Objectives
To explore compensation mechanisms for pH homeostasis.
- Respiratory compensation.
- Renal compensation.

Review of ventilation regulation
Review for Mid-term
- Preparation Suggestions
  - Discriminating study habits

Compensation
A form of homeostasis that occurs when an acid-base imbalance occurs when the built in buffering system fails.

I. Respiratory Compensations
II. Renal Compensations

Respiratory Compensations
The respiratory compensates for the metabolic disturbances to pH.

Respiratory centers are stimulated by H+ levels and respond to restore balance.

Metabolic Acidosis
Blood pH is low (below 7.35)
HCO\(_3^-\) level is below 22 mEq/l

Response by respiratory system:
- Exhales more CO\(_2\) to compensate.
- PCO\(_2\) falls below 35 mm Hg.

Metabolic Alkalosis
Blood pH is over 7.45
HCO\(_3^-\) level is over 26 mEq/l

Response by respiratory system:
- Slow, shallow breathing pattern.
- This allows a build up of CO\(_2\) in the blood.
- PCO\(_2\) levels above 45 mm Hg.

Renal Compensations
The kidneys compensate for respiratory disturbances to pH.

Respiratory acidosis:
Hypoventilating person – will experience R.A. as CO\(_2\) builds.
- PCO\(_2\) high
- HCO\(_3^-\) high - kidneys are retaining bicarbonate to offset acidosis.
Renal Compensations

Respiratory alkalosis

If renal compensation is happening then:
- High blood pH
- Low pCO2
- Bicarbonate ion levels begin to fall
  (kidneys work to eliminate it)