

Respiratory System

I. Introduction

A. Functions

- Oxygen uptake
- Carbon dioxide expulsion

B. Atmospheric gasses

- Nitrogen
- Oxygen
- Carbon dioxide

C. Elements of gas exchange

- Gradients: concentration and pressure
- Temperature & moisture affect diffusion

D. Mechanisms of gas exchange

- Cutaneous respiration
- Tracheal respiration
- Gills
 - Countercurrent flow
- Lungs

E. Mechanics of breathing with lungs

- Boyle's law
 - Pressure varies inversely with volume
 - Causes inhalation and exhalation

F. Comparative breathing

- Amphibian
- Avian

II. Human Respiratory System

A. Structures

- Primary structures
 - Oral / nasal cavities
 - Pharynx
 - Larynx
 - Epiglottis
 - Vocal folds
 - Trachea
 - Bronchi
 - Bronchioles
 - Alveoli
- Other structures
 - Hyaline cartilage
 - Ciliated epithelia
 - Diaphragm

BIO 102 General Biology
Lecture Outline

B. Breathing

Mechanics of breathing

Inhalation

Exhalation

Lung capacities

Total lung capacity

Tidal volume

Vital capacity

Residual volume

C. Gas exchange and transport

Alveoli Capillaries

Oxygen transport

Carbon dioxide transport

Partial pressure gradients drive gas exchange

D. Respiratory control

Voluntary

Involuntary

Medulla oblongata & pons

Carbon dioxide levels drive breathing rate

E. Respiratory disease

III. Environmental Effects on Respiration

A. Altitude

Effects

Acclimatization

B. Depth

Human divers

Diving mammals