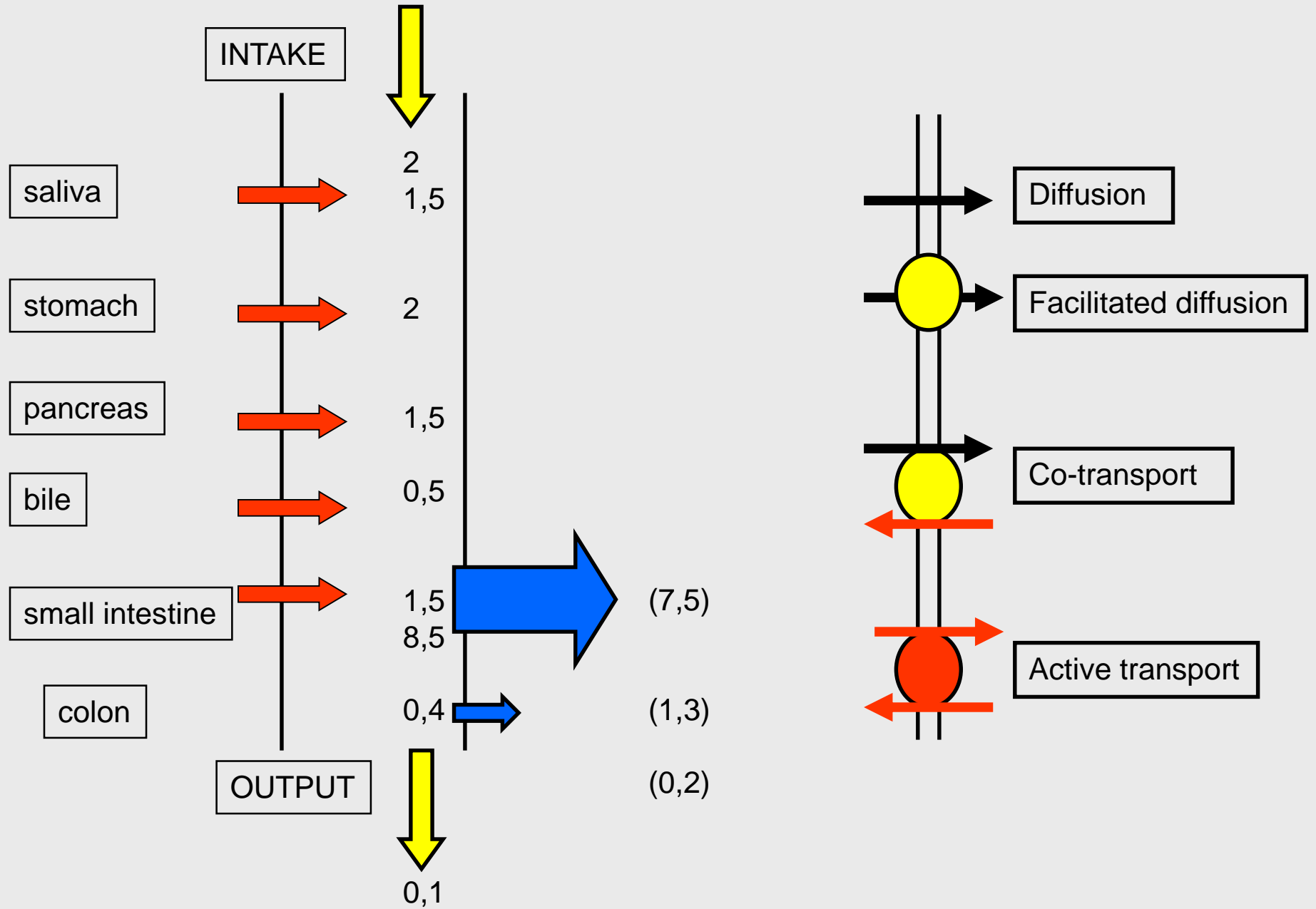


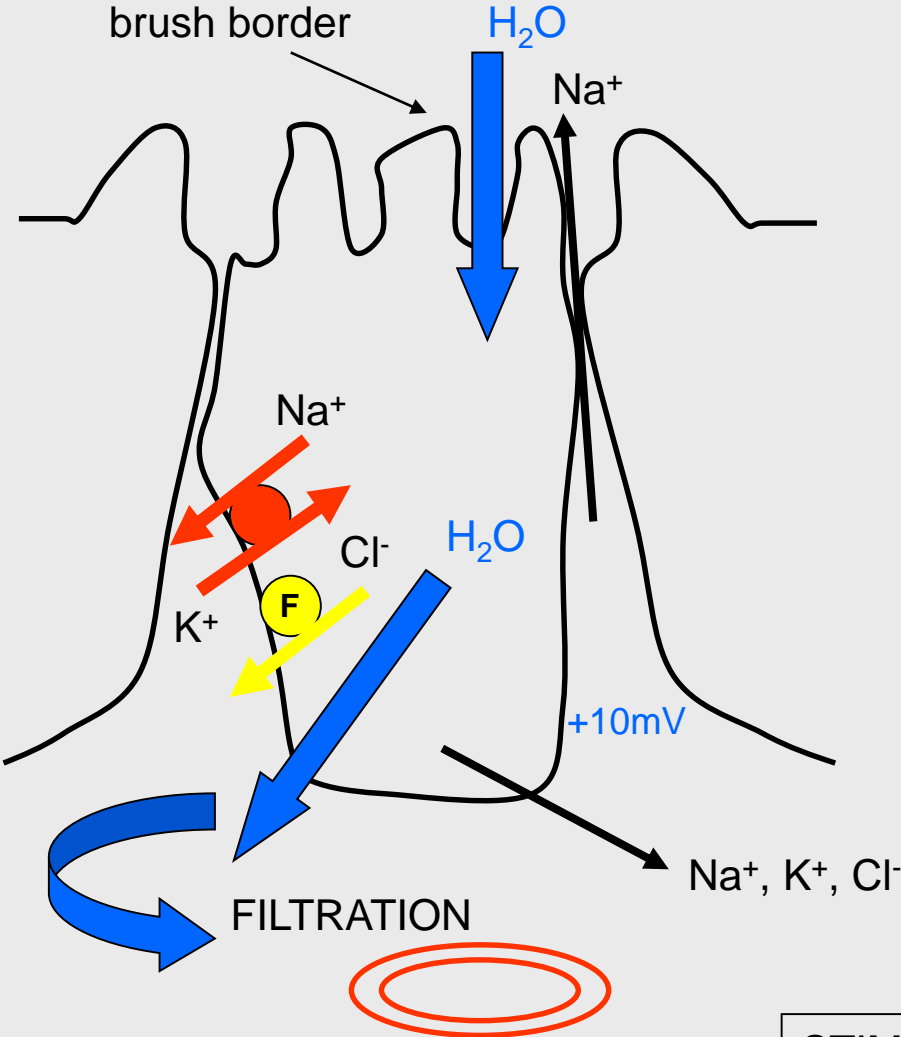
WATER BALANCE (l / DAY)



WATER ABSORPTION

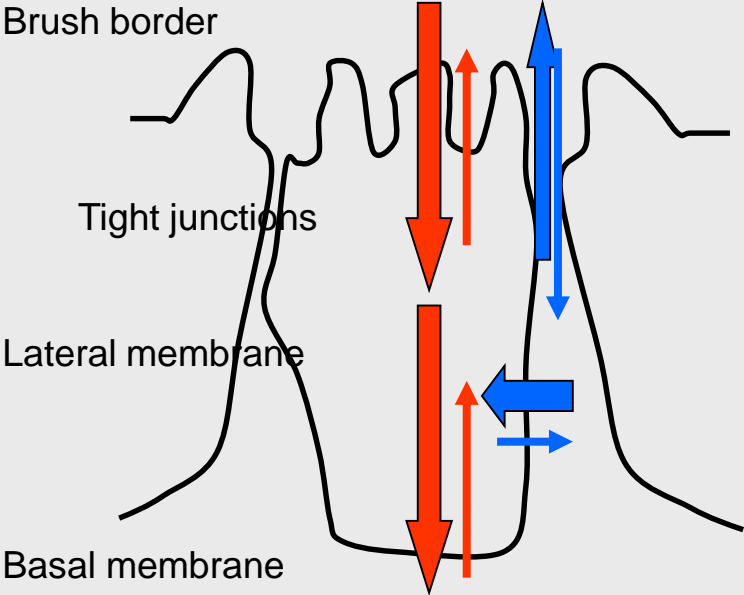
(small intestine, gallbladder, stomach, colon)

(duodenum - osmotic draft of H₂O)



Continuous osmotic gradient

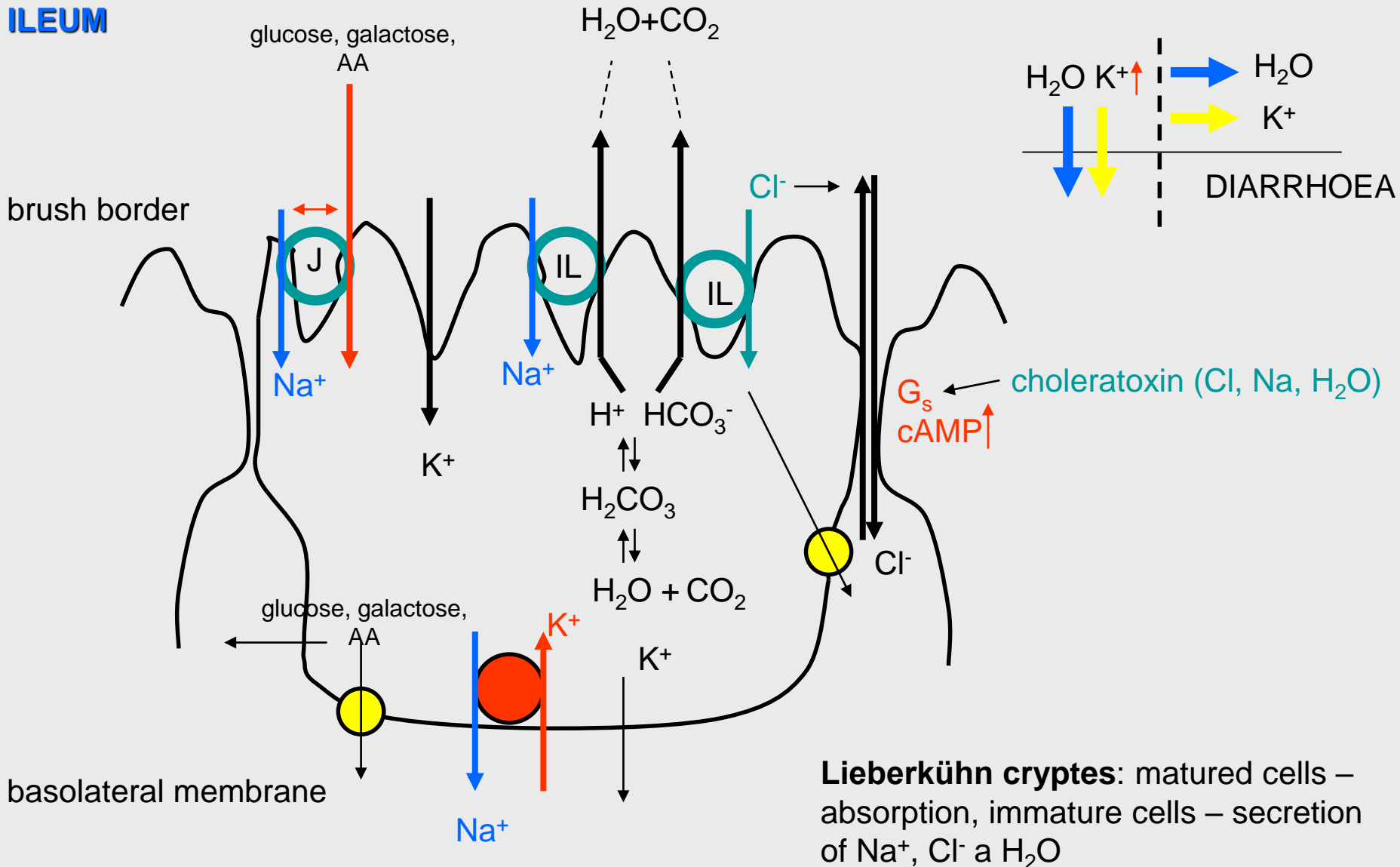
TRANSPORT
• Transcellular
• Paracellular



STIMULATION: digestion products (AA, sugars)

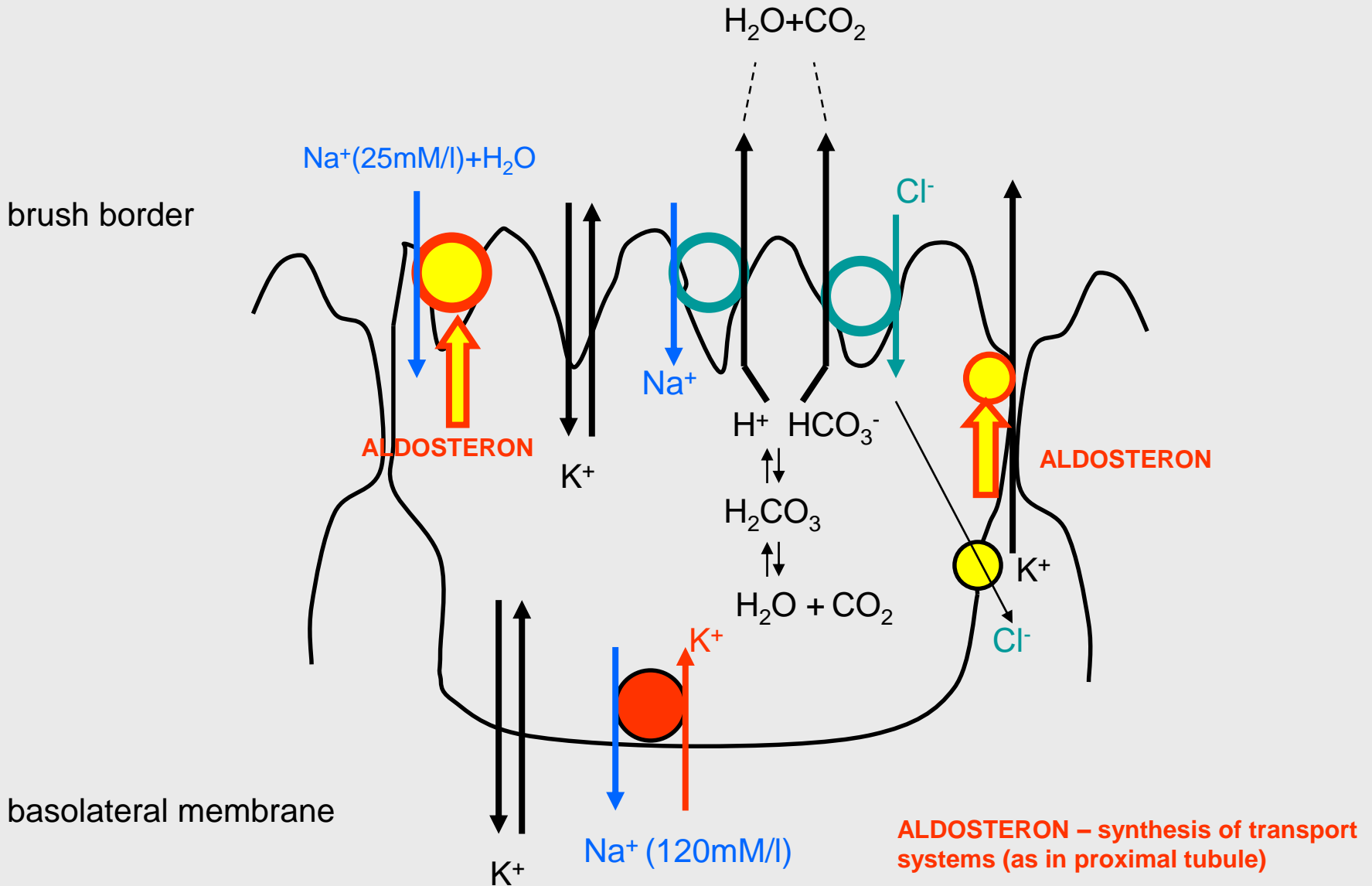
TRANSPORT OF ELECTROLYTES

JEJUNUM
ILEUM



TRANSPORT OF ELECTROLYTES

COLON



REGULATION OF TRANSPORT OF WATER AND ELECTROLYTES

1. **Autonomous nervous system:** **SYMP** – increase of absorption of water, sodium and chlorine
2. **Aldosteron:** colon – stimulation of secretion of potassium and absorption of sodium and water (up-regulation of Na/K-ATPase, Na-channel)
3. **Glucocorticoids:** colon - stimulation of secretion of potassium and absorption of sodium and water (up-regulation of Na/K-ATPase)

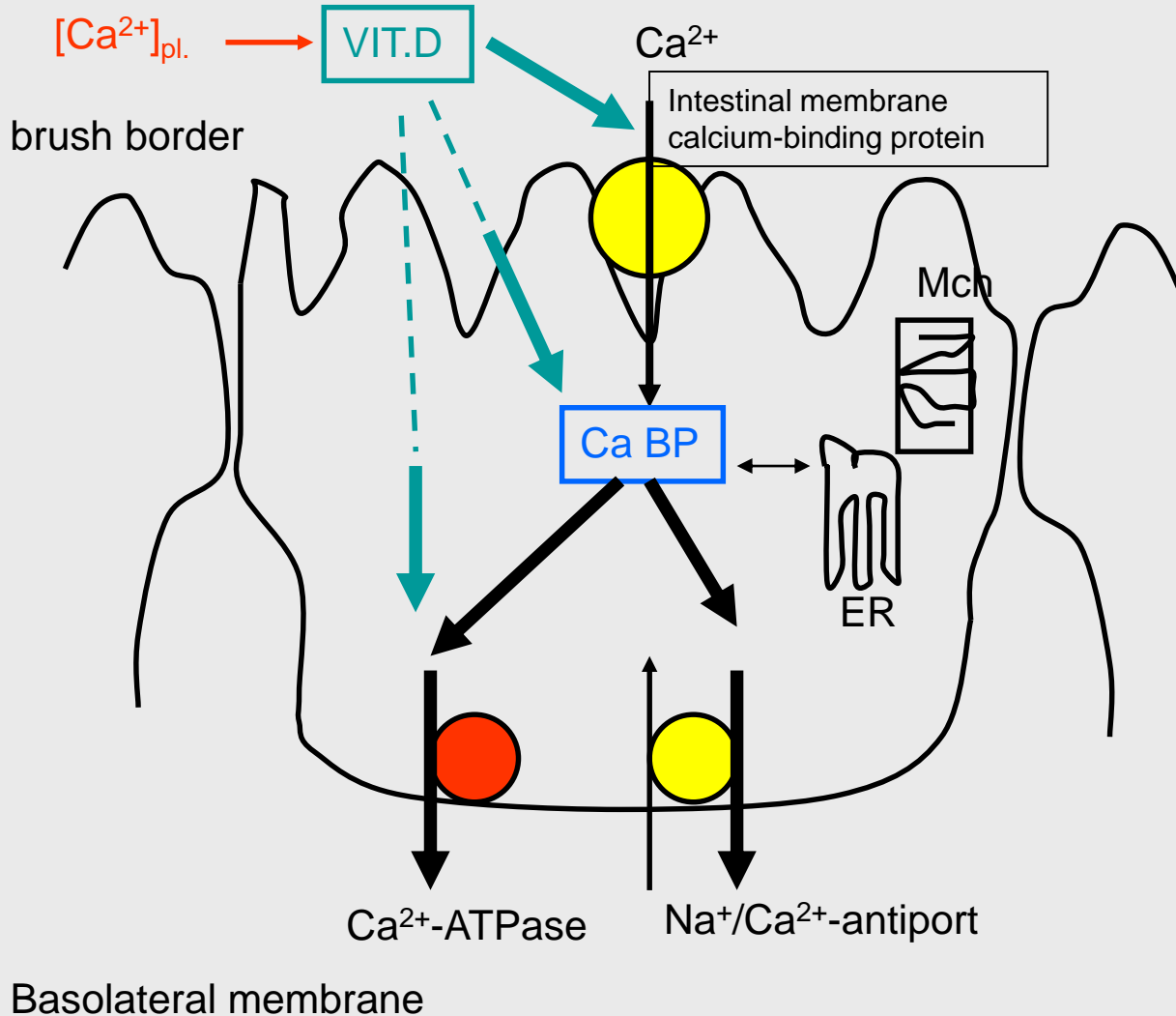
ABSORPTION OF Ca^{2+}

INTAKE: 1000mg/day
ABSORPTION: 350mg/day

Absorption against concentration gradient (1:10) in all GIT (D, J), 50x slower than absorption of Na^+

1,25-dihydrocholecalciferol

Calbindin – prevention of formation of insoluble salts (phosphates, oxalates)



$[\text{Ca}^{2+}]_{\text{pl.}}$

VIT.D

Ca^{2+}

Intestinal membrane calcium-binding protein

brush border

Mch

Ca BP

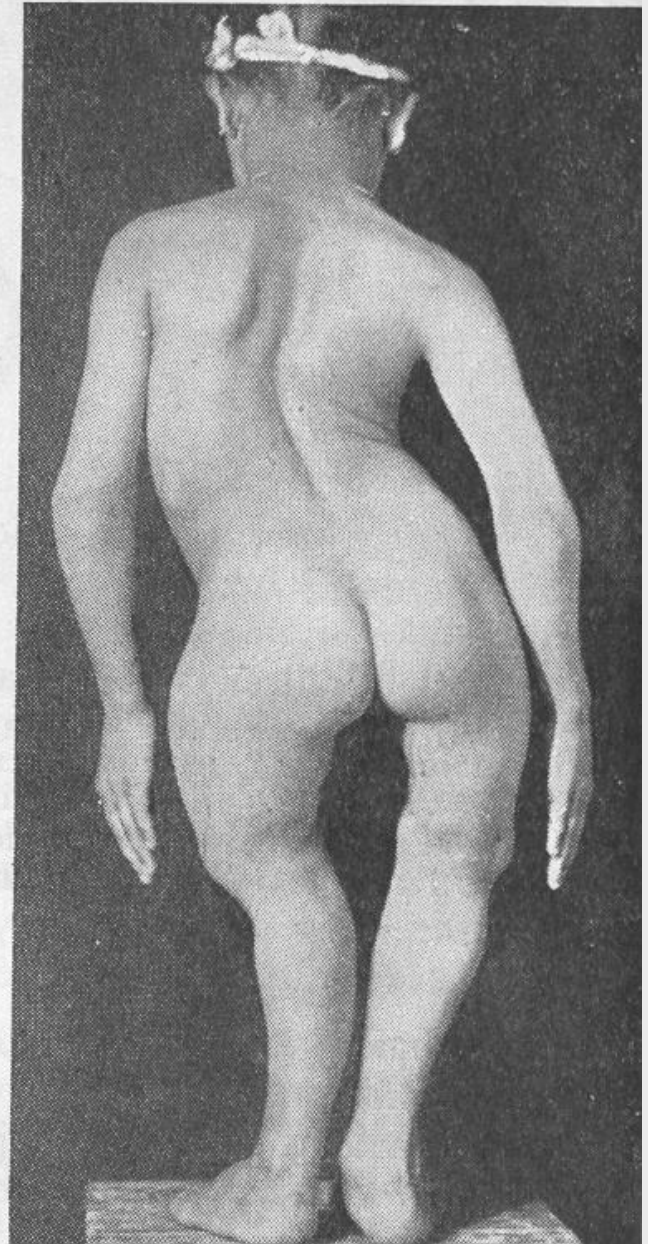
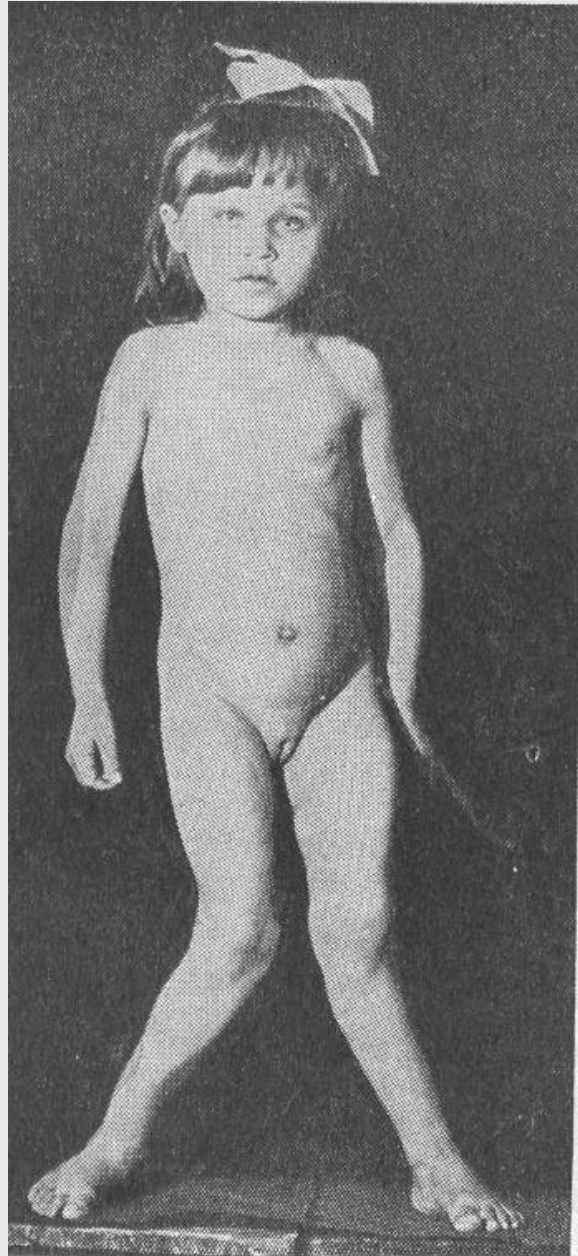
ER

Ca^{2+} -ATPase

$\text{Na}^+/\text{Ca}^{2+}$ -antiport

Basolateral membrane

RACHITIS
(rickets)



ABSORPTION OF Fe^{2+}

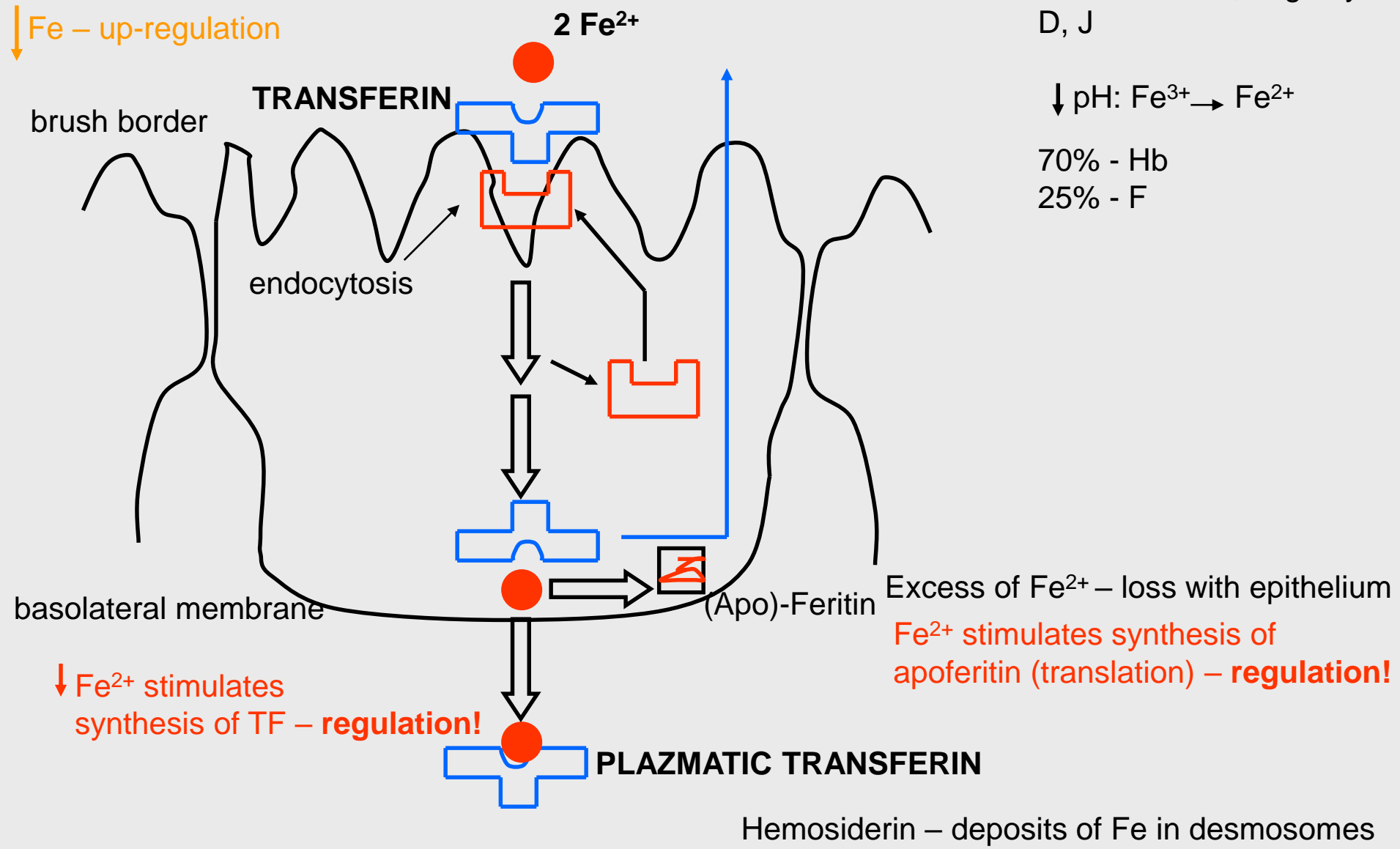
INTAKE: 15-20mg/day
ABSORPTION:
Men: 0,5 - 1mg/day
Women: 1 - 1,5mg/day
D, J

↓ pH: $Fe^{3+} \rightarrow Fe^{2+}$

70% - Hb
25% - F

Insoluble salts and complexes (20:1) – limitation of absorption
Decrease of pH

↓ Fe – up-regulation



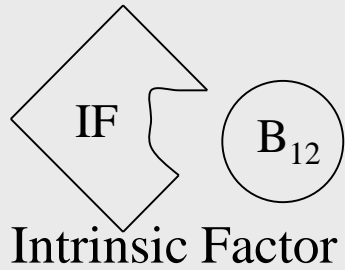
VITAMIN B₁₂

- Daily dose is close to absorption capacity
- Synthesised by bacteria in colon – BUT there is not absorption mechanism
- Store in liver (2-5mg)
- In bile 0,5-5µg / day, reabsorbed
- Daily loss – 0,1% of stores → stores will last for 3-6 years

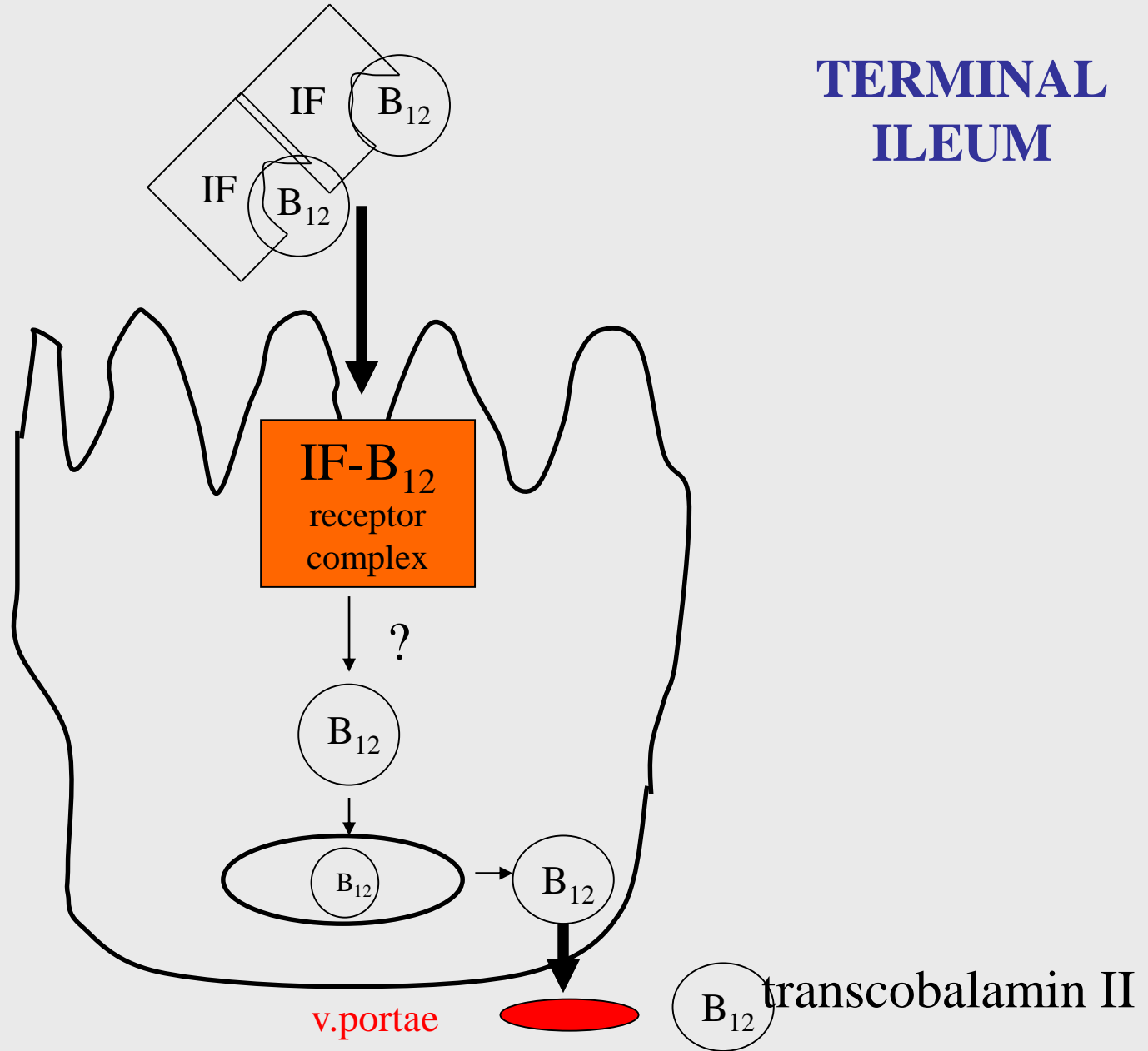
ABSORPTION

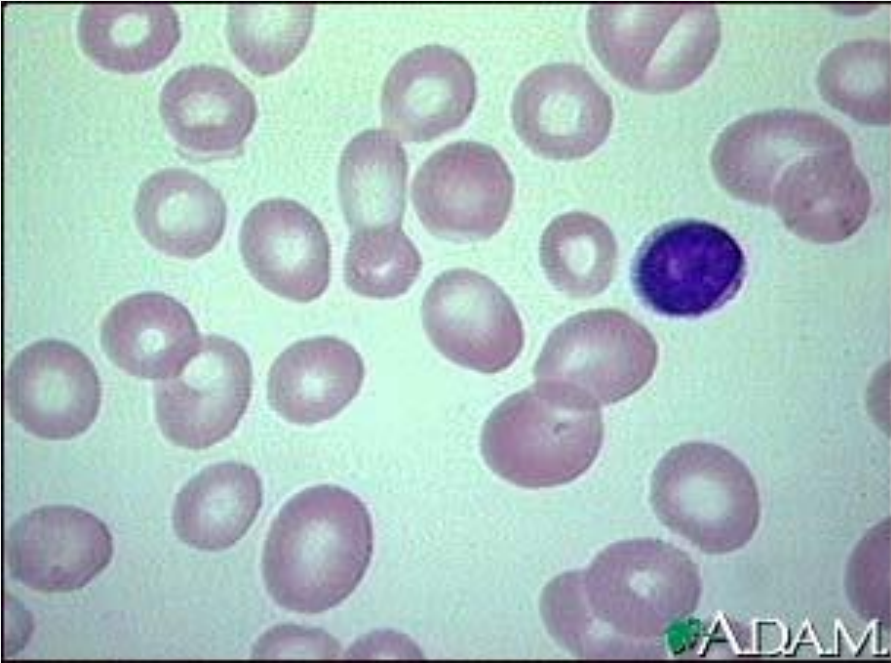
- 1. Gastric phase:** B₁₂ is bound to proteins, low pH and pepsin release it; bound to glycoproteins – **R-proteins** (saliva, gastric juice), almost pH-undependable; intrinsic factor (**IF**) – parietal cells of gastric mucosa; most of vitamin bound to R-proteins
- 2. Intestinal phase:** pancreatic proteases, cleavage of R-B₁₂, bound to IF (resistant to pancreatic proteases)

ABSORPTION OF B₁₂ VITAMIN

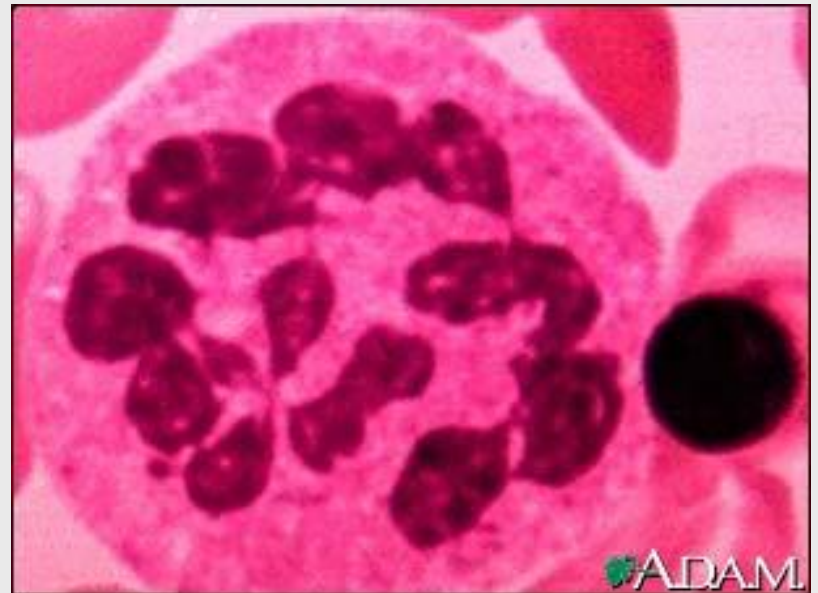


TERMINAL
ILEUM

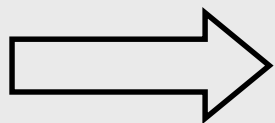




Pernicious anaemia
(megaloblastic)



DIGESTION AND ABSORPTION OF SACCHARIDES

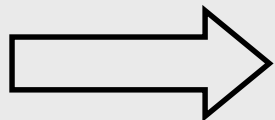


POLYSACCHARIDES
(α -glycosylated s.)

salivary amylase
 α -amylase

AMYLOPECTIN
GLYCOGEN

Saliva
Pancreatic juice



OLIGOSACCHARIDES

Epithelium of duodenum and jejunum

Isomaltase

DEXTRIN

Maltase

TRICHACHARIDES

Saccharase

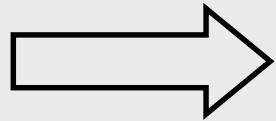
DISACHARIDES:

Lactase

SACCHAROSE

MALTOSE

LACTOSE



MONOSACCHARIDES

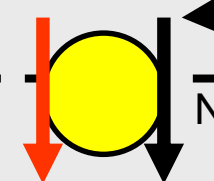
FRUCTOSE

GLUCOSE

GALACTOSE



GLUT-5



SGLT-1

Na⁺

2 binding sites for Na⁺
1 binding site for saccharide

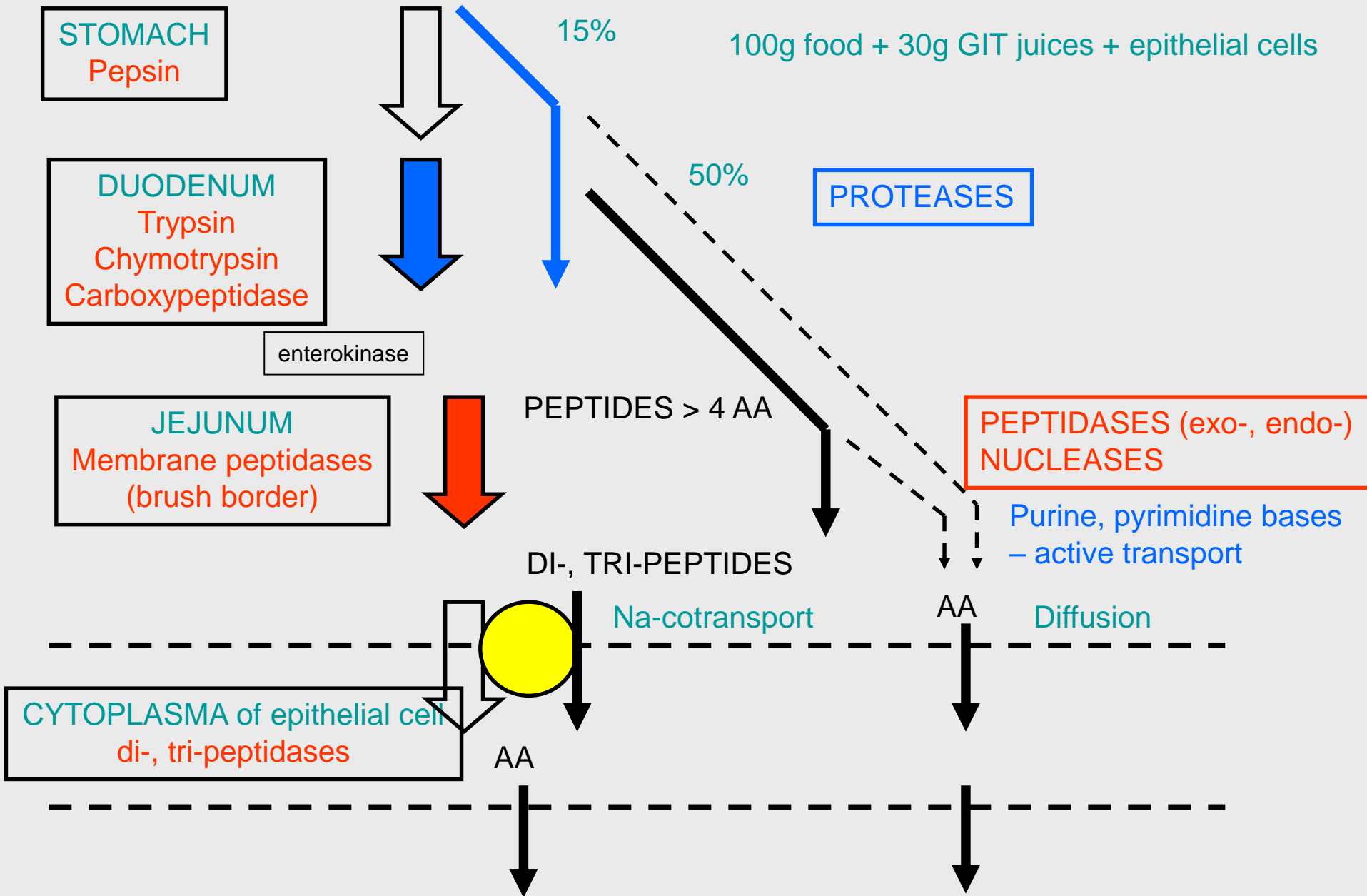


GLUT-2

facilitated transport + diffusion

- Lactase intolerance
- Diarrhoea

DIGESTION AND ABSORPTION OF PROTEINS



ABSORPTION OF LIPIDS

