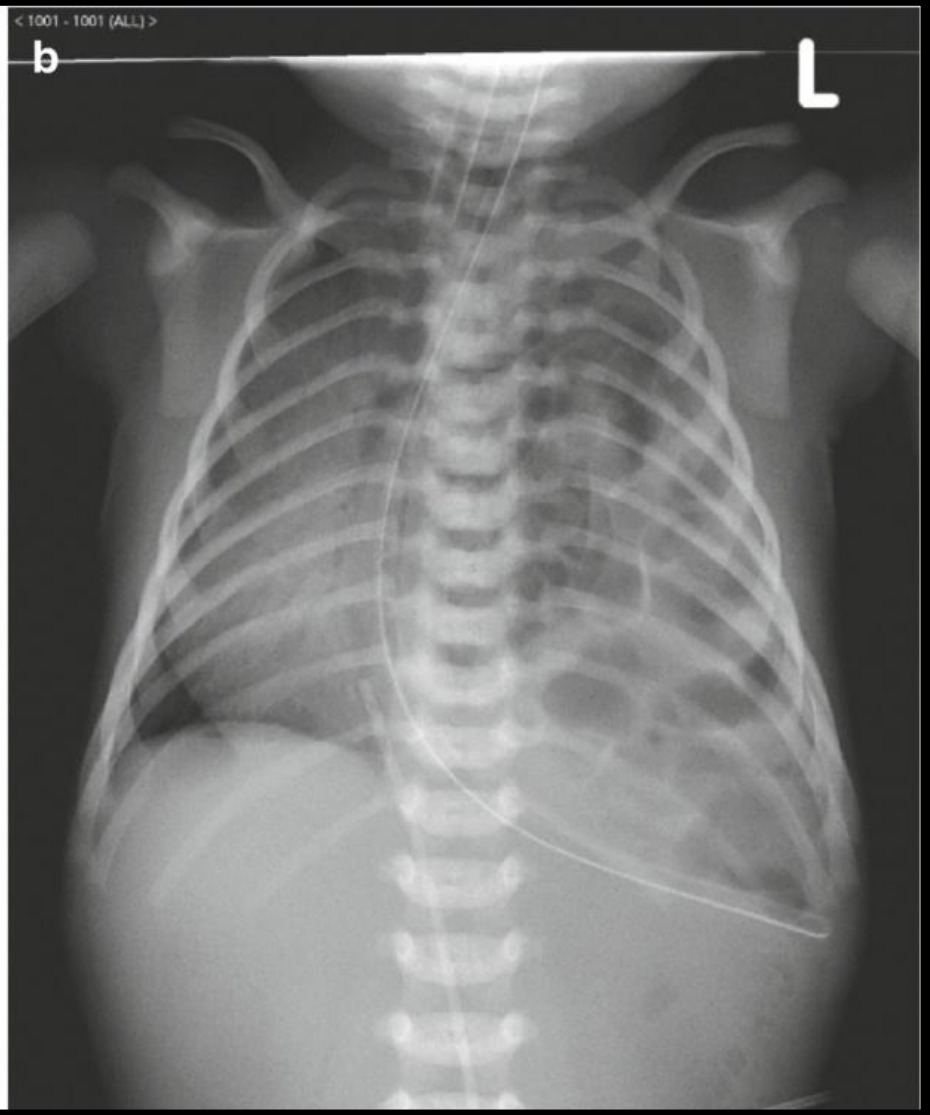
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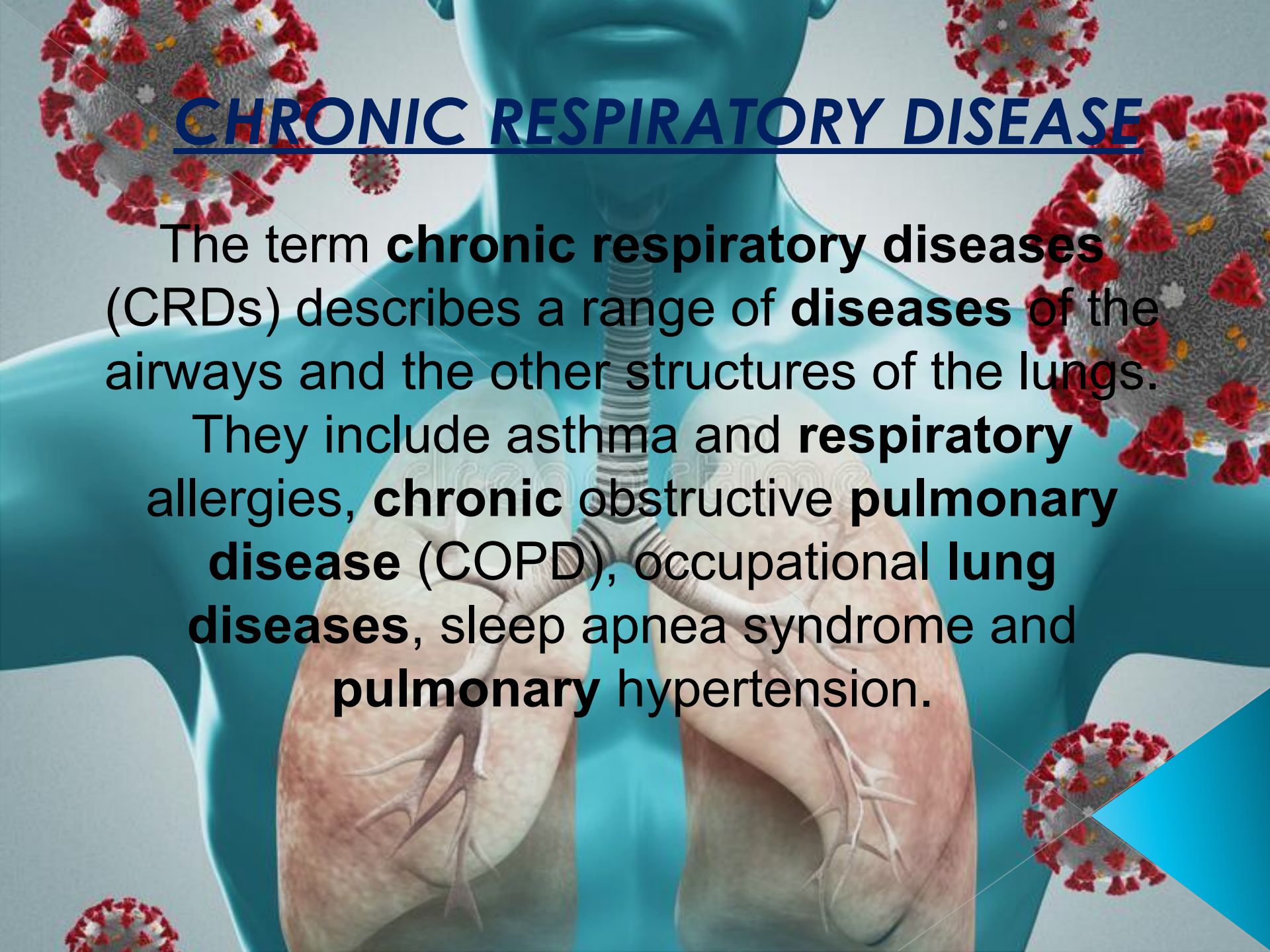


CHRONIC RESPIRATORY DISEASE

The term **chronic respiratory diseases** (CRDs) describes a range of **diseases** of the airways and the other structures of the lungs. They include asthma and **respiratory** allergies, **chronic** obstructive **pulmonary disease** (COPD), occupational **lung diseases**, sleep apnea syndrome and **pulmonary** hypertension.

Rhinitis and laryngitis

Large particles are deposited in the nose, pharynx, and larynx. More soluble gases (e.g., sulfur dioxide) are absorbed by upper respiratory tract mucous membranes, causing edema and mucus hypersecretion.

Tracheitis, bronchitis, and bronchiolitis

Large particles (more than 10 μm in diameter) are deposited and then cleared by cilia. Small particles and fine fibers are deposited in bronchioles and bifurcations of alveolar ducts. Less soluble gases penetrate to deeper, small airways.

Asthma and chronic obstructive pulmonary disease

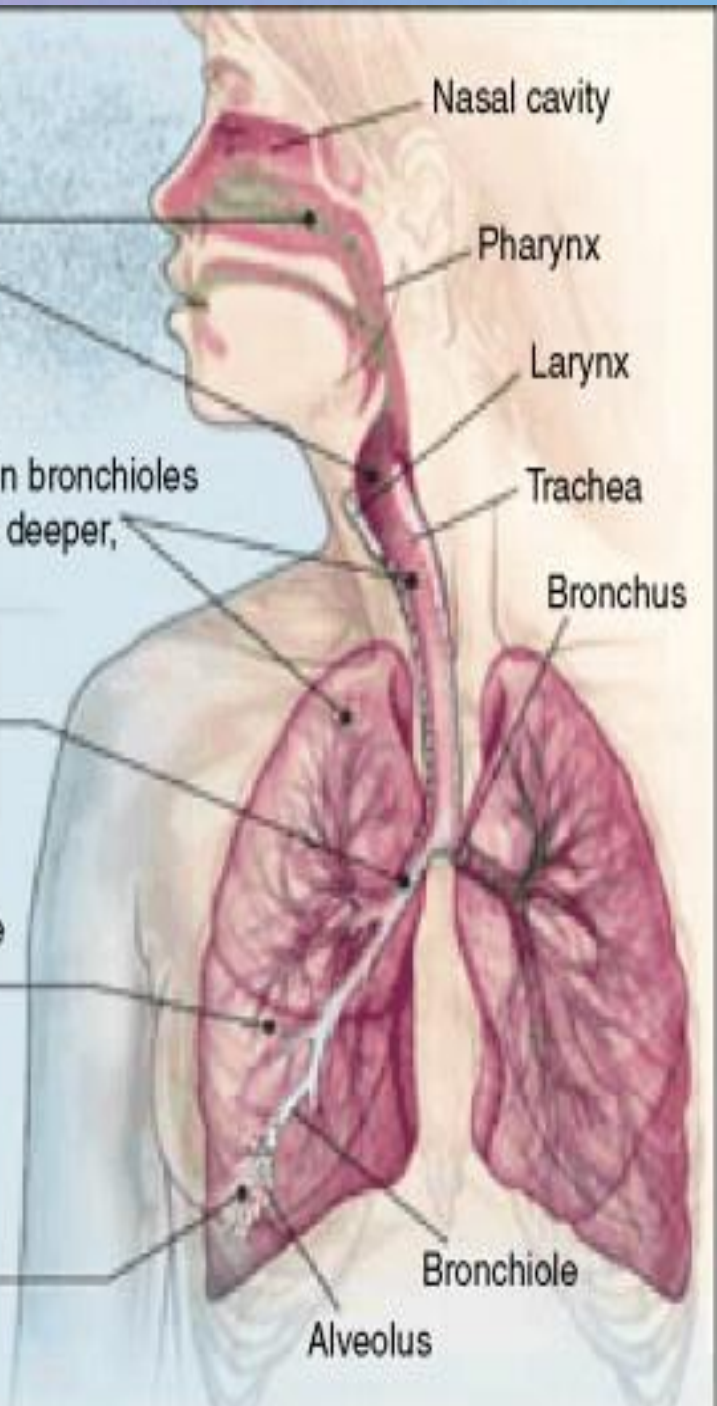
Allergens and irritants are deposited in large airways by turbulent flow, causing chronic inflammatory changes.

Cancer

Carcinogens (asbestos and polycyclic aromatic hydrocarbons) come into contact with bronchial epithelial cells, causing mutations in proto-oncogenes and tumor-suppressor genes. More than one such contact results in malignant transformation.

Interstitial disease

Small particles (less than 10 μm in diameter) and fibers are deposited in terminal bronchioles, alveolar ducts, and alveoli. Penetration to the interstitium results in fibrosis and the formation of granulomas.

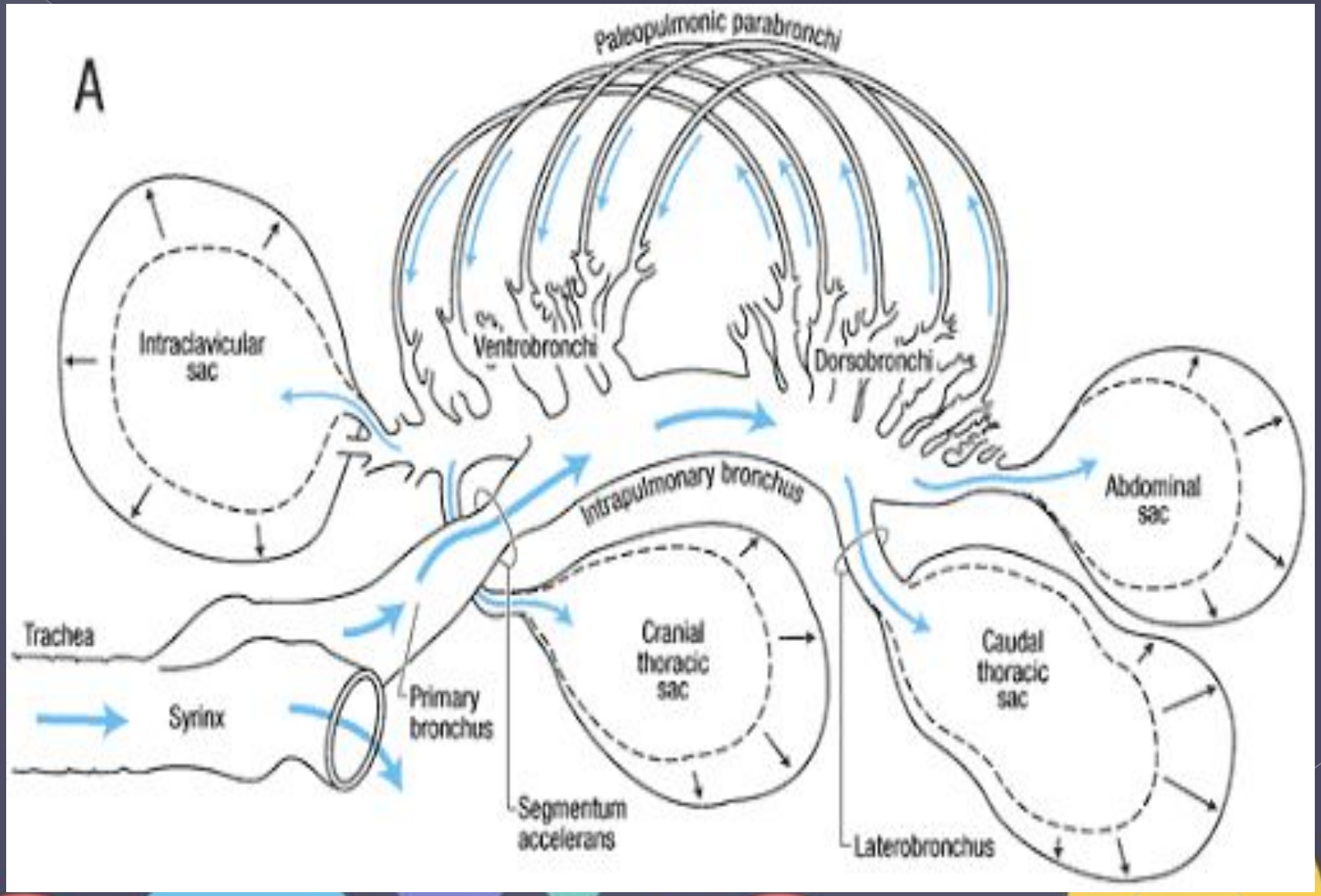


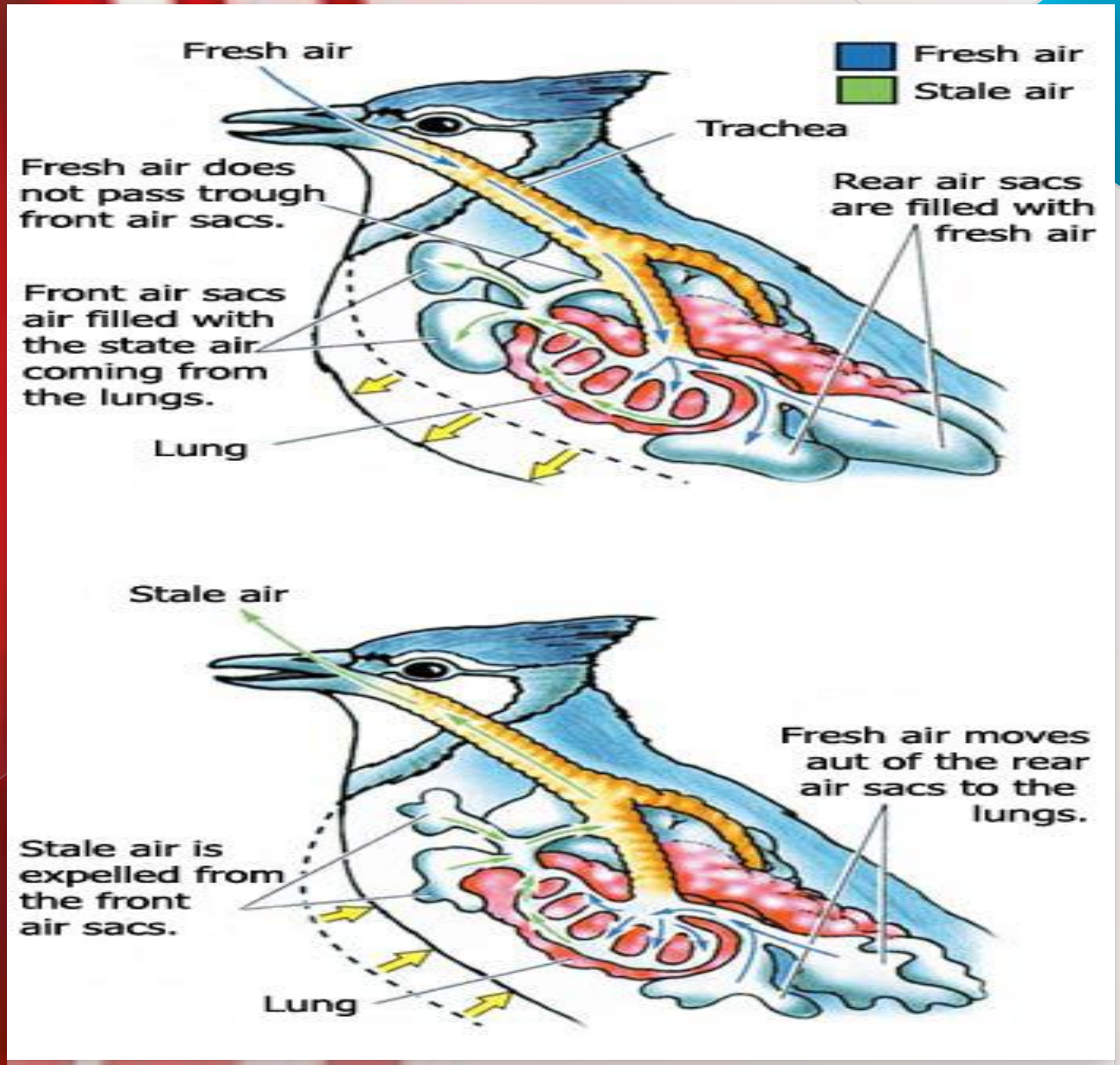
CONGENITAL RESPIRATORY DISORDERS

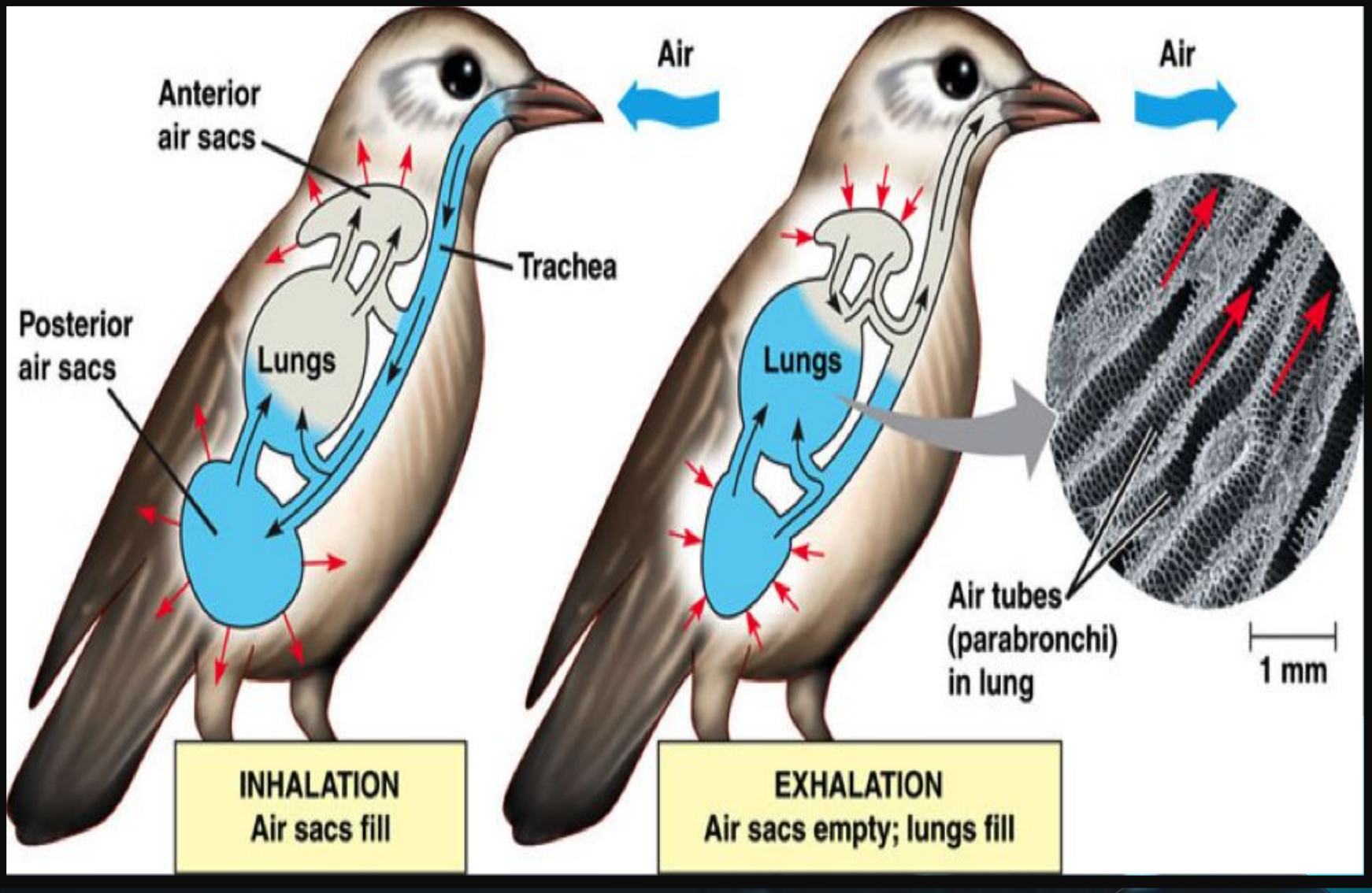
The incidence of congenital disorders of the respiratory tract is low and their effects are particularly seen during the first year of life. Congenital disorders can be subdivided into abnormalities of the thorax, specifically the diaphragm (hernia of the diaphragm), the lung (lung sequestration, cystic adenomatoid malformation, bronchogenic cyst, foregut cyst), the blood supply (aberrant vascularisation, double arch of the aorta), the airways (tracheal rings, tracheomalacia, tracheal atresia) and the larynx and oral cavity. Investigation and management of these diseases is usually organised in specialised centres.

Phylogenesis of chord Avian Respiratory System

Birds have evolved on the planet for over 150 million years and become the most speciose clade of modern vertebrates. Their biological success has been ascribed to important evolutionary novelties including feathers, powered flight, and respiratory system, some of which have a deep evolutionary history even before the origin of birds. The last two decades have witnessed a wealth of exceptionally preserved feathered non-avian dinosaurs and primitive birds, which provide the most compelling evidence supporting the hypothesis that birds are descended from theropod dinosaurs.


A
Paleopulmonic parabronchi
Intraclavicular sac
Ventrobronchi
Dorsobronchi
Intrapulmonary bronchus
Abdominal sac
Trachea
Syrinx
Primary bronchus
Cranial thoracic sac
Caudal thoracic sac
Segmentum accelerans
Laterobronchus


Fresh air
Fresh air
Stale air
Trachea
Fresh air does not pass trough front air sacs.
Rear air sacs are filled with fresh air
Front air sacs air filled with the state air coming from the lungs.
Lung
Stale air
Fresh air moves aut of the rear air sacs to the lungs.
Stale air is expelled from the front air sacs.
Lung


Air
Air
Anterior
air sacs
Trachea
Posterior
air sacs
Lungs
Lungs
Air tubes
(parabronchi)
in lung
1 mm
INHALATION
Air sacs fill
EXHALATION
Air sacs empty; lungs fill

PHYSIOLOGY OF BIRDS FLYING AT HIGH ALTITUDE

Birds that fly at high altitudes must support vigorous exercise in oxygen-thin environments. Here we discuss the characteristics that help high-fliers sustain the high rates of metabolism needed for flight at elevation. Many traits in the O2 transport pathway distinguish birds in general from other vertebrates. These include enhanced gas-exchange effectiveness in the lungs, maintenance of O2 delivery and oxygenation in the brain during hypoxia, augmented O2 diffusion capacity in peripheral tissues, and a high aerobic capacity. These traits are not high-altitude adaptations, because they are also characteristic of lowland birds, but are nonetheless important for hypoxia tolerance and exercise capacity.

Video links

- https://youtu.be/835-5C_wOGg
- https://youtu.be/-oHlcuS7AeU
- https://youtu.be/kWMmyVu1ueY

THANK YOU FOR YOUR ATTENTION