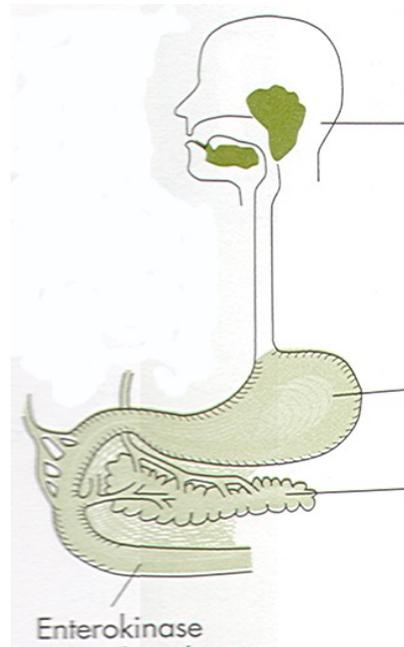


DIGESTÃO E ABSORÇÃO DE MACRONUTRIENTES



amilase salivar
lipase lingual

pepsina
lipase

Amilase, tripsina,
quimiotripsina,
carboxipeptidases,
**lipase, fosfolipase A₂,
colesterol-esterase,**
elastase, ribo e
desoxiribonucleases

**Enzimas
luminais**

**Enzimas
da borda
em escova**

**Glicoamilase, maltase,
sacarase, lactase,
isomaltase**

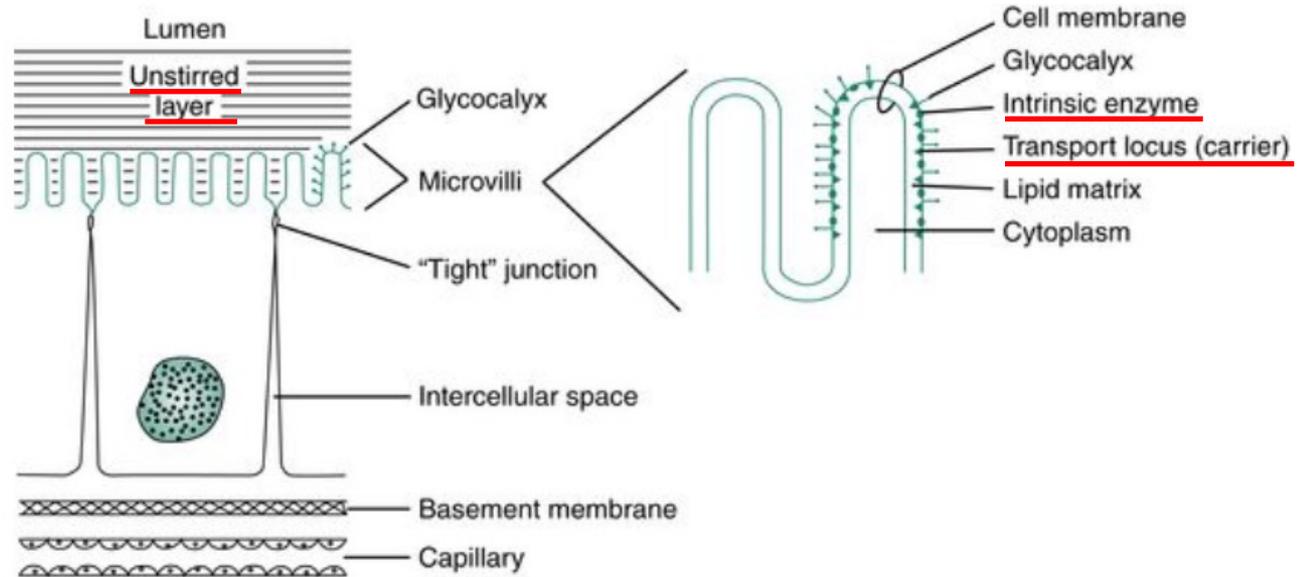
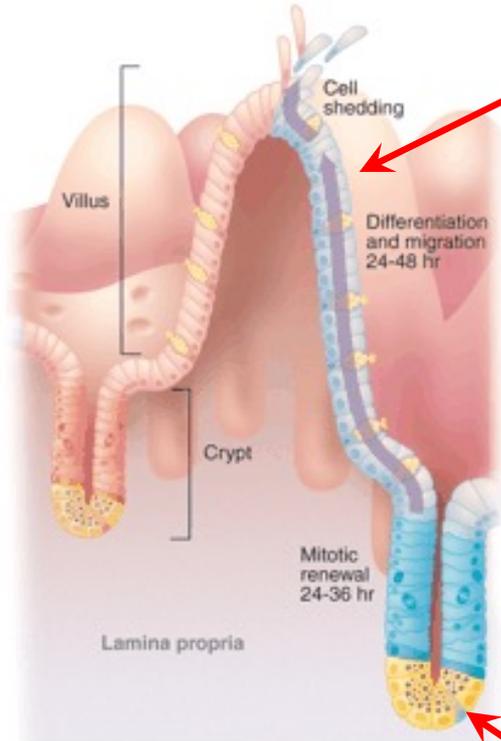
**Peptidases:
aminooligopeptidases,
dipeptidases**





Características funcionais da borda em escova

digestivo/absortivo



secretor



DIGESTÃO E ABSORÇÃO DE CARBOIDRATOS

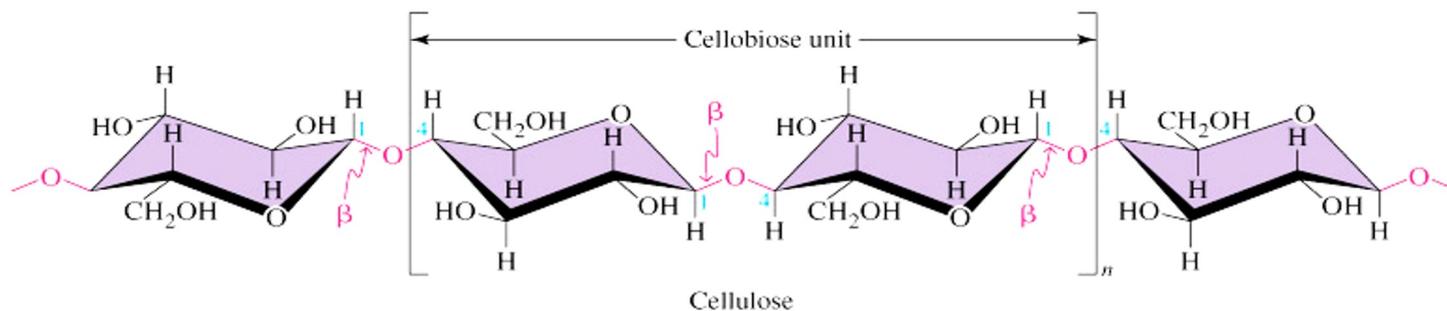
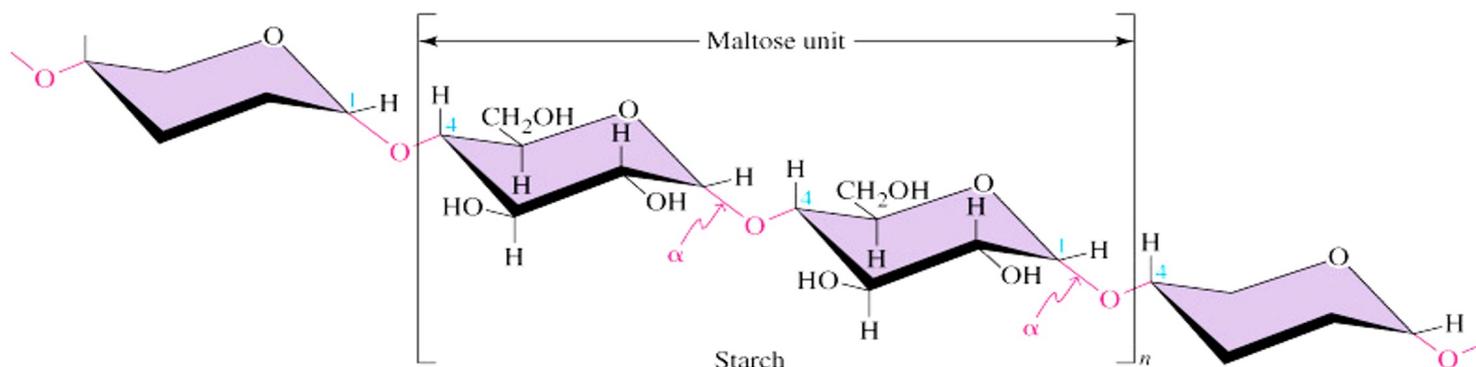
FONTES:

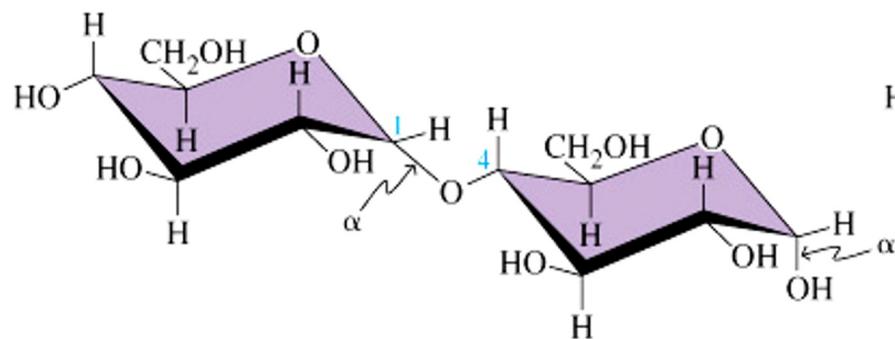
Amido: principal

Celulose: principal componente das fibras

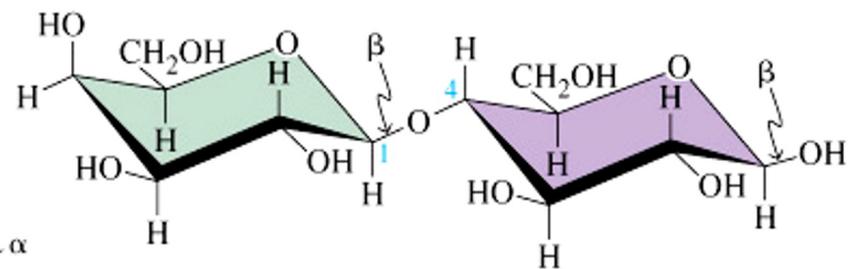
Glicogênio: amido animal ramificado

Também: sacarose e lactose

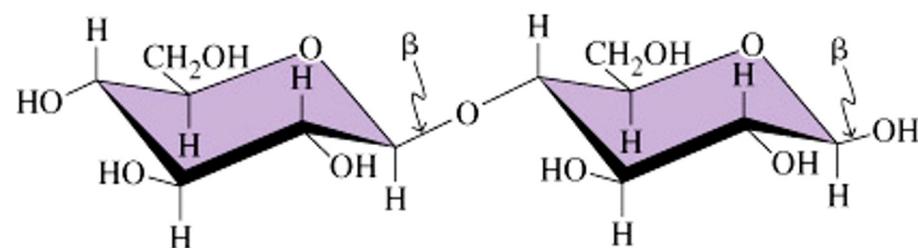




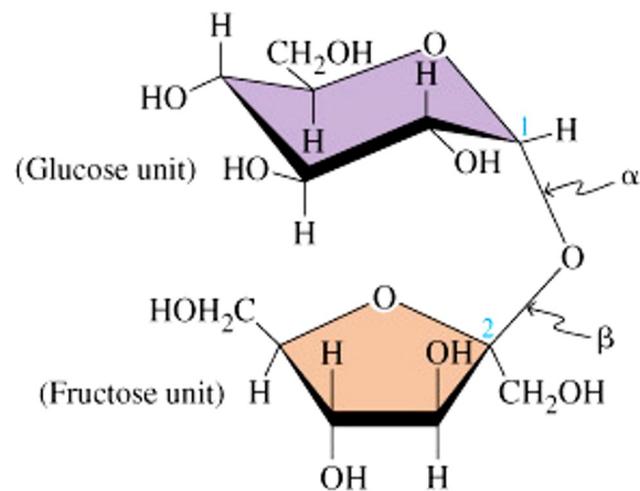
Maltose (α form)



Lactose (β form)



Cellobiose

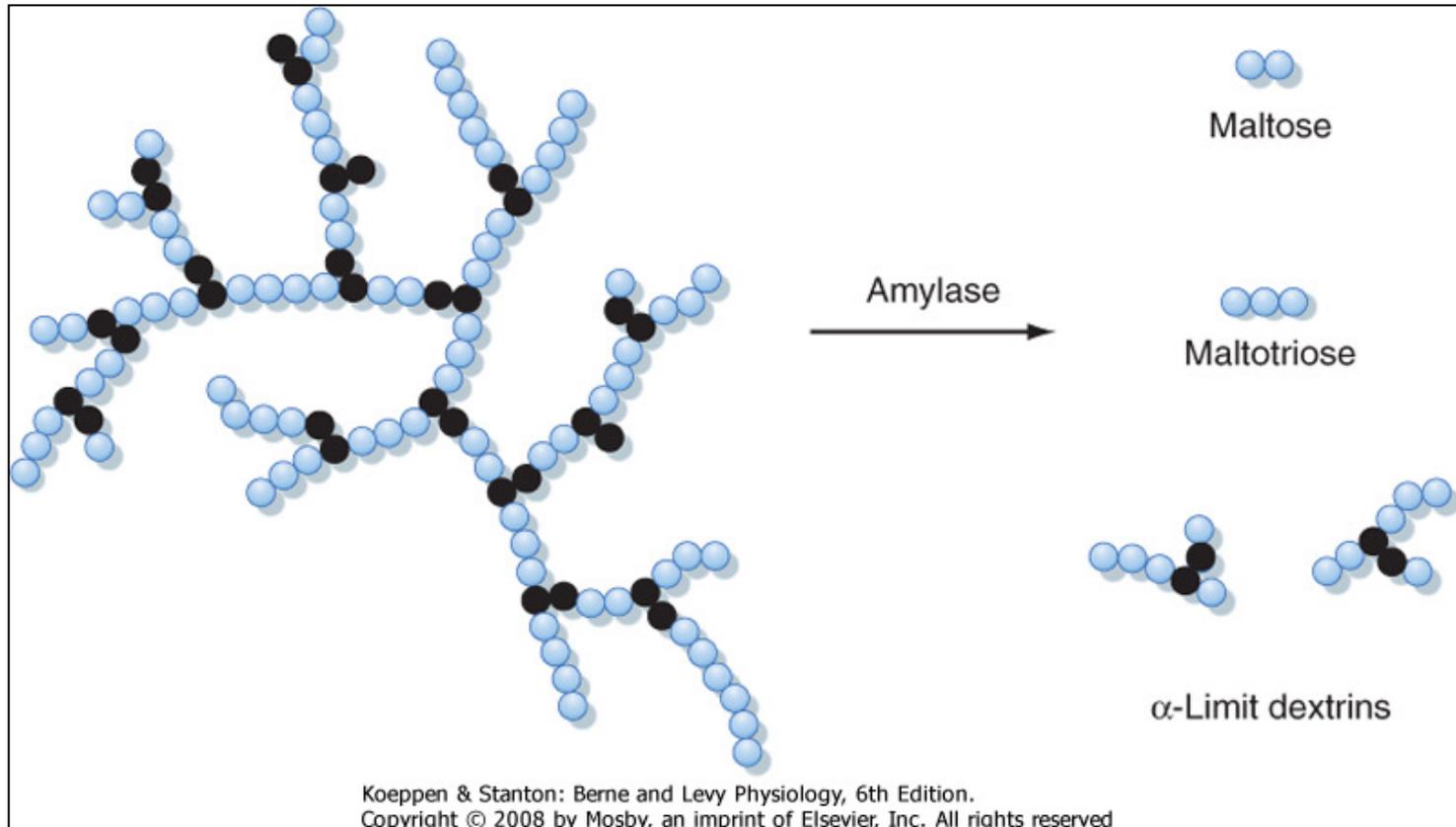


Sucrose

Glucose
 Galactose
 Fructose



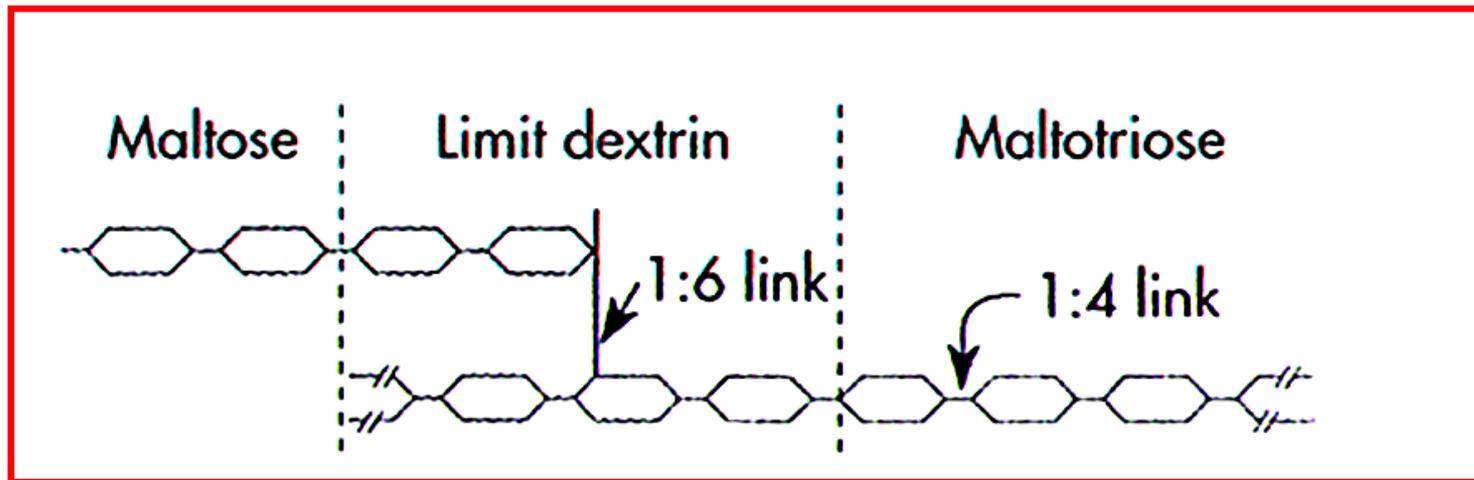
Produtos da digestão do amido/glicogênio pela α -amilase (salivar ou pancreática)

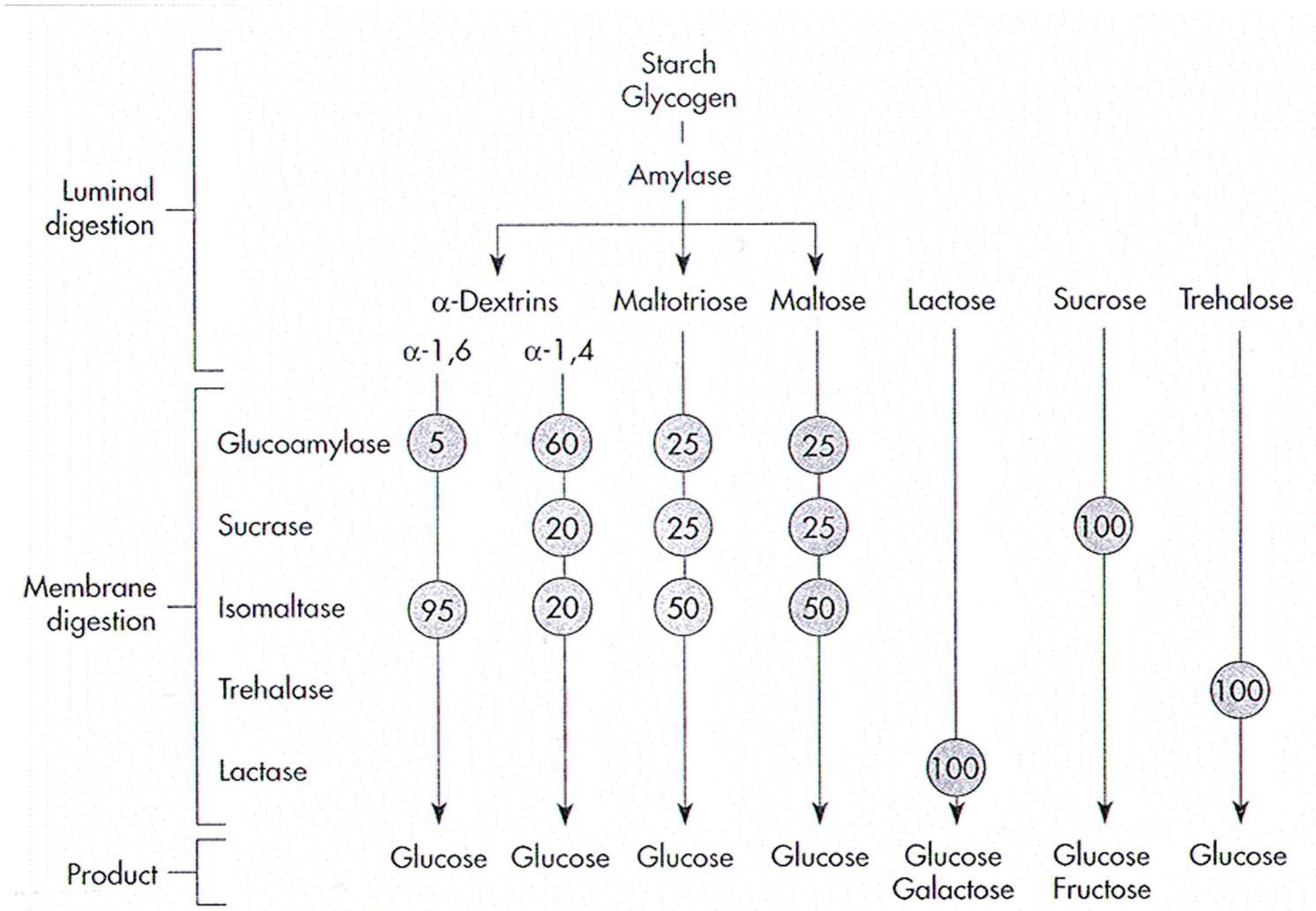


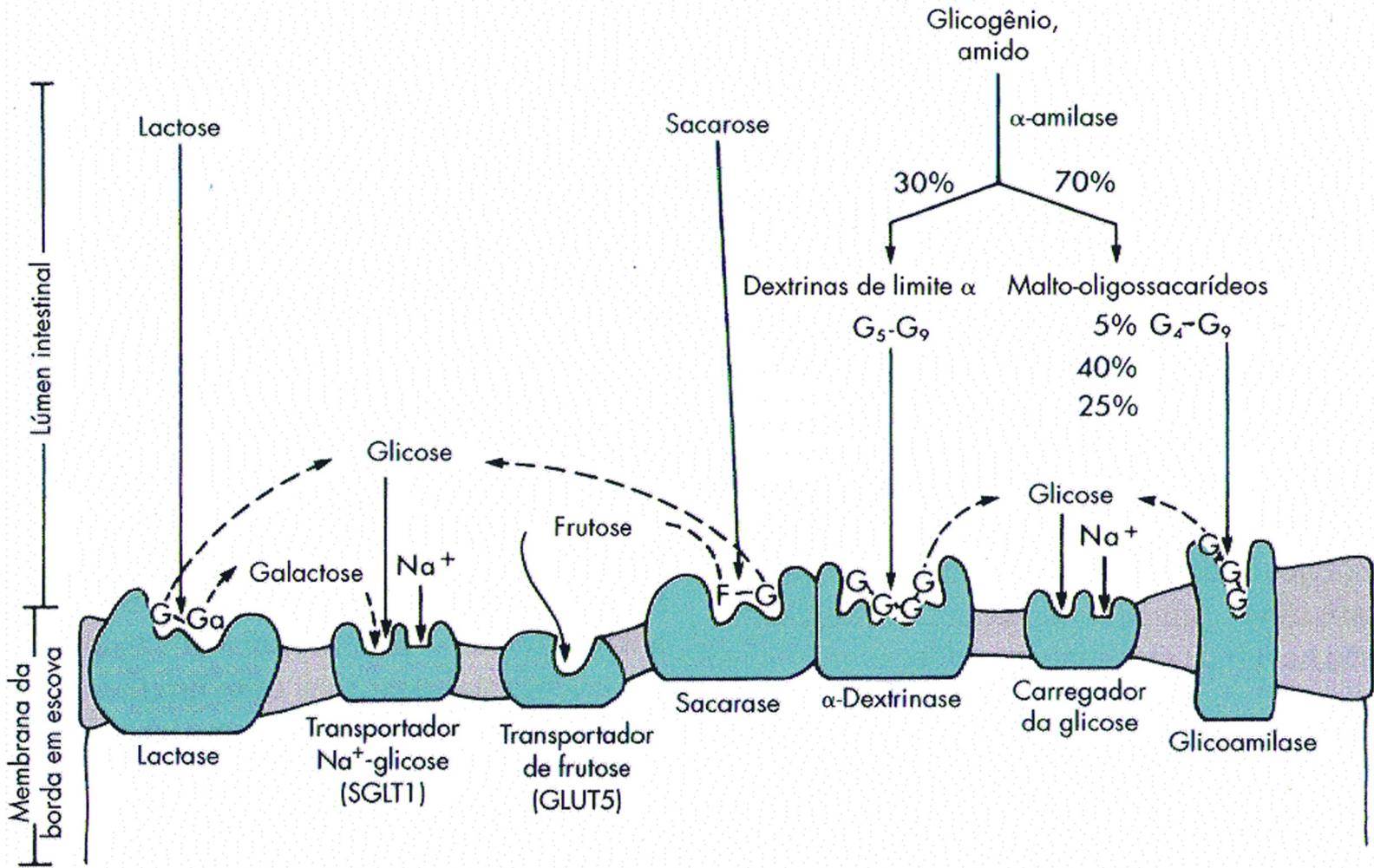


Alfa-Amilase hidrolisa ligações α -1,4, mas não:

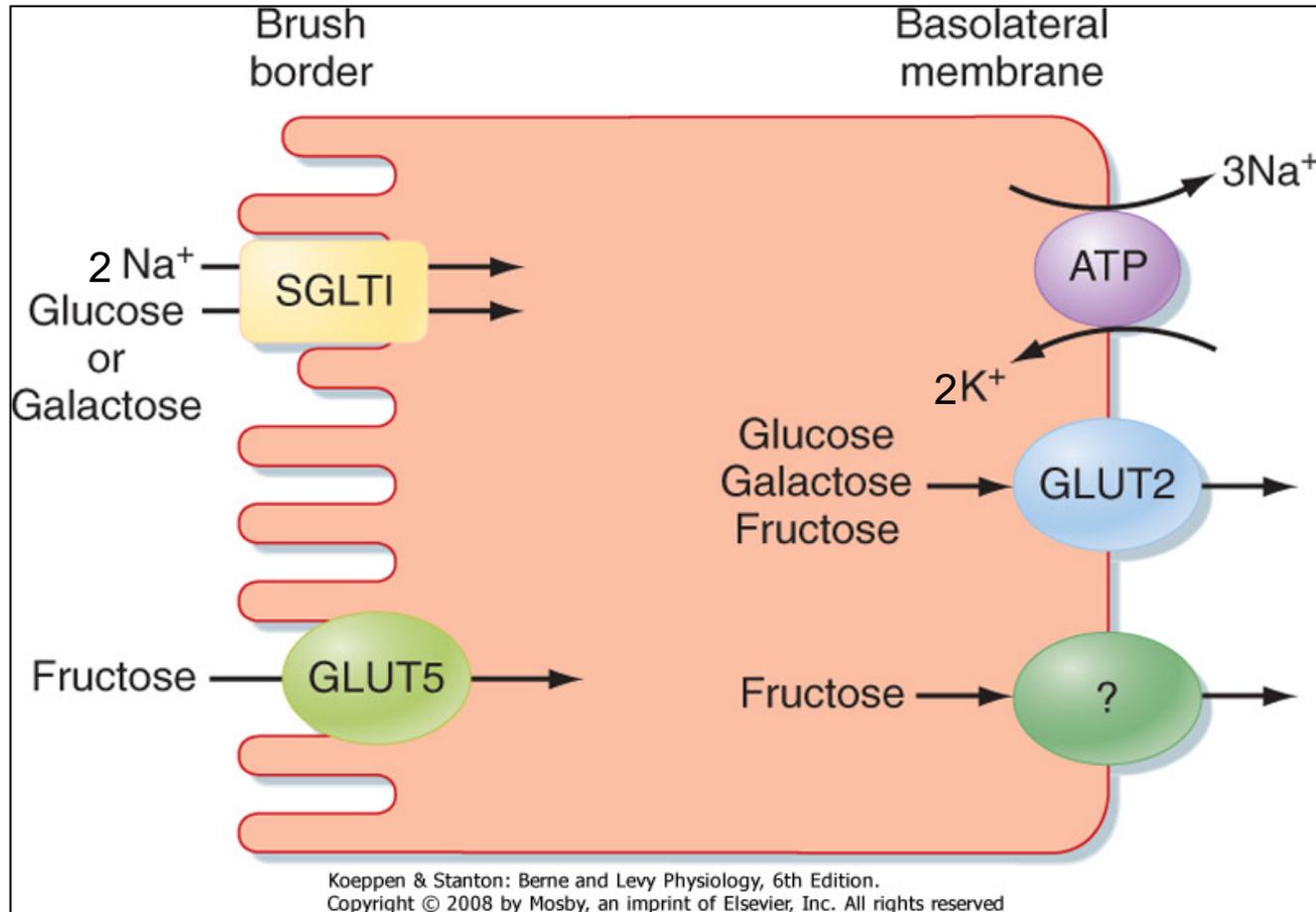
- α -1,4 terminais
- α -1,4 adjacentes a α -1,6
- α -1,6

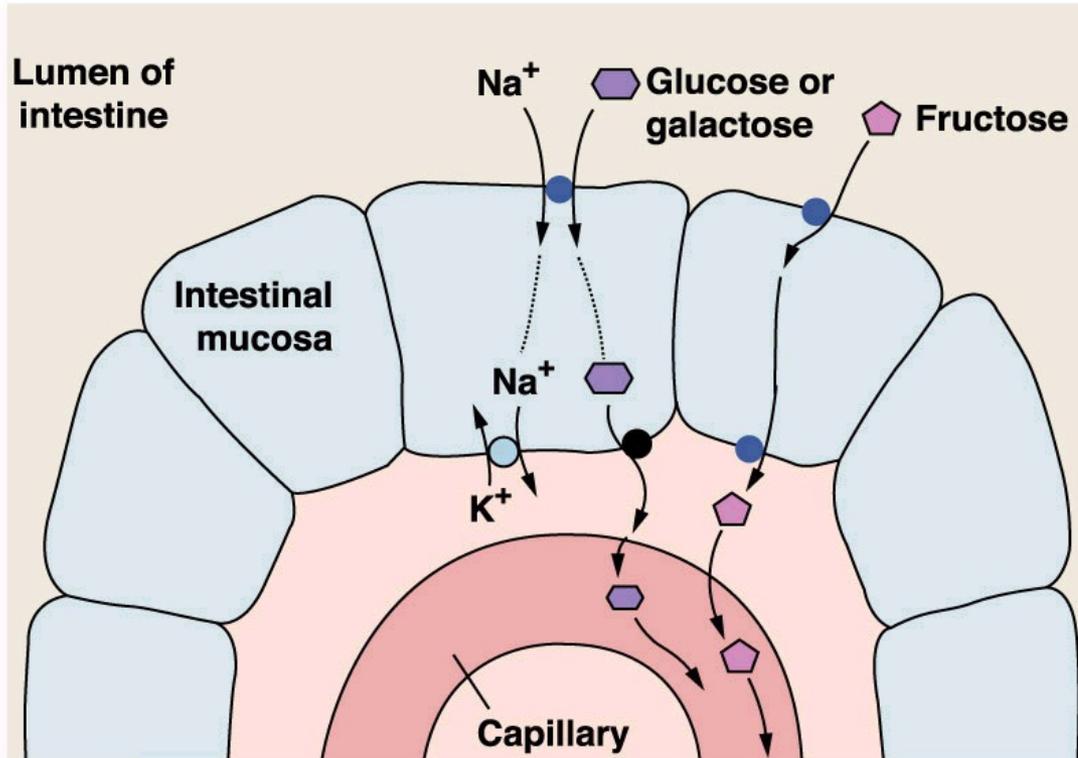






Principais mecanismos de absorção de CHO





Absorção: 120g/hora (~3kg/dia)
(1-10kg/dia)

regulação ?



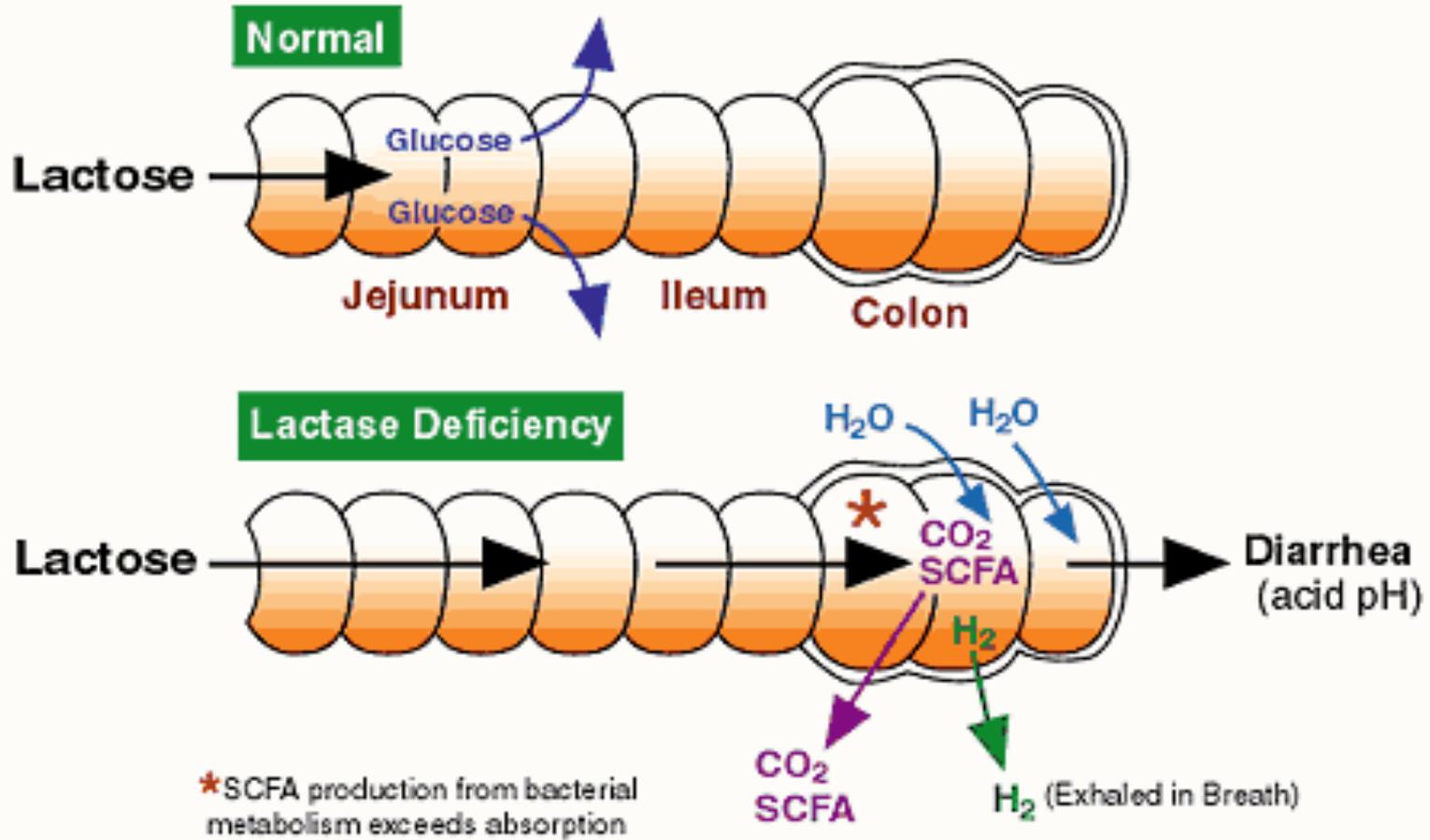
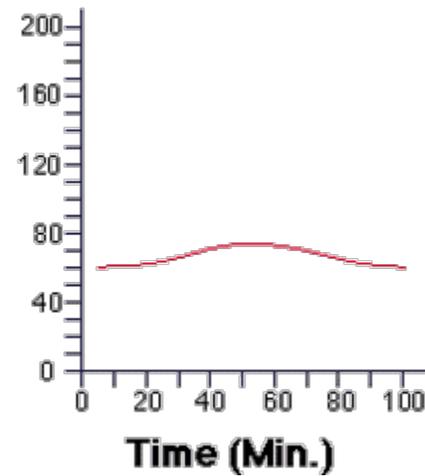
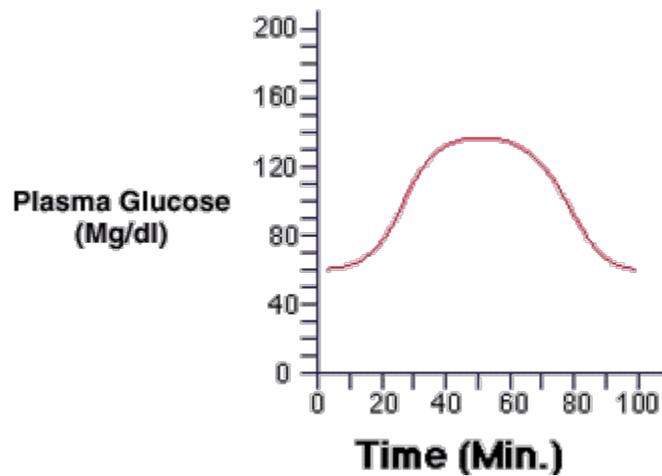
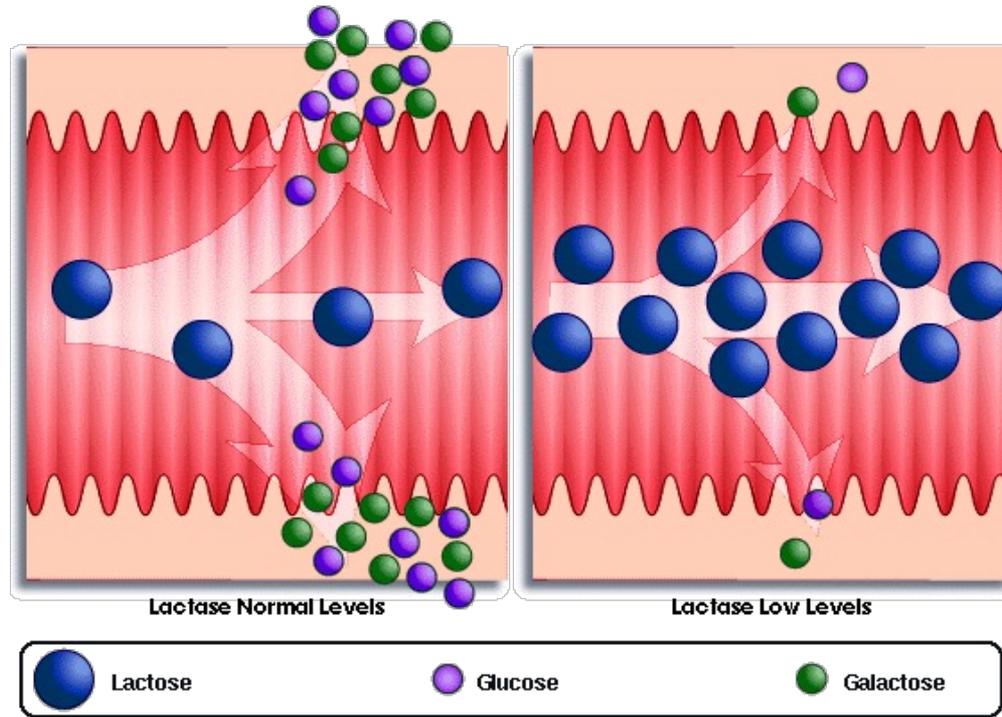


Fig. 2 Pathophysiology of Lactose Intolerance. SCFA = Short-Chain Fatty Acids.



Lactose Tolerance Test



DIGESTÃO E ABSORÇÃO DE PROTEÍNAS

FONTES:

Proteínas exógenas: dieta

Proteínas endógenas: secretadas, enzimas, de células descamadas, de bactérias presentes na luz do TGI.

Nas fezes: proteínas originárias do cólon

Pepsinas (estômago): hidrólise variável (~ 15-20%)

Intestino delgado: grande capacidade de digestão

**3 etapas: luminal
membrana
intracelular**



DIGESTÃO DE PROTEÍNAS: FASE GÁTRICA

PEPSINOGENIO

HCl, autocatálise
clivagem de 44 a.a. (N terminal)

PEPSINA

pH ótimo de ação = 2 a 3 - inativação a pH >5

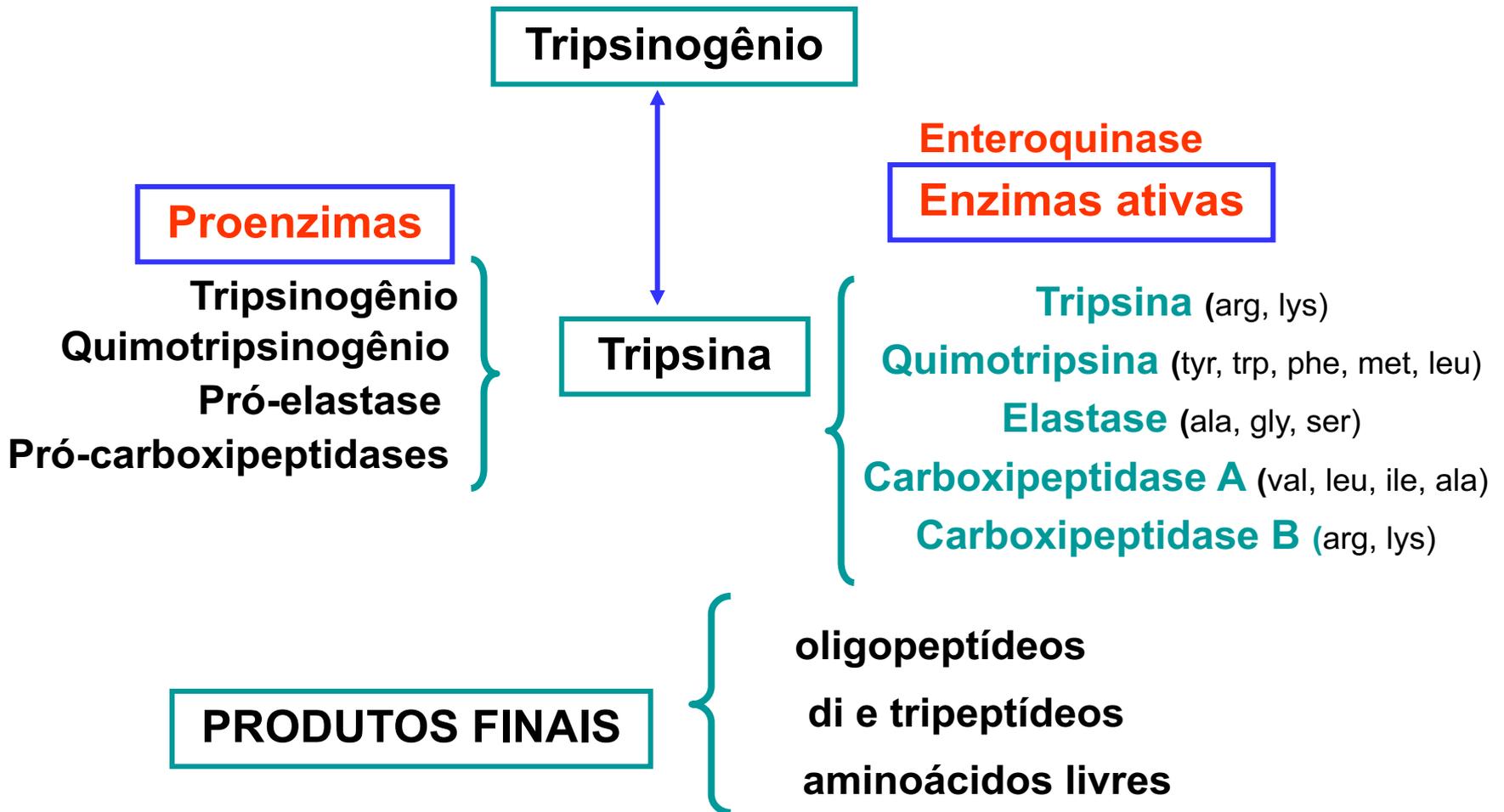
Pepsina = endopeptidase: origina oligopeptídeos, não é essencial

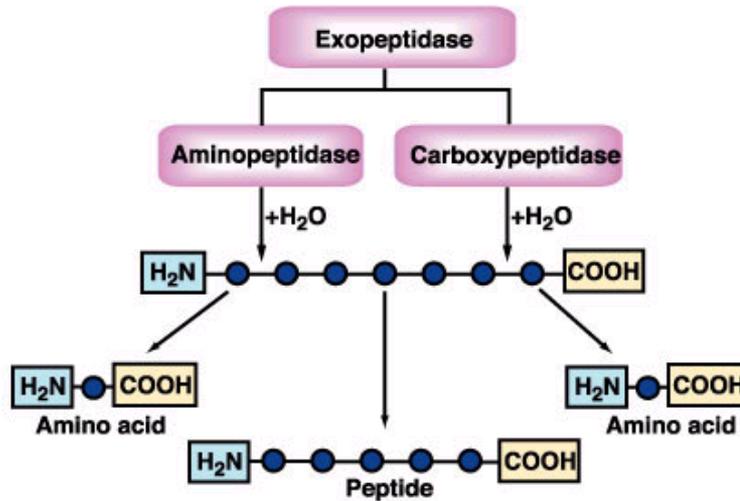
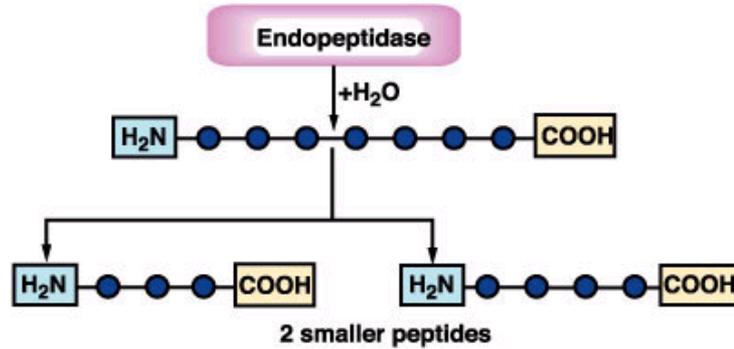
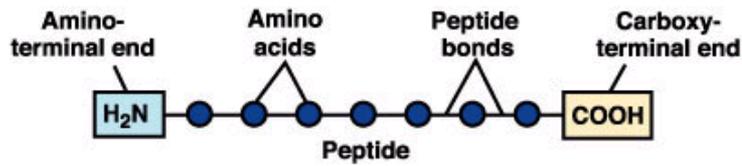
Importância: (a) hidroliza colágeno, facilitando ação de outras enzimas;

(b) oligopeptídeos estimulam secreção de gastrina e de CCK no duodeno.



FASE INTESTINAL OU PANCREÁTICA



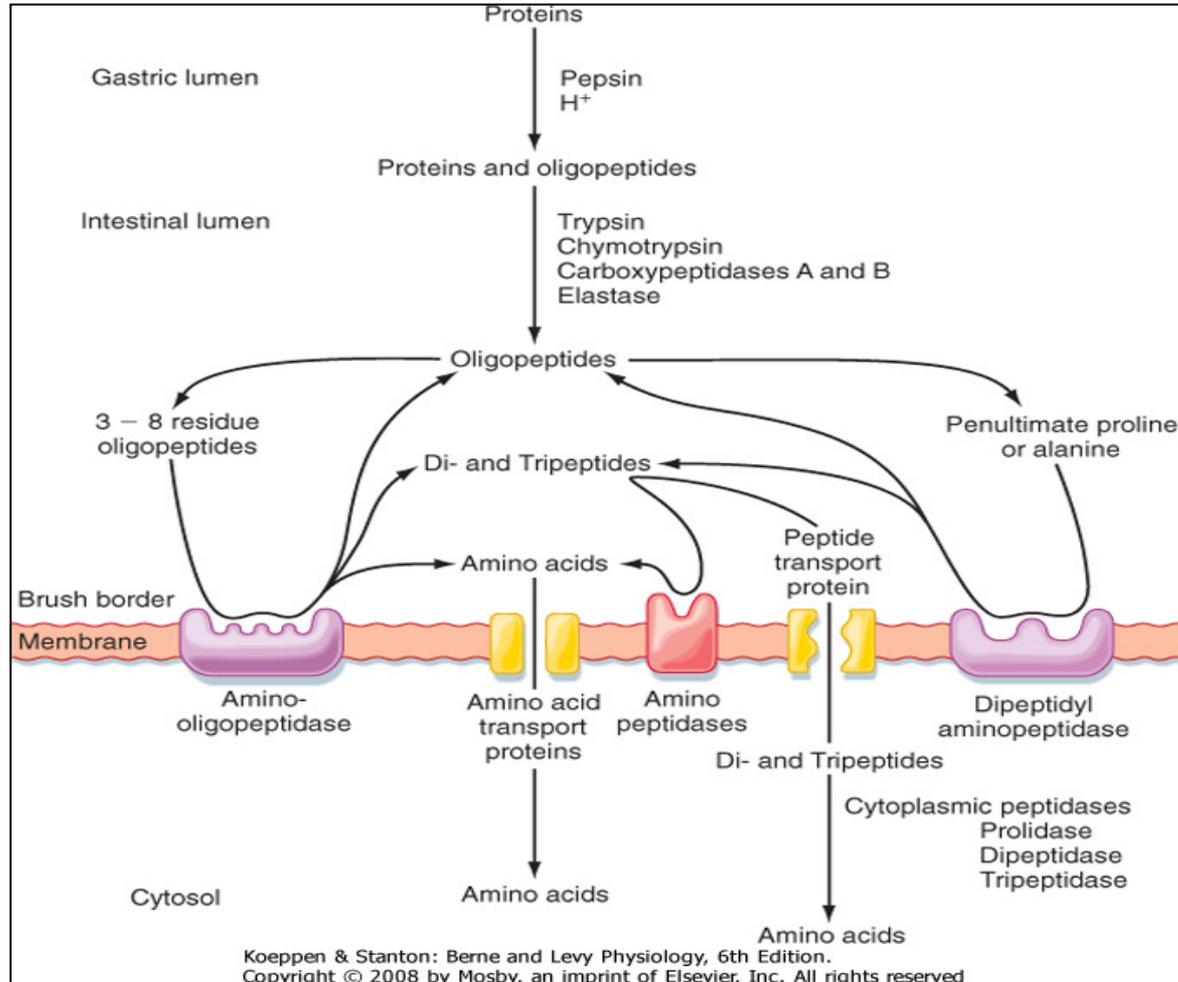


pepsina
tripsina, quimotripsina e
elastase: lumbais

Amino peptidases: de membrana



Aminopeptidases



Absorção

a.a. livres ou peptídeos de 2-3 resíduos

Jejuno: 33-40% = aa livres
60-67% = peptídeos
(absorve a maior parte)

Íleo: aa livres

Mecanismos

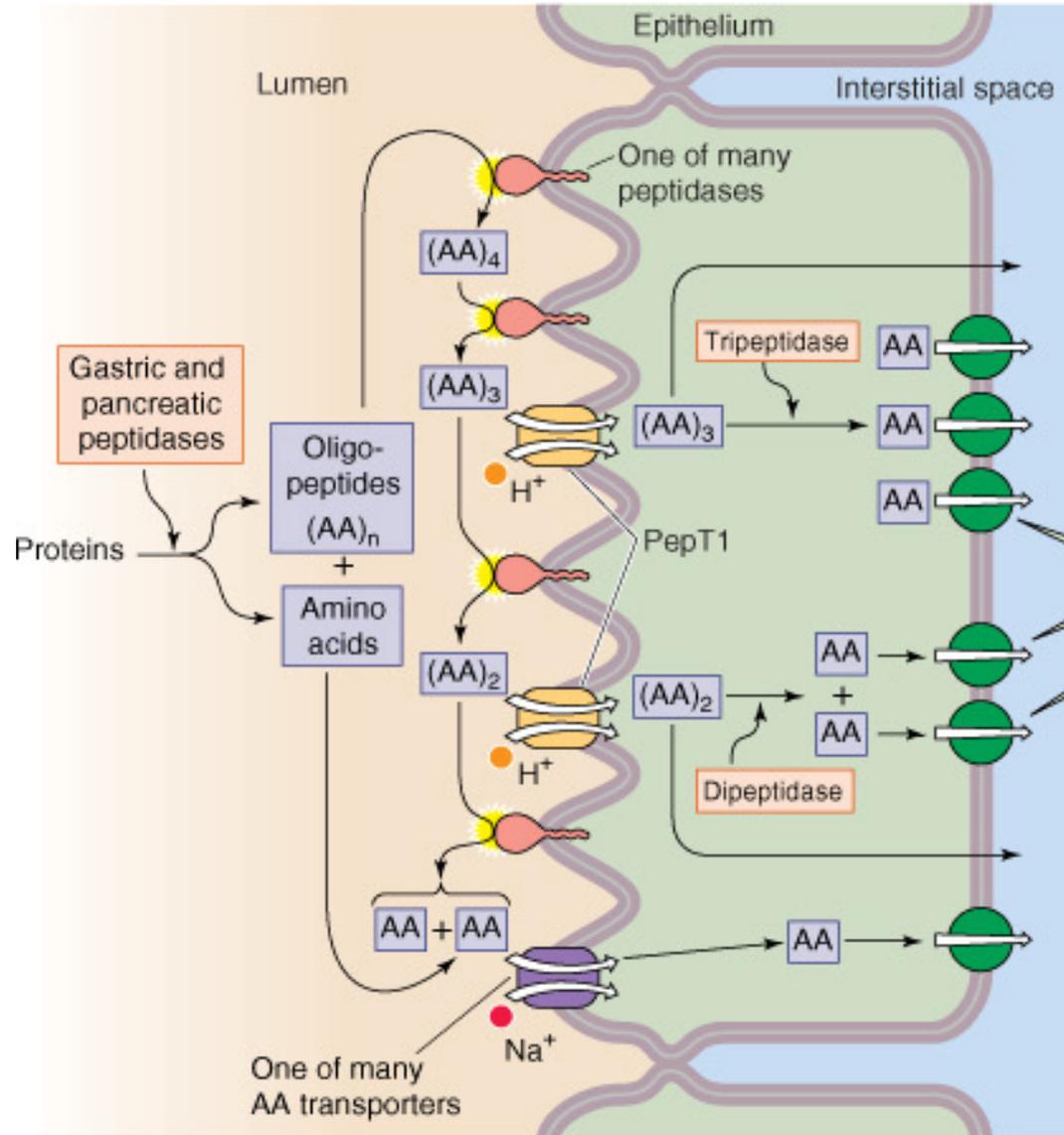
Membrana apical:

7 tipos: cotransporte AA - Na⁺

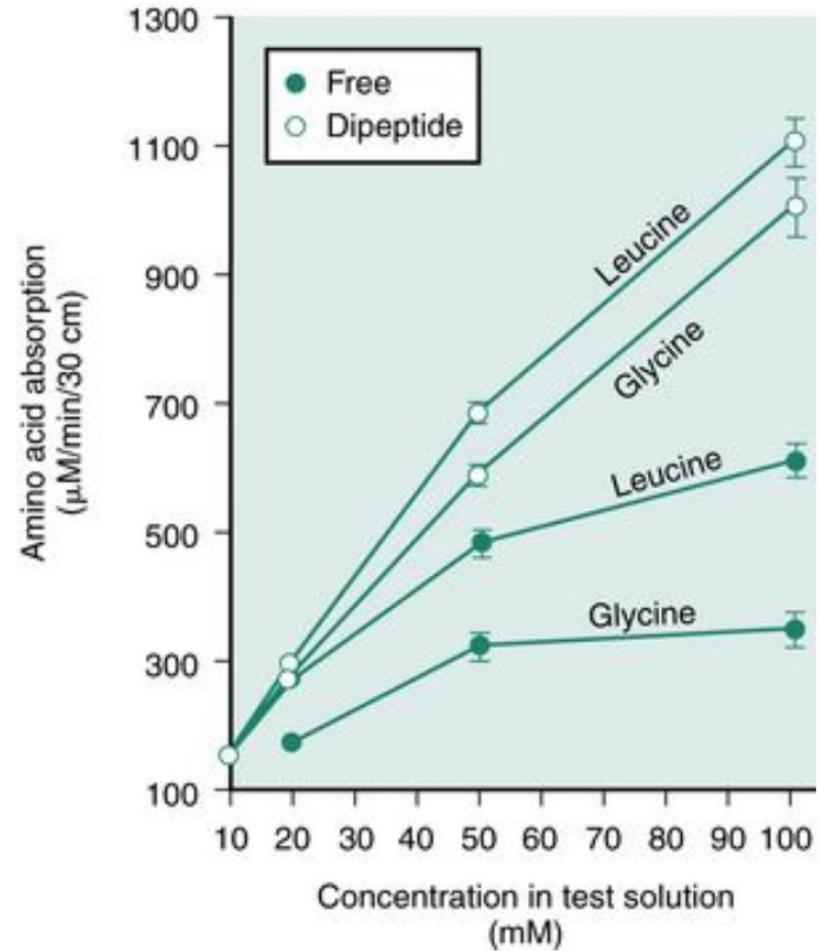
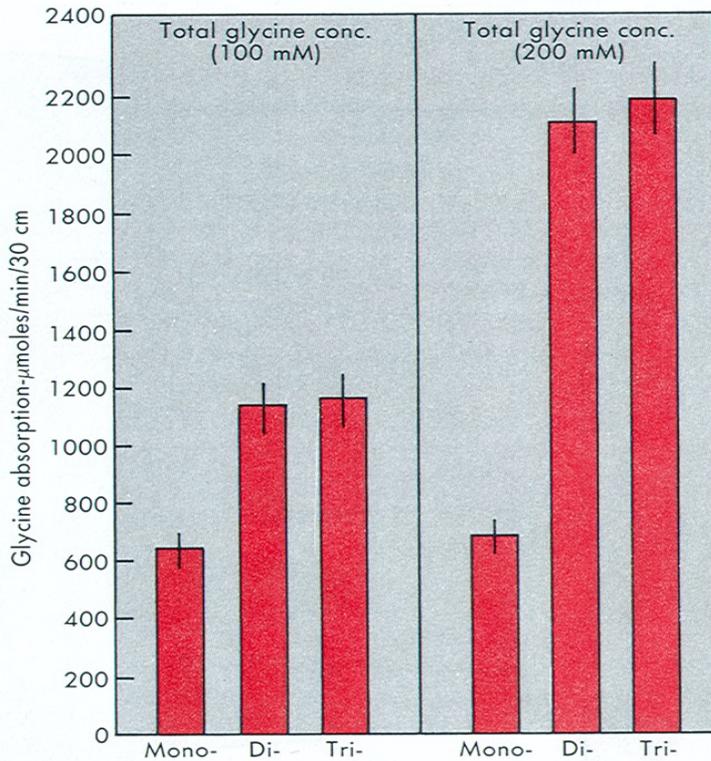
Cotransporte oligopeptídeos - H⁺

Membrana basolateral:

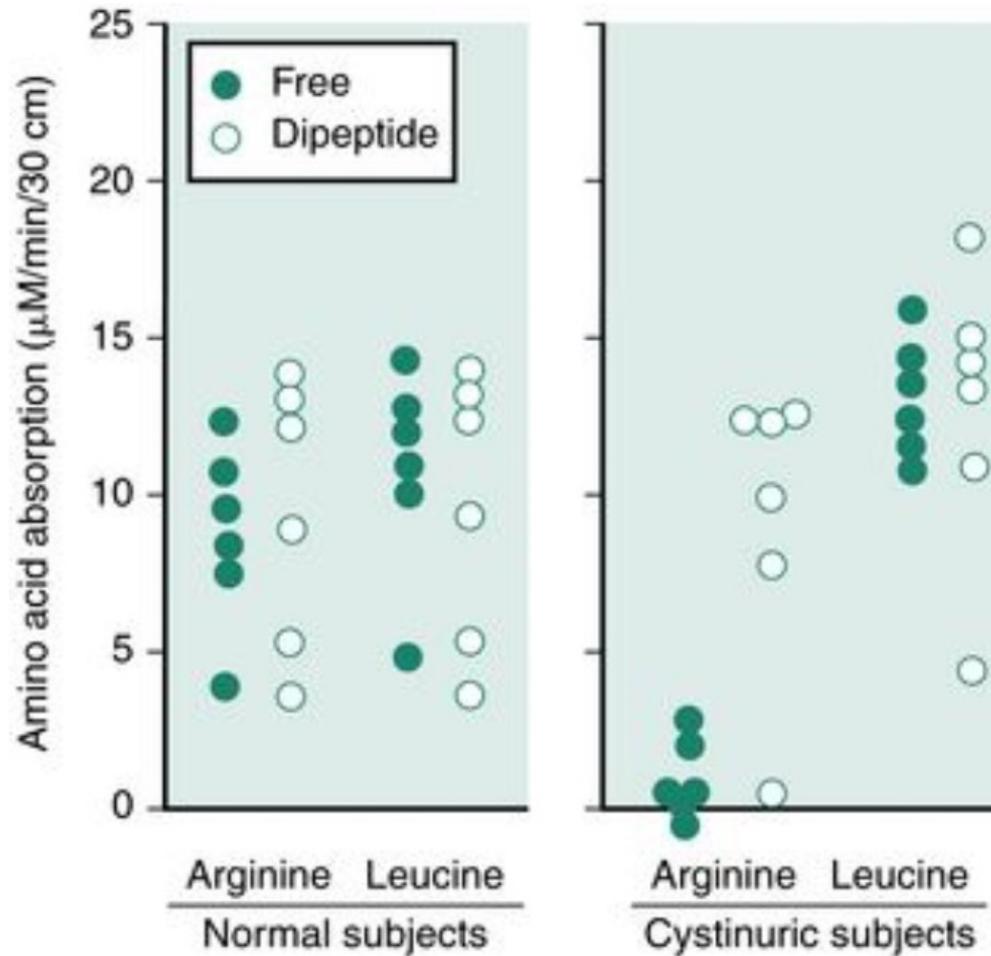
5 tipos (dependente e independente de Na⁺)



ABSORÇÃO DE AA NAS FORMAS LIVRE E DE MONO, DI E TRIPEPTÍDEO



Cistinúria = defeito no transporte de AA catiônicos
(arginina, lisina e ornitina)



DIGESTÃO E ABSORÇÃO DE LIPÍDEOS

Fontes: dieta (TAG), células descamadas

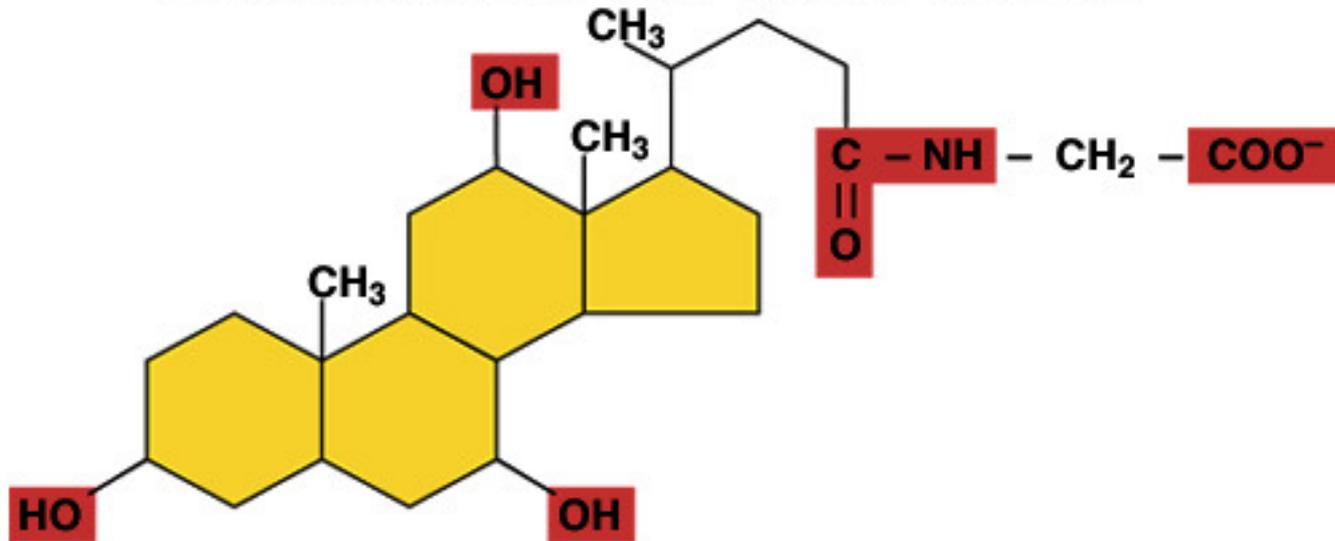
**Gorduras: tendem a separar-se das secreções aquosas
digestão requer processos distintos**

MECANISMO: emulsificação e incorporação em micelas



Structure of bile salts

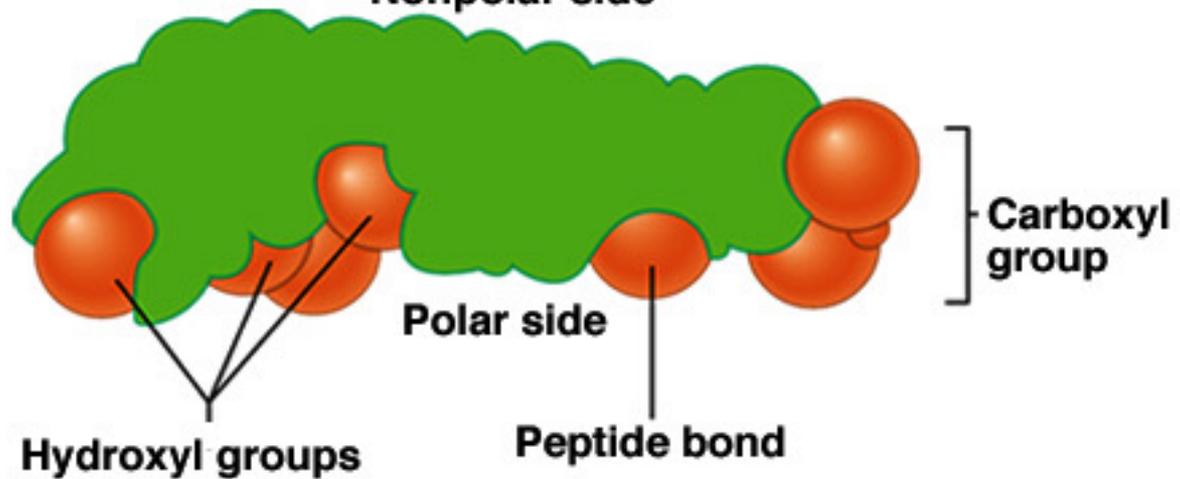
(a)



Bile salt (glycocholic acid)

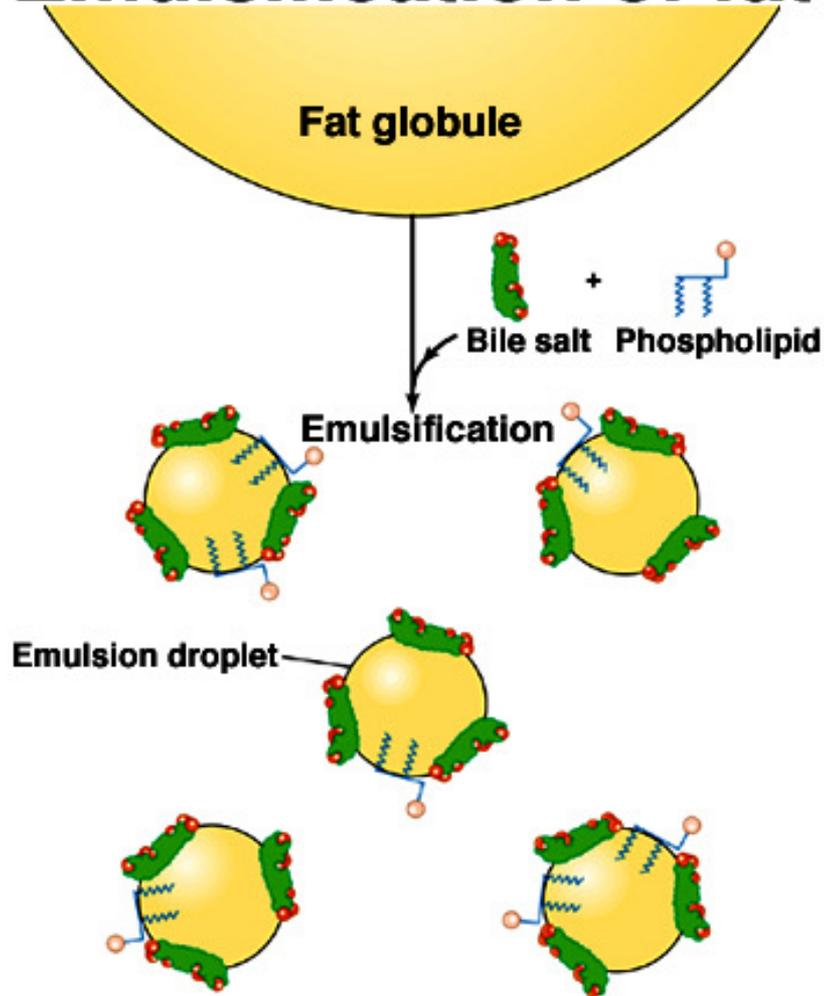
Nonpolar side

(b)





Emulsification of fat

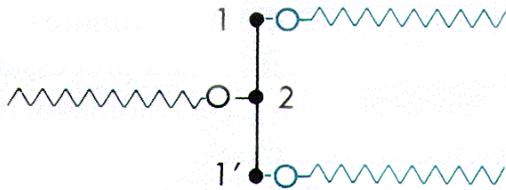


Digestão de Lipídeos

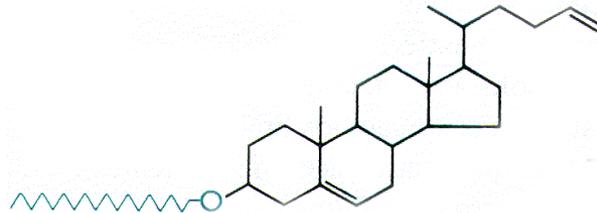
Triglicerídeo

Éster de colesterol

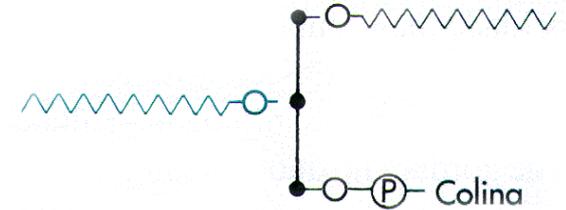
Fosfolipídeo



Triglicerídeo



Éster de colesterol



Lecitina

Hidrolase de éster de glicerol (lipase)

Colesterol éster hidrolase (colesterol esterase)

Fosfolipase A2

Monoglicerídeo
2 Ácidos graxos

Colesterol
1 Ácido graxo

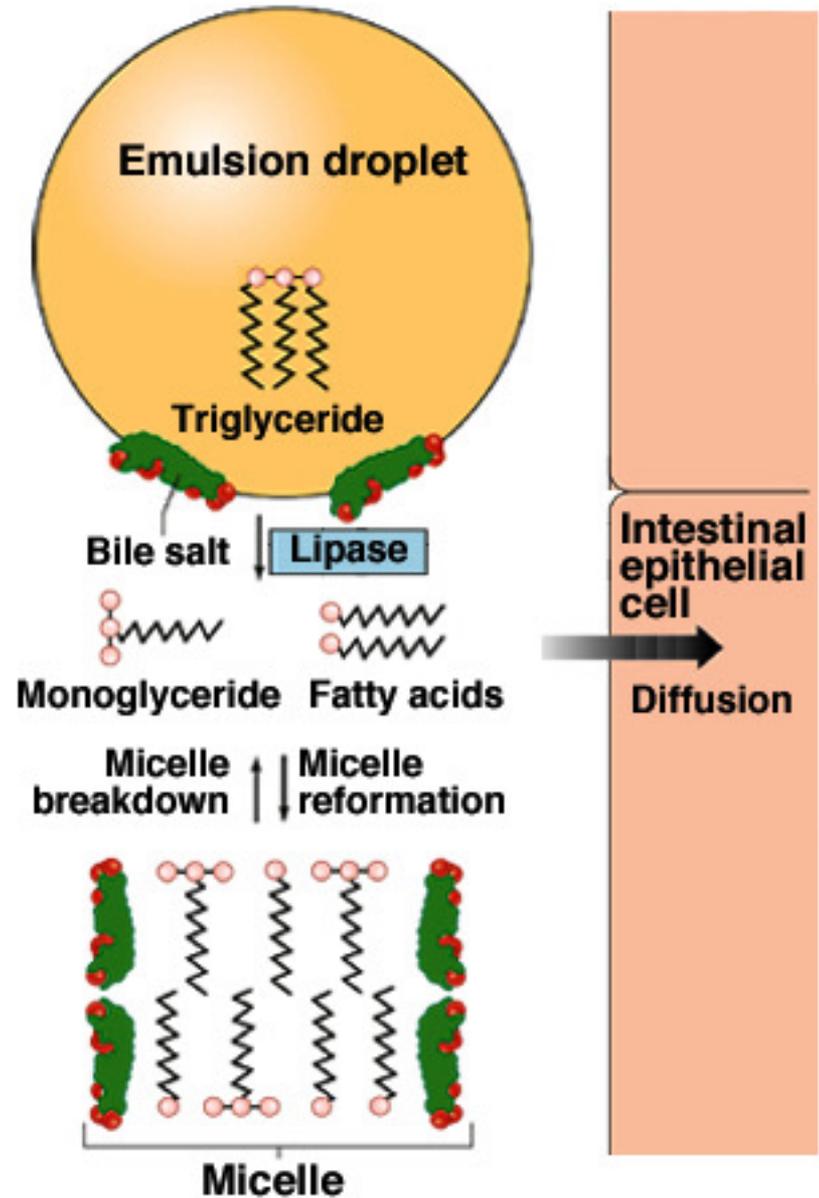
Lisolecitina
1 Ácido graxo



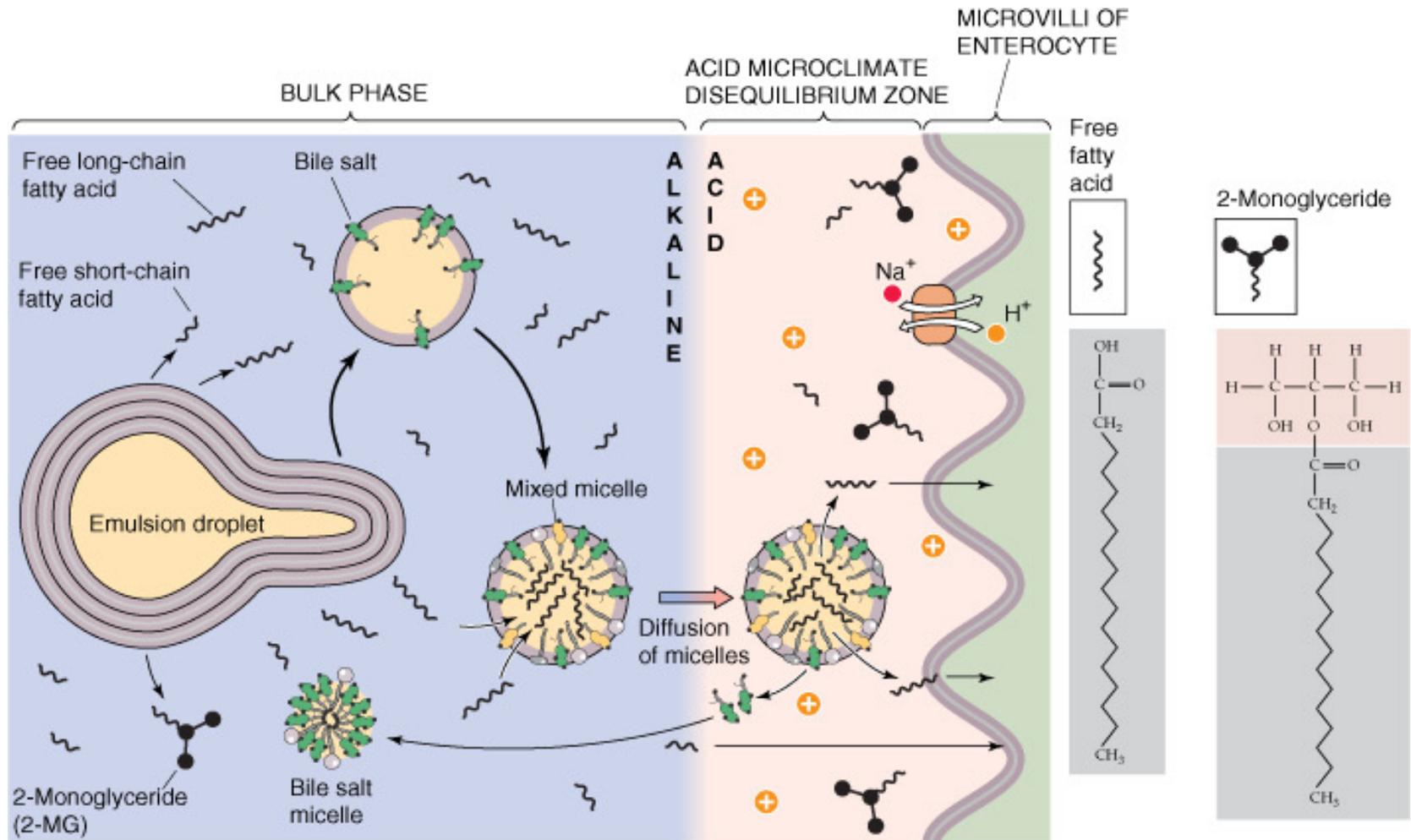


Products of fat digestion/lipase

Colipase: impede a inativação da lipase pelos sais biliares



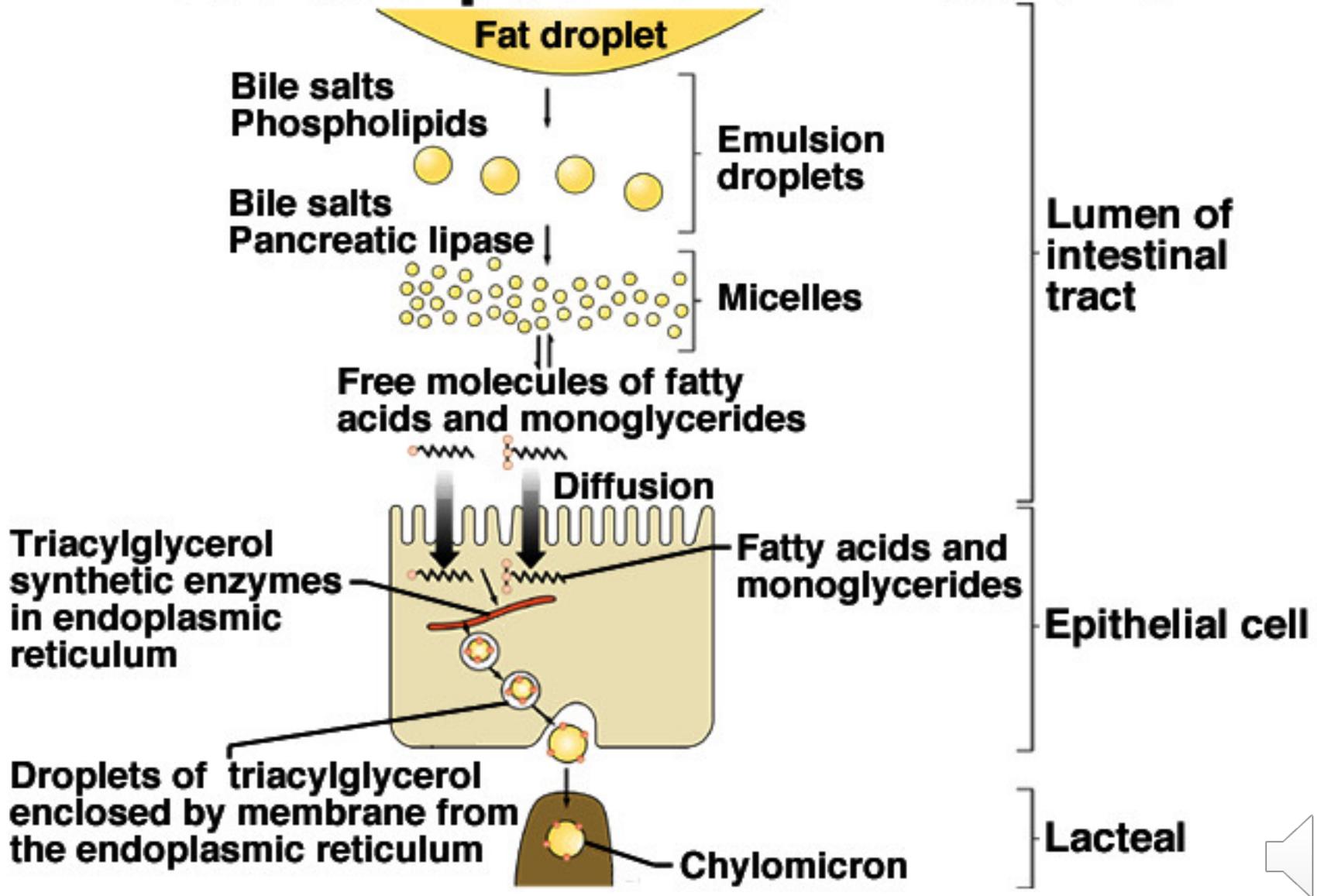
Absorção dos produtos da hidrólise dos lipídios: função das micelas e da camada estacionária de água



Camada estacionária
(40 micrometros)

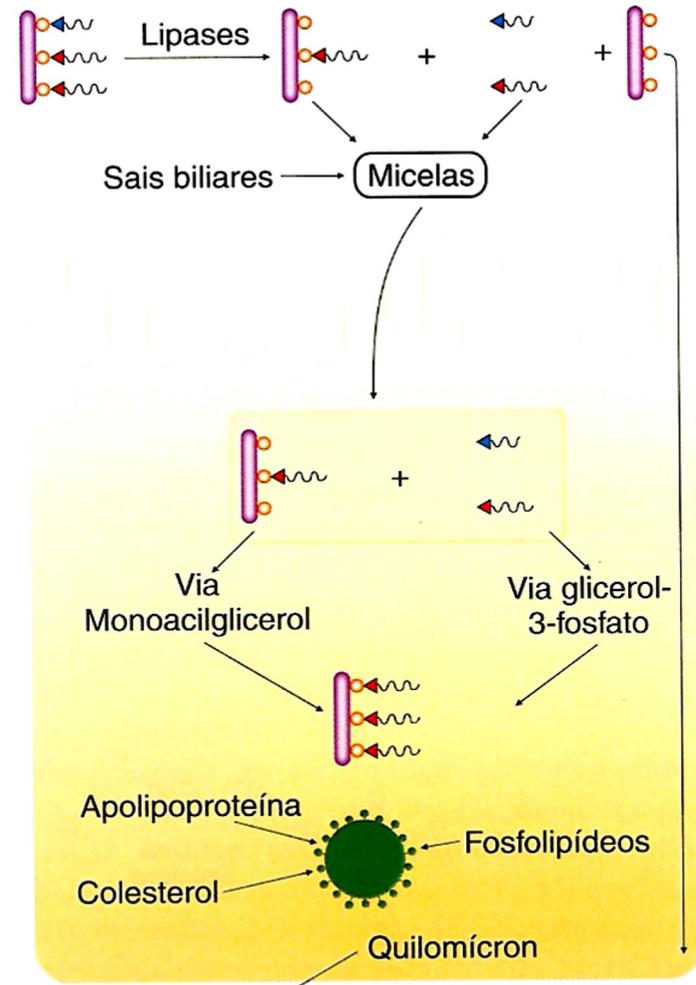


Fat absorption/small intestine



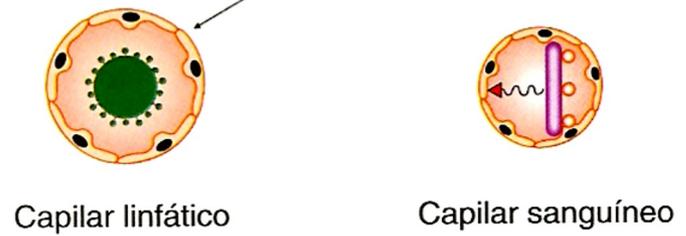


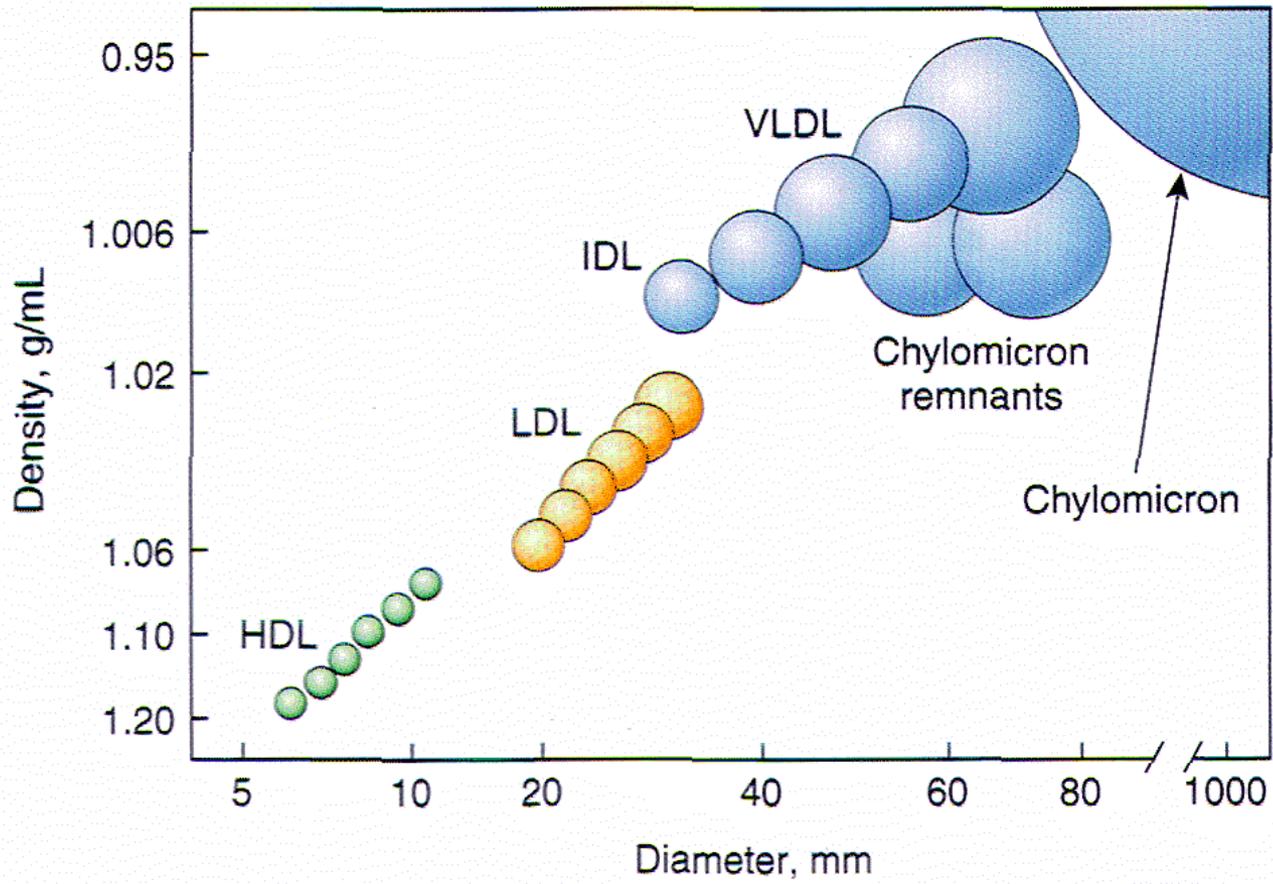
Triglicerídeo Monoglicerídeo/Ácidos grasos/Glicerol



Quilomícrons (60-750nm):

- Triglicerídeos (90%)
- Apolipoproteínas (A, B e C)
- Fosfolípidios
- colesterol



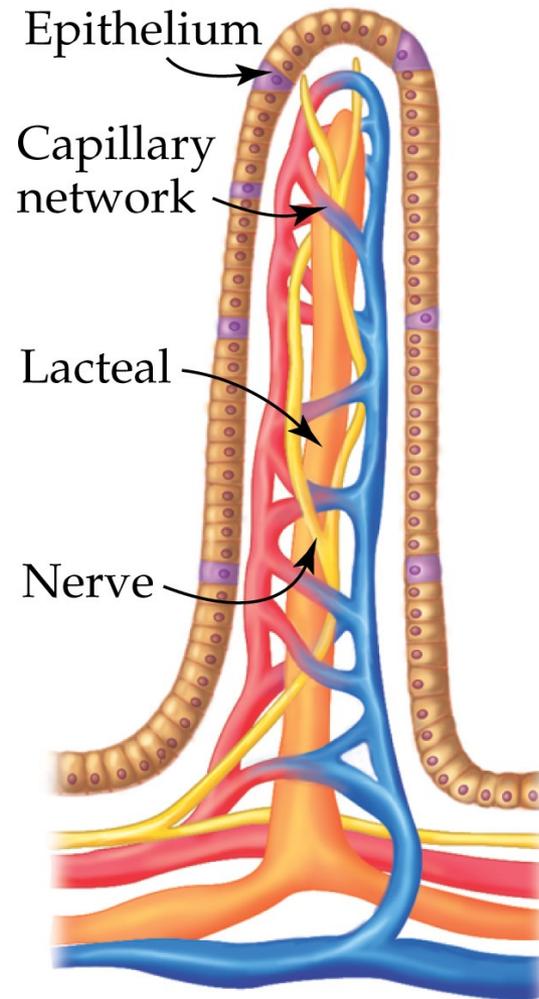


Lactíferos:

- Capilar linfático entérico (conteúdo esbranquiçado)
 - Presença de grandes fenestrações

Quilomícrons

AG de cadeia curta
glicerol



Fat Transport

