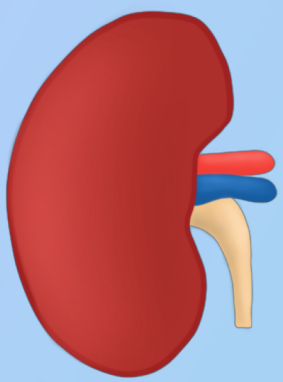
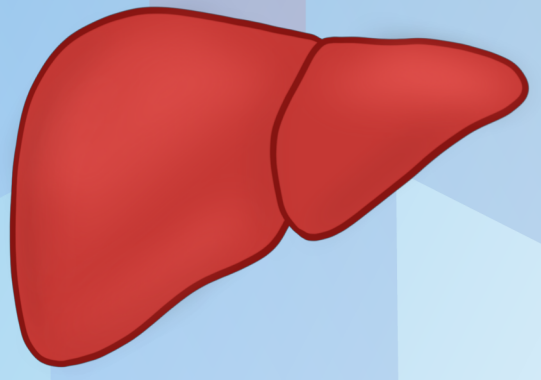
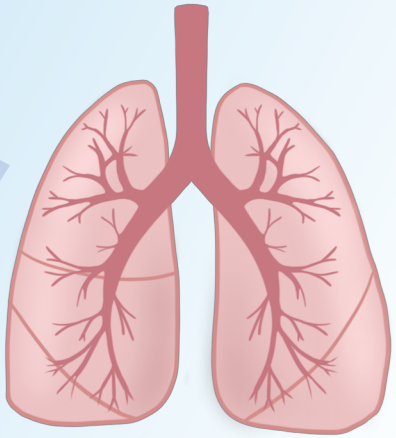
RAAS

Renin-Angiotensin-Aldosterone-System







Blood Pressure Regulation

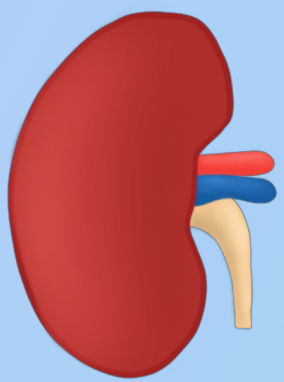
Baroreceptor Reflex

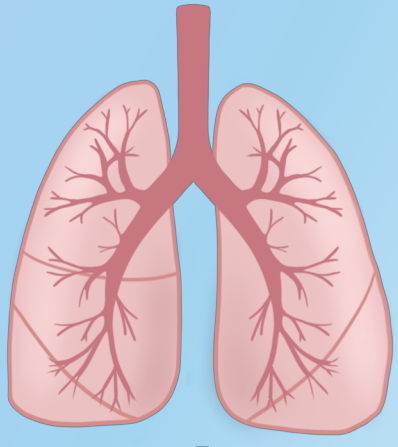
- Neurally mediated
- Fast
- Respond to change in Arterial pressure (Pa)

RAAS

- Hormonally mediated
- Slow
- Respond to change in Arterial pressure (Pa)

↓ BP

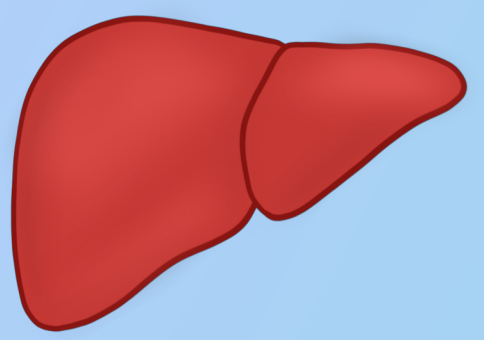




RENIN

ACE

ANGIOTENSINOGEN → ANGIOTENSIN I → ANGIOTENSIN II



Aldosterone
- ↓ Na+ and H_2O excretion by the kidney

ADH
- ↓ H_2O excretion

v**A**soconstriction
- ↑BP and GFR

Step by step

- **Renin** (Angiotensinogenase)
  - Made from Prorenin
  - Hydrolyze Angiotensinogen to Angiotensin I
- **Angiotensinogen**
  - Produced mainly in liver
  - Constant presence in circulation
- **Angiotensin I**
  - No apparent biological activity, except as precursor
- **ACE** (Angiotensin converting enzyme)
  - Convert AT1→ AT2 in the lungs and kidneys

The Quarterback – The playmaker

- **Angiotensin II**
  - Hypothalamus
    - Increases secretion of Antidiuretic hormone (**ADH**, also called vasopressin)
      - ADH increase water reabsorption in collecting ducts
  - Zona glomerulosa of adrenal cortex
    - Increases **Aldosterone** synthesis and secretion
  - Direct action on kidneys
    - Stimulates Na^+/H^+ exchange
    - Increases reabsorption of Na^+ and HCO_3^+
  - Arterioles
    - (v**A**so)**Constricts** efferent arteriole → ↑GFR
    - Stimulate G_q protein in endothelial cells → generalized vasoconstriction → ↑BP

The Star player

- **Aldosterone**
  - Mineralocorticoid hormone
  - Function
    - Distal tubule and collecting ducts
      - increase Na+ reabsorption
    - Colon:
      - upregulates epithelial sodium channels → increased Na+ absorption