

Pathology of the Respiratory System

Wanda M. Haschek-Hock B.V.Sc., Ph.D. ,
D.A.C.V.P., D.A.B.T.

College of Veterinary Medicine
University of Illinois at Urbana-Champaign

whaschek@uiuc.edu

This material is to be used solely for educational purposes.

Disclaimer: While this material provides an over view of the field, it does not attempt to cover all diseases and the most recent scientific findings in the field.

**General Pathology of the Respiratory
System:
Structure and Cell Biology**

Respiratory System

- Conducting System
 - Nasal passages
 - Paranasal sinuses
 - Larynx, pharynx, trachea
 - Bronchi
- Transitional System
 - Bronchioles
- Gas exchange
 - Alveoli
- Respiratory system has many other functions
- Lymphoid system

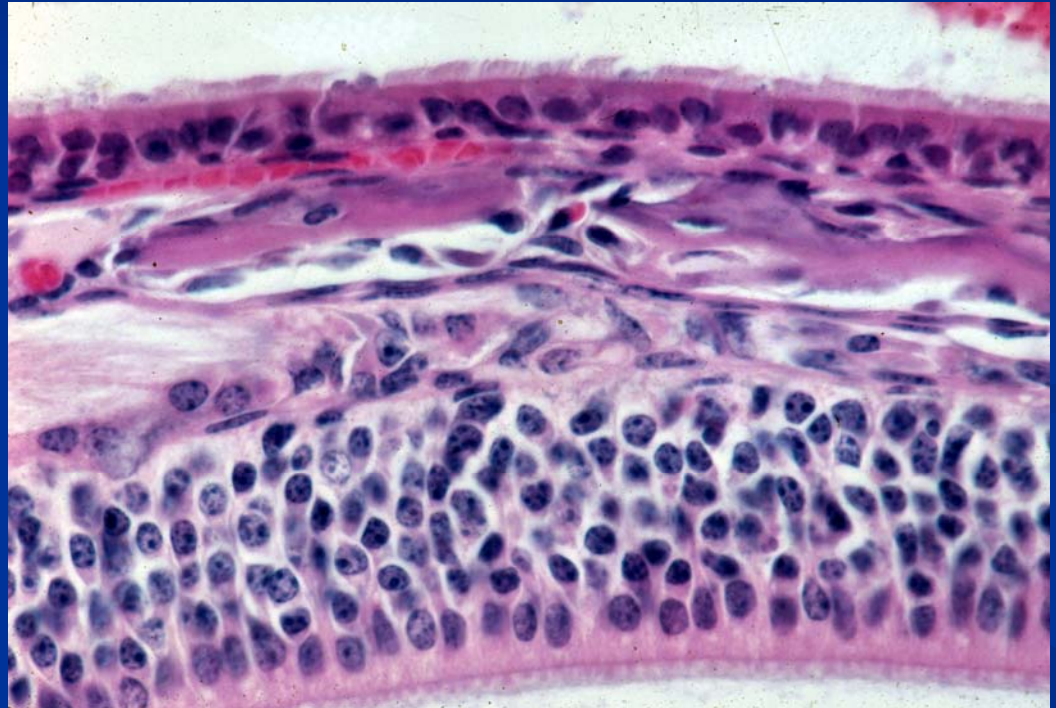
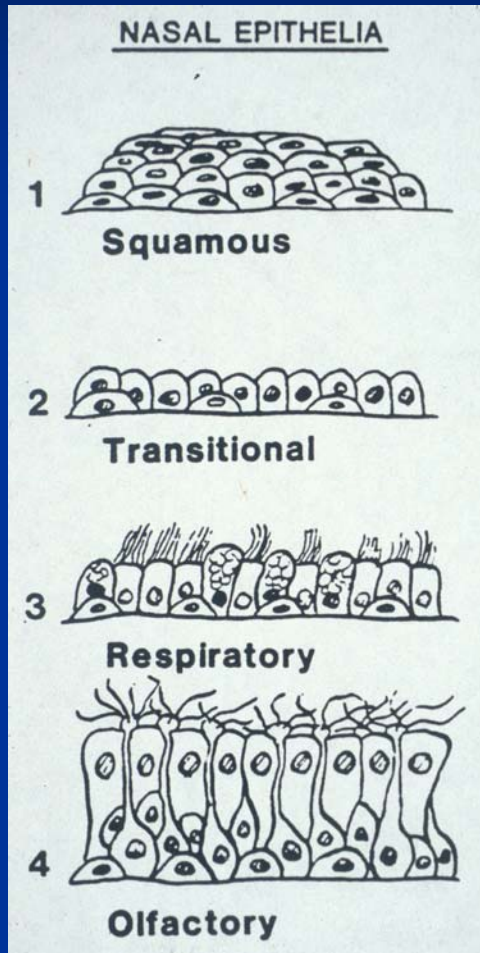
Conducting Airway Function

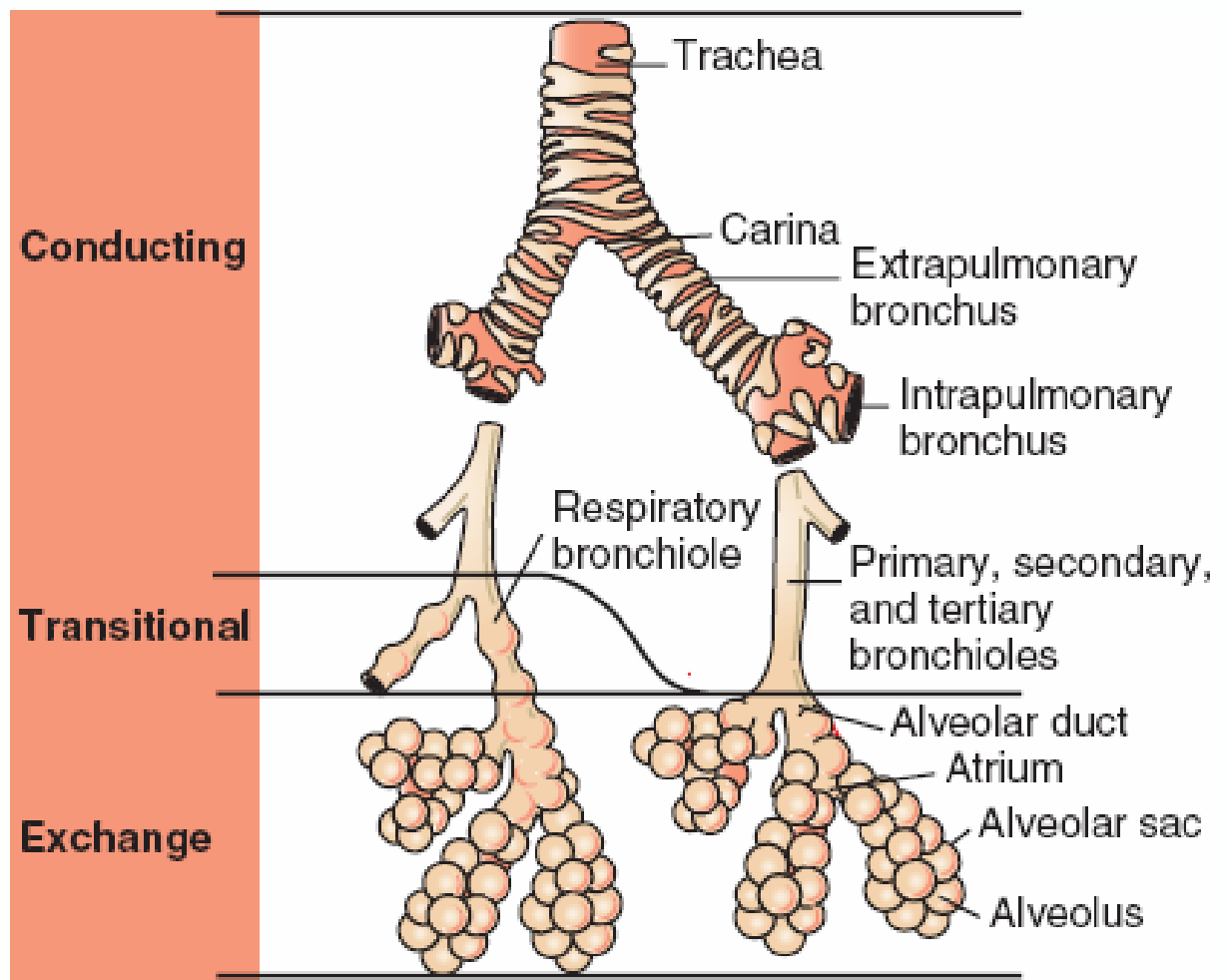
- Conduct, humidify and warm air
- Smell-find food, protection, pheromones
- Absorption of water soluble gases (SO₂, O₃)
- "Filter" out all particles $\geq 10 \mu\text{m}$ in nasal cavity, particles $\geq 3 \mu\text{m}$ ❖ lung
- Mucociliary clearance of particles including viruses and bacteria

Conducting Airway Function (cont)

- Protective reflexes: sneeze, cough reflex, broncho-constriction
- Xenobiotic metabolism – detoxification e.g. olfactory epithelium, Clara cells
- Immune function
- Nonspecific defenses - interferon, lysozyme, lactoferrin
- Normal flora - prevents colonization by pathogens

Nasal Epithelium



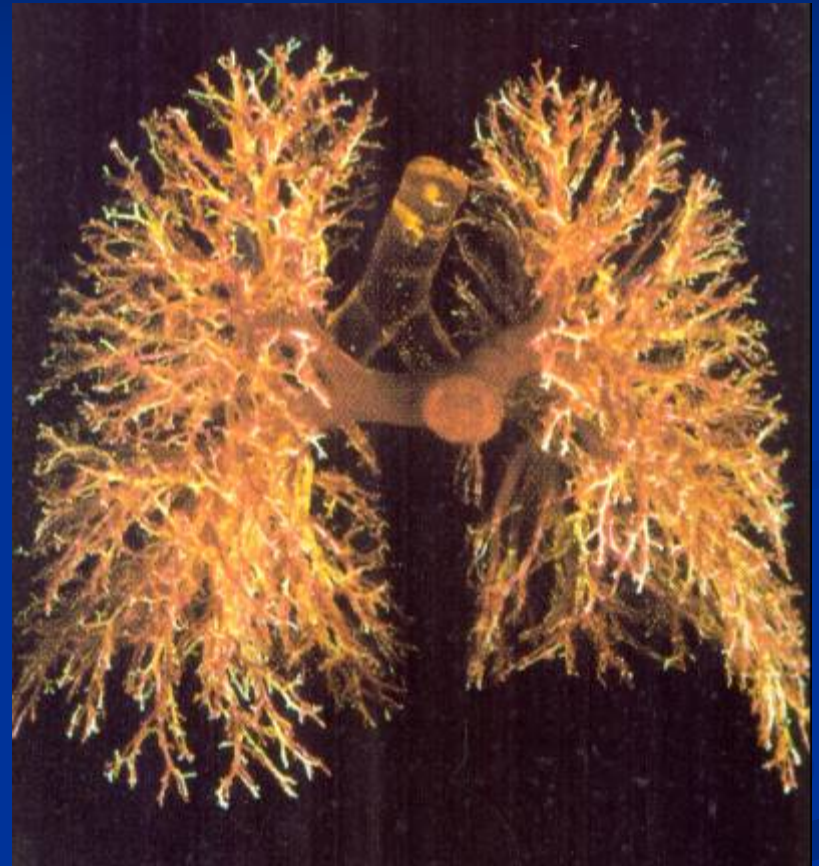


Comparative Respiratory Anatomy/Physiology

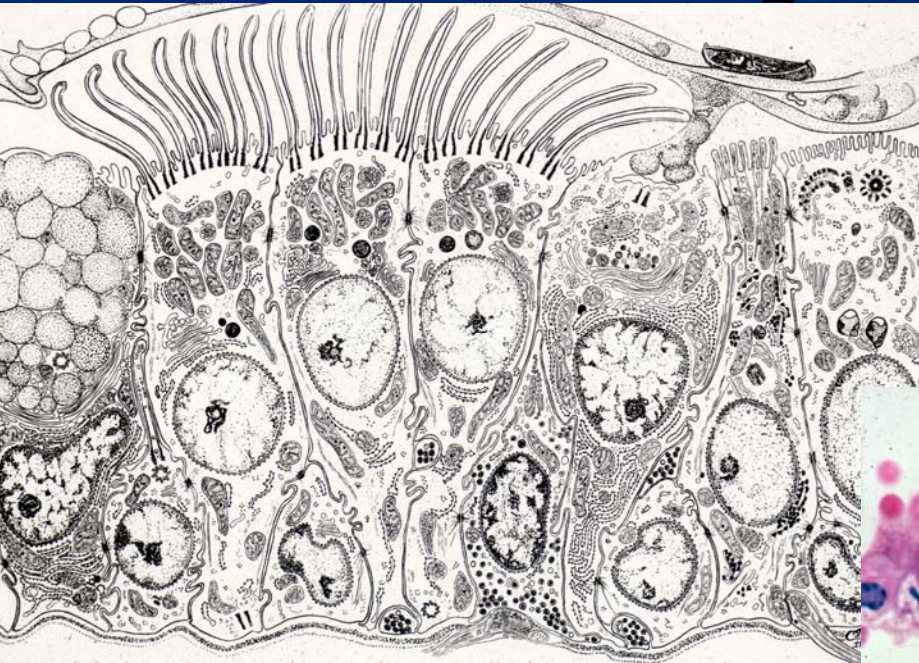
Airway Features	Mouse	Rat	Human
Branching Pattern of Airways	Monopodial	Monopodial	Dichotomous Symmetrical
Airway Generations	13-17	12-20	17-21
Respiratory Bronchioles	Absent	Absent	Extensive
Cartilage and Submucosal Glands in Intrapulmonary Bronchi	Absent	Absent	Present
Clara Cells (bronchi/bronchioles)	Abundant	Abundant	Less Abundant
Serous Cells in the Respiratory Epithelium	Absent	Present	Absent

Bronchi

- Epithelium
 - Pseudostratified ciliated columnar cells
 - Basal cells
 - Ciliated cells
 - Secretory cells
- Lamina propria mucosa
 - Elastic fibers
- Lamina muscularis mucosa
 - Smooth muscle fibers
- Propria - submucosa
- Hyaline cartilage
- Smooth muscle



Bronchial/Bronchiolar Epithelium



- Ciliated cells
- Secretory cells
 - Serous and mucous cells decrease distally and Clara cells increase distally

