2005a(13): Describe the non-respiratory functions of the lung

Filtration

Filtration

Immune (mφ, IgA)

Reservoir (blood / gas)

Metabolic (ACE, α₁-antitrypsin, CHO, protein)

Thermoregulation (↑T°C / humidify)

Inhalational agents

Taking up drugs (fent, lig, prop)

Surfactant Synthesis (surfactant)

Filtration

Blood → Receives all CO
  - Venous emboli filtering
    - Intrinsic fibrinolytic activity ↑break down
    - Consider R→L shunt: ↑venous emboli entering heart/brain
  - Microbe filtering to prevent entry to arterial circulation

Airways (1° upper airway) → Particulate matter filtration
  - Impaction/sedimentation
  - Nasal hairs
  - Mucous production
  - Mucociliary escalator

Immunological

Macrophages within alveoli

Secretary IgA

Reservoir

Blood → Lung blood vol ~450ml (80ml pulmonary capillary, 370ml pulmonary vasculature)
  - During straining pulmonary contribution can decrease down to 250ml, ↑effective blood volume
  - SNS stimulation → constriction pulmonary vasculature → mobilization of blood to ↑CO

↑pulmonary artery pressure → ↑pulmonary blood vol 2° to:
  - ↑recruitment of capillaries
  - Distension of capillaries (↑caliber)

Gas → Transmission of air to vocalize/cough, FRC is O₂ reservoir

Metabolism

Vasoactive Substances → Highest store in body of ACE
  - Converts angiotensin I to angiotensin II
  - Breaks down bradykinin

Protein production
  - Maintaining structure of lung

CHO metabolism

Removal of proteases via α₁-antitrypsin

Thermoregulation

Warming and humidification
  - ↑role of lung in ↑MV, extreme cold/dry conditions

By Amanda Diaz
**Inhalational Agents**
- Access point for VA / bronchodilators

**Taking up drugs**
- Sequestering of drugs → fentanyl, lignocaine, propofol
- Passive/active
- Fentanyl has significant uptake in the lungs
  - Release later on into arterial circulation → ‘2nd peak’

**Surfactant Synthesis**
- Type 2 pneumocytes
- Role: ↓surface tension of alveoli → prevents emptying of smaller alveoli into larger ones / preventing transudation of water into alveolar space