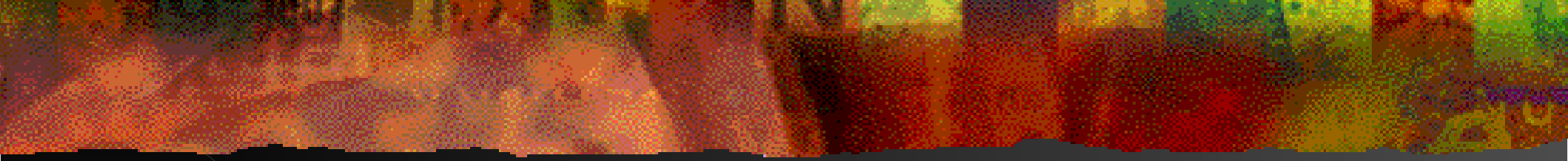
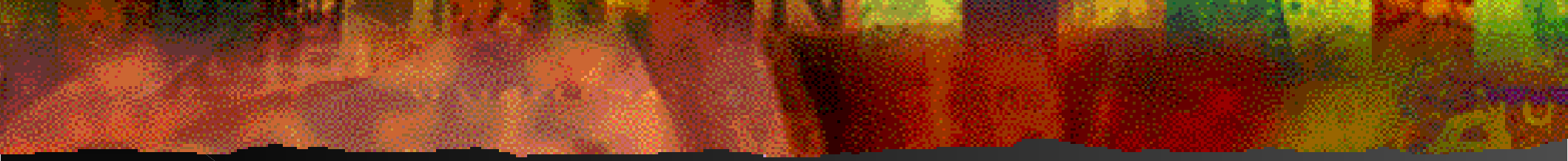


Digestion and Absorption

Micronutrients



Vitamins and Electrolytes transport and Diarrhea

Absorption of vitamins

- In terms of absorption, vitamins are classified to whether they are lipid-soluble or water-soluble
- The fat-soluble vitamins include A, D, E, & K
- The water-soluble vitamins are C, B_1, B_2, B_6, B_{12}, and folic acid

Absorption of vitamins (cont)

A. Fat-soluble vitamins are incorporated into micelles and absorbed along with other lipids
B. Most water-soluble vitamins are absorbed by Na-dependent cotransport mechanisms
C. Vitamin B_{12} is absorbed in the ileum and requires intrinsic factor
   - Gastrectomy results in the loss of parietal cells and loss of intrinsic factor ⟹ pernicious anemia

Absorption and secretion of electrolytes and water

- Electrolytes and H_2O may cross intestinal epithelial cells by either cellular or paracellular
- The permeability of the tight junctions varies with the type of epithelium
  - A tight epithelium is the colon
  - Leaky epithelia are the small intestine and gallbladder

Absorption and secretion of electrolytes and water

- Absorption of NaCl:

Na moves into the intestinal cells by the following mechanisms

1) Passive diffusion
2) Na-glucose or Na-amino acid cotransport
3) Na-Cl exchange
4) Na-H exchange

Absorption and secretion of electrolytes and water

- Cl absorption accompanies Na absorption by the following mechanisms:

1) Passive diffusion
2) Na-Cl cotransport
3) Cl-HCO_3 exchange

- Absorption and secretion of K

- K is absorbed in the small intestine by passive diffusion
- K secretion in the colon is stimulated by aldosterone
- Excessive loss of k in diarrheal fluids causes hypokalemia

Ca Absorption by Enterocytes

- ↓ plasma Ca → ↑ parathyroid hormone

  ↓

  25-hydroxy-vitamin D_3 → kidney

1,25 dihydroxy-vitamin D_3 →

Stimulates synthesis of Ca-binding protein and Ca-ATPase in enterocytes

Diarrhea

- Diarrhea
- To run through ⇒
- ✓ ↓ ECF → ↓ arterial pressure
- ✓ ↓ HCO3 (relative to Cl) → Hyperchloremic metabolic acidosis
- ✓ ↓ K → Hypokalemia

Causes of Diarrhea:

- Decreased surface area for absorption
- Osmotic diarrhea (lactase deficiency)
- Secretory diarrhea