

Sistema respiratorio

- Funcoes
- Estrutura anatomico-funcional
- Mecanismos de transporte do O₂ e CO₂

- **Funcoes**

- filtragem e humidificacao do ar

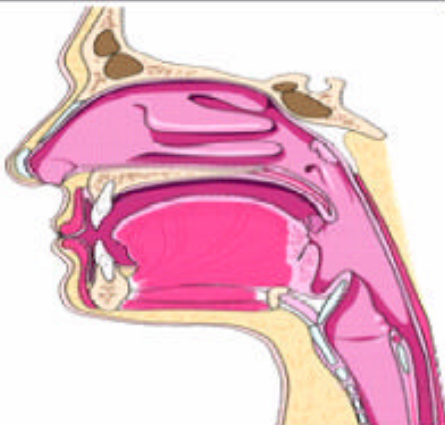

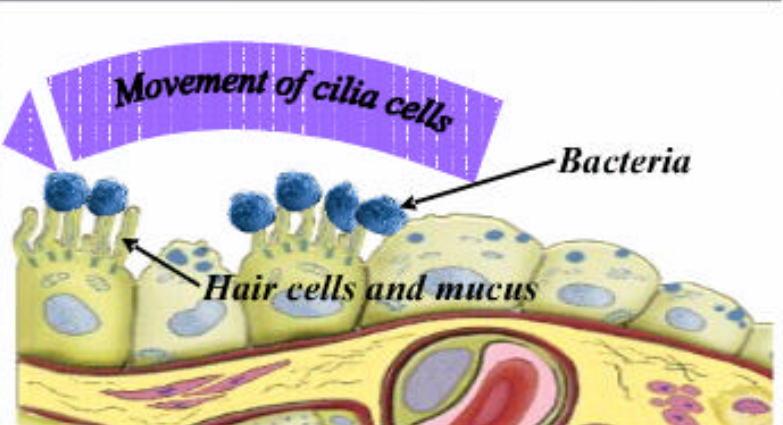
- transporte de O₂ e CO₂

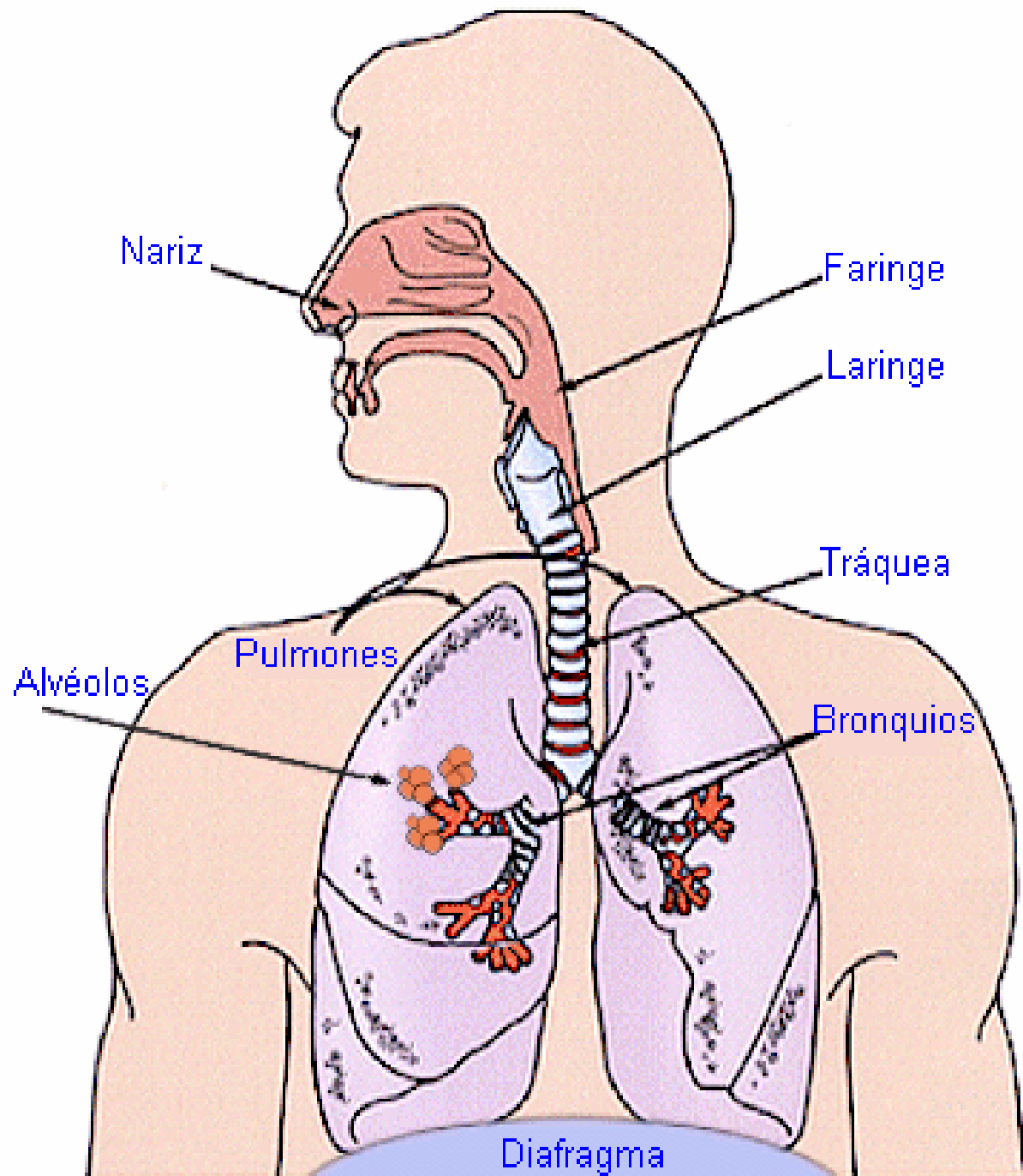
- manutencao das concentracoes de O₂ e CO₂ na corrente sanguinea

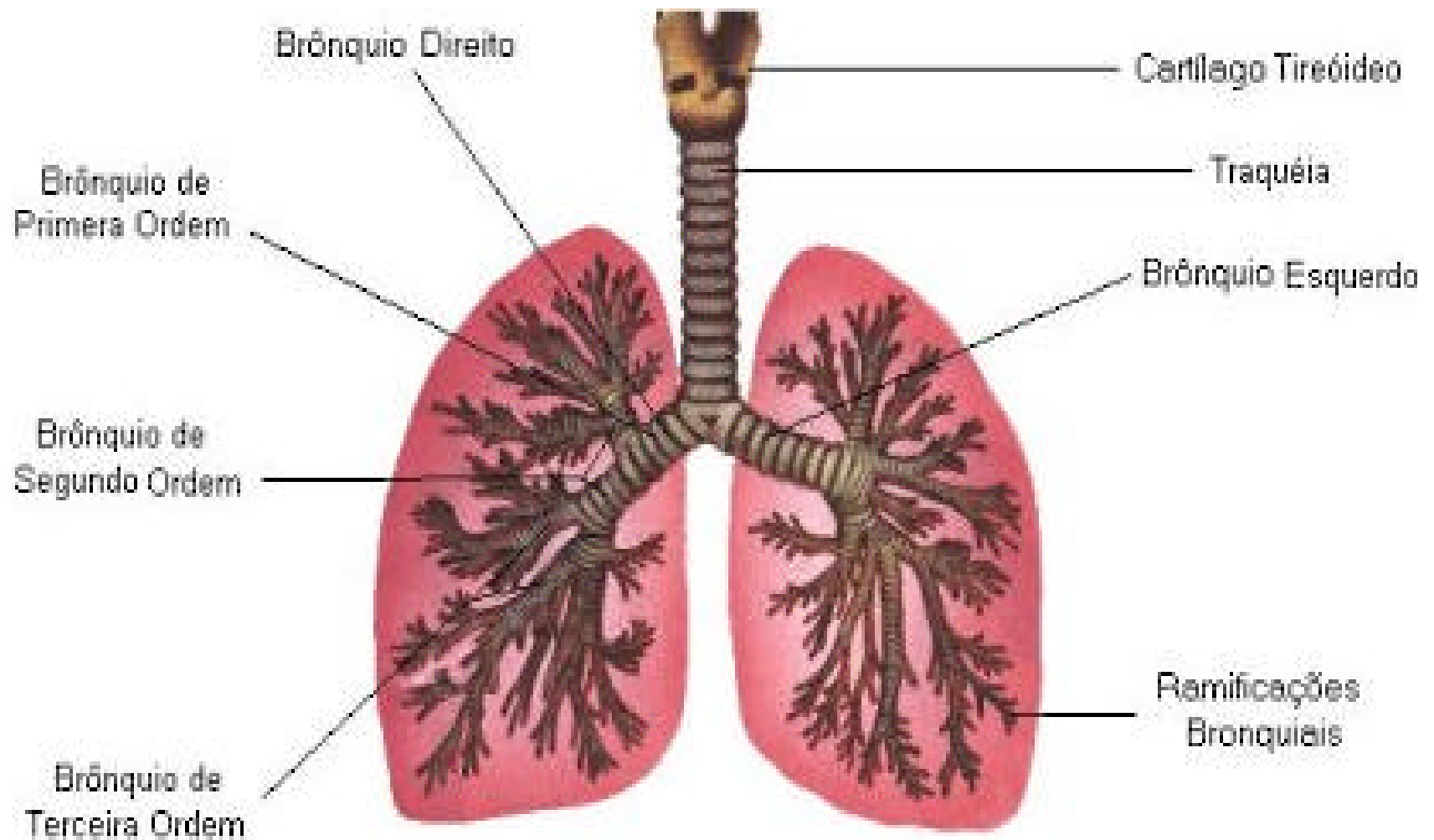
Celulas da mucosa nasal: "filtragem" do ar e protecao dos pulmoes

Protecting the lungs:

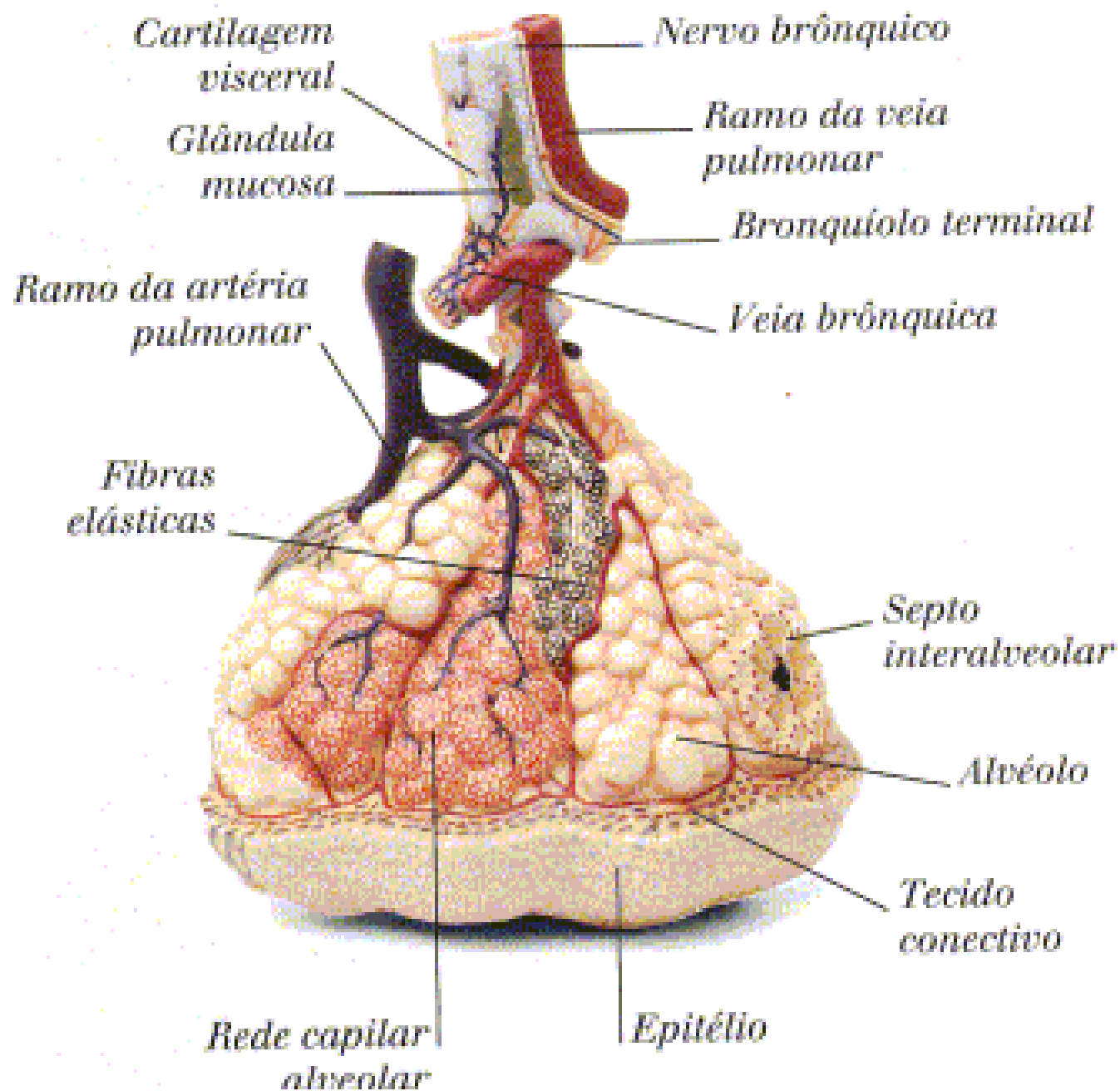
Word bank: nose mucus

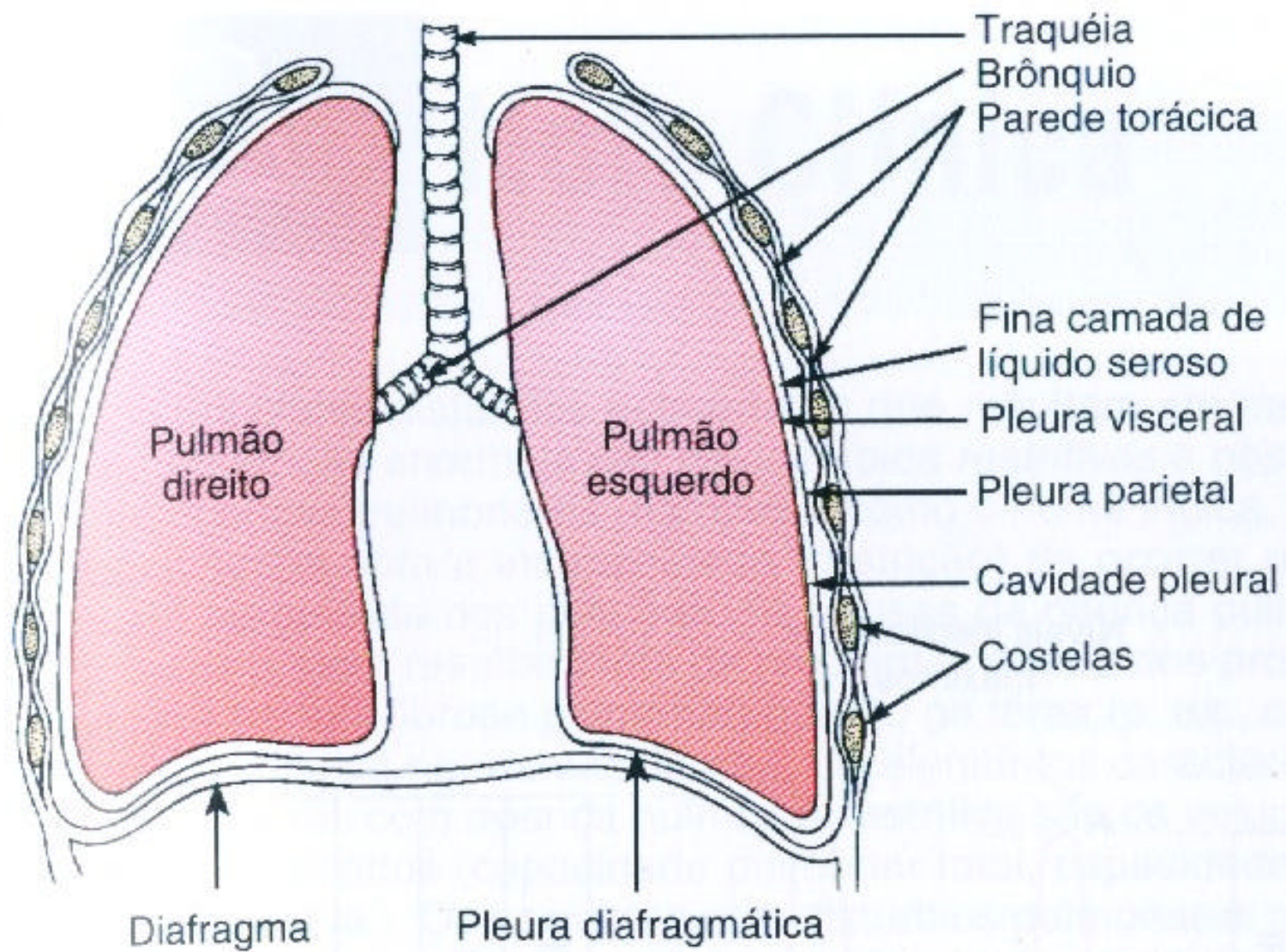
	Warm and moist air	Ciliated epithelia cells	Trapping dirt and microbes in the trachea
Diagram			
Notes	Inhaled air is warmed and made moist by the nasal cavity which is richly supplied by warm blood through thousands of capillaries.	The ciliated hair cells trap dust, dirt and bacteria preventing them entering the delicate lung tissue. Smoking damages these specialised cells.	Thousands of hair like protrusions trap dust and bacteria. This is then covered in a sticky mucus which is secreted by the goblet cells. The hairs beat the mucus and bacteria to the back of the throat where it is swallowed. Bacteria are then destroyed by the acid in the stomach.

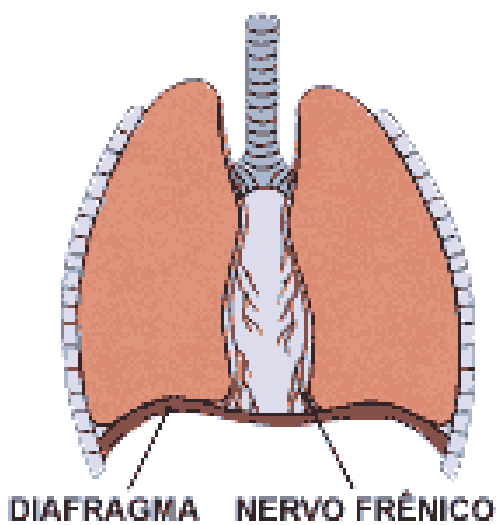
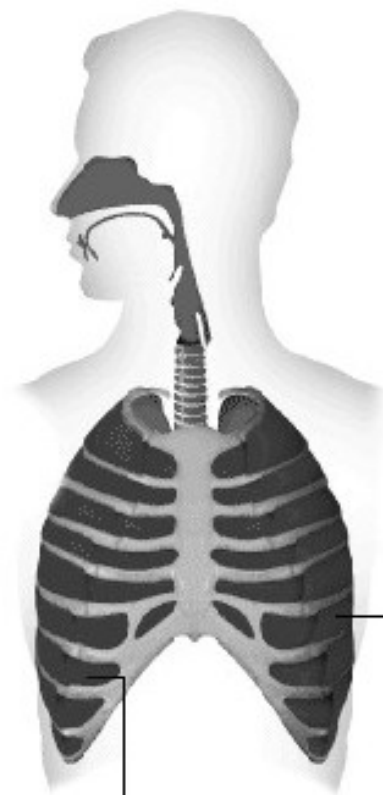
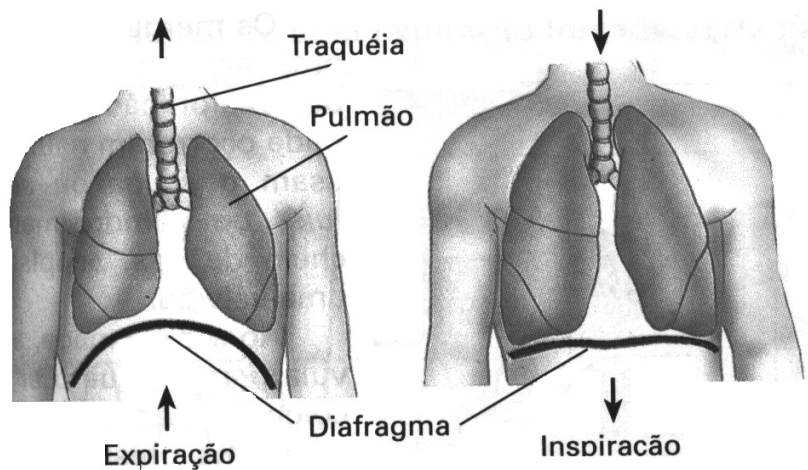




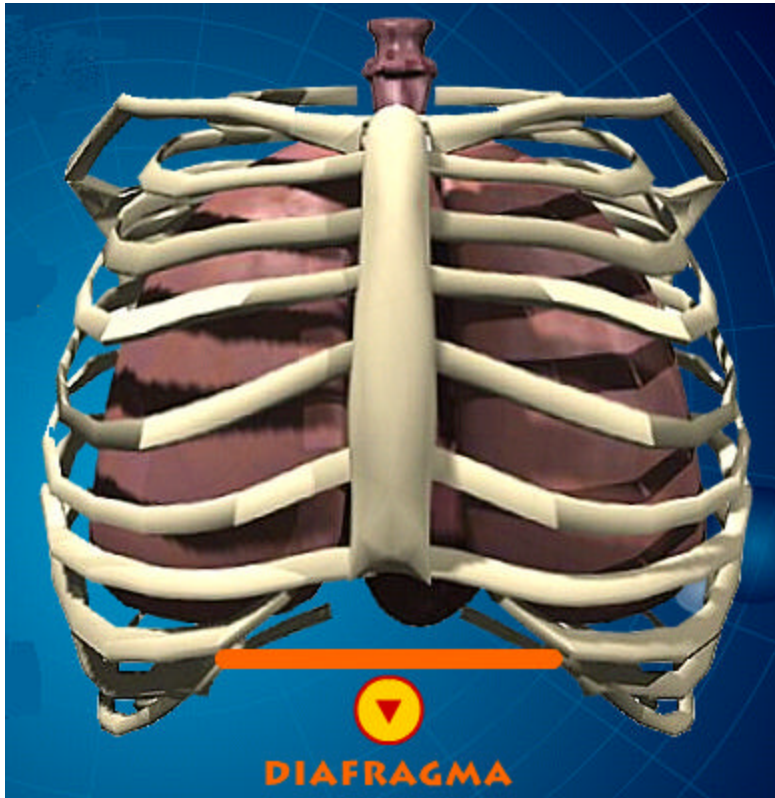
Bronquíolos e alvéolos



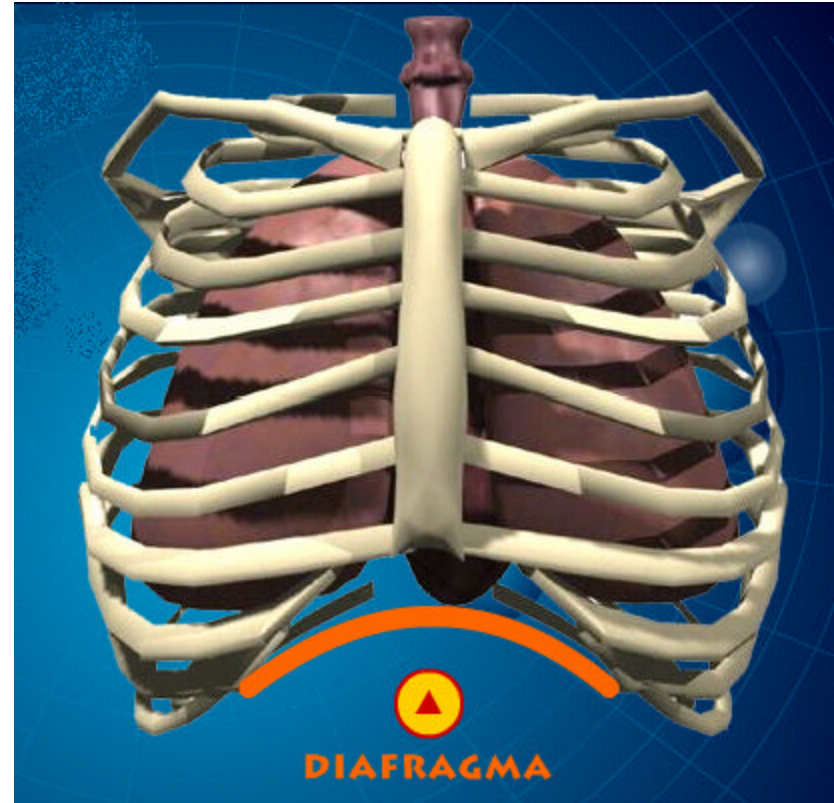




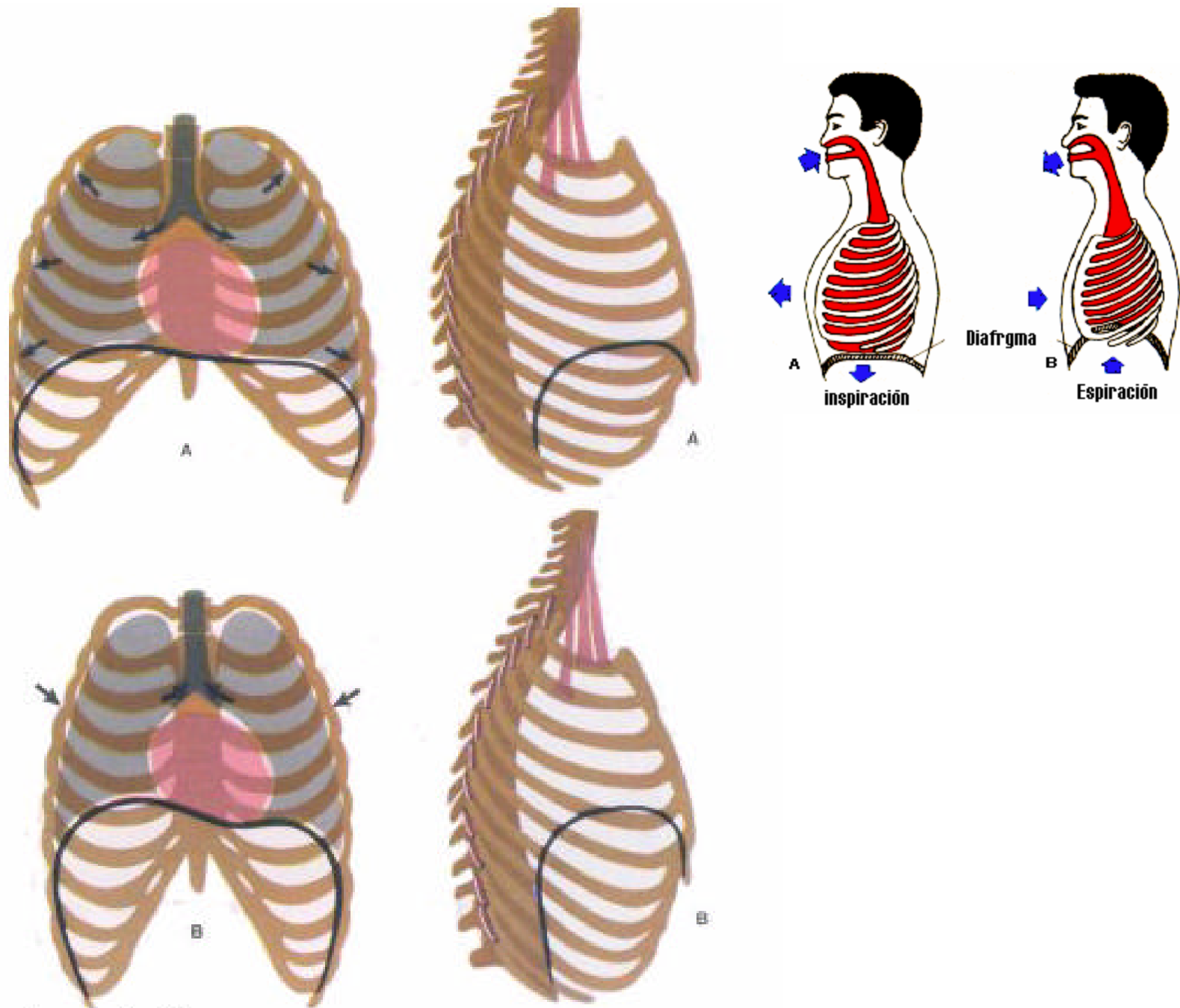
Expiração ← **Músculos internos** Puxam as costelas para baixo e para dentro | **Músculos externos** Movem as costelas para cima e para fora → **Inspiração**



Inspiração



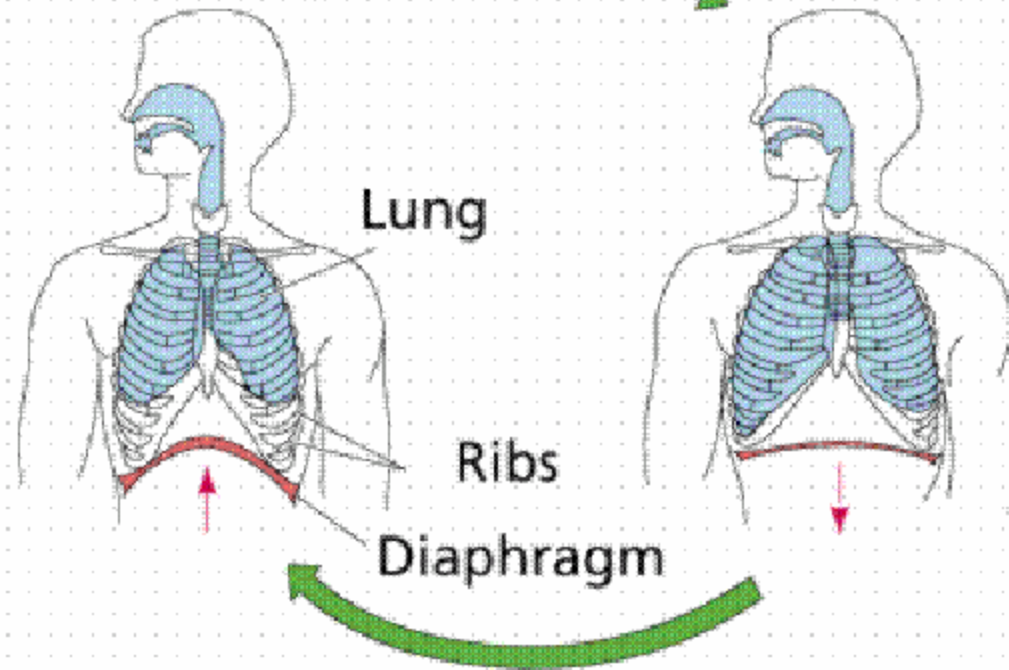
Expiração



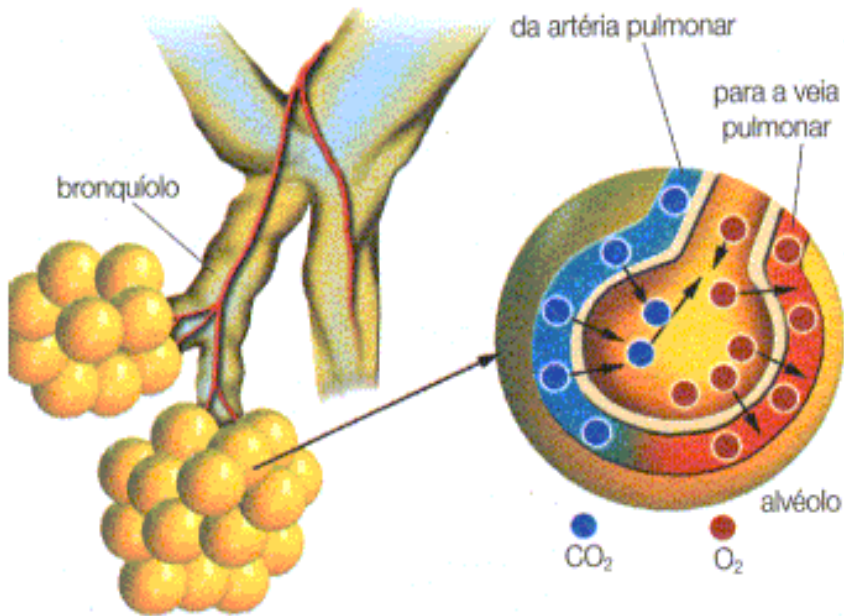
Movimentos da caixa torácica
Vista de frente (à esquerda) e de perfil (à direita) A-Inspiração; B-Expiração

Exhalation

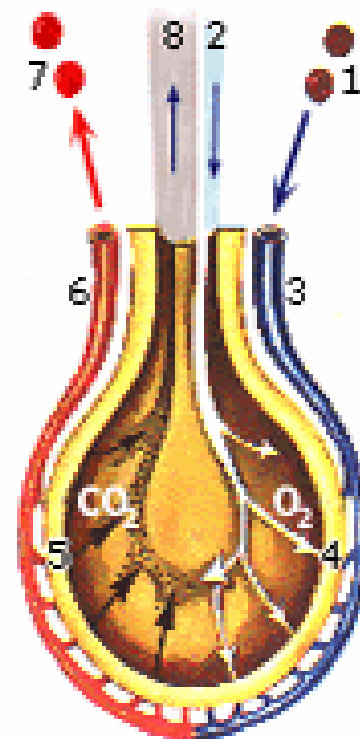
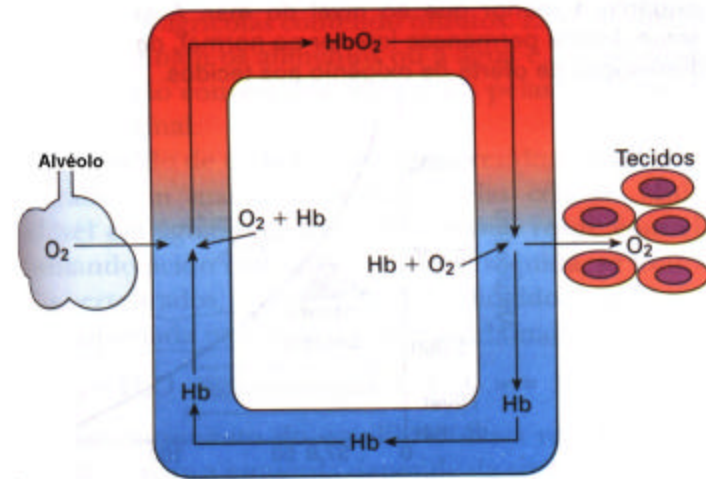
Inhalation



Transporte de gases respiratórios

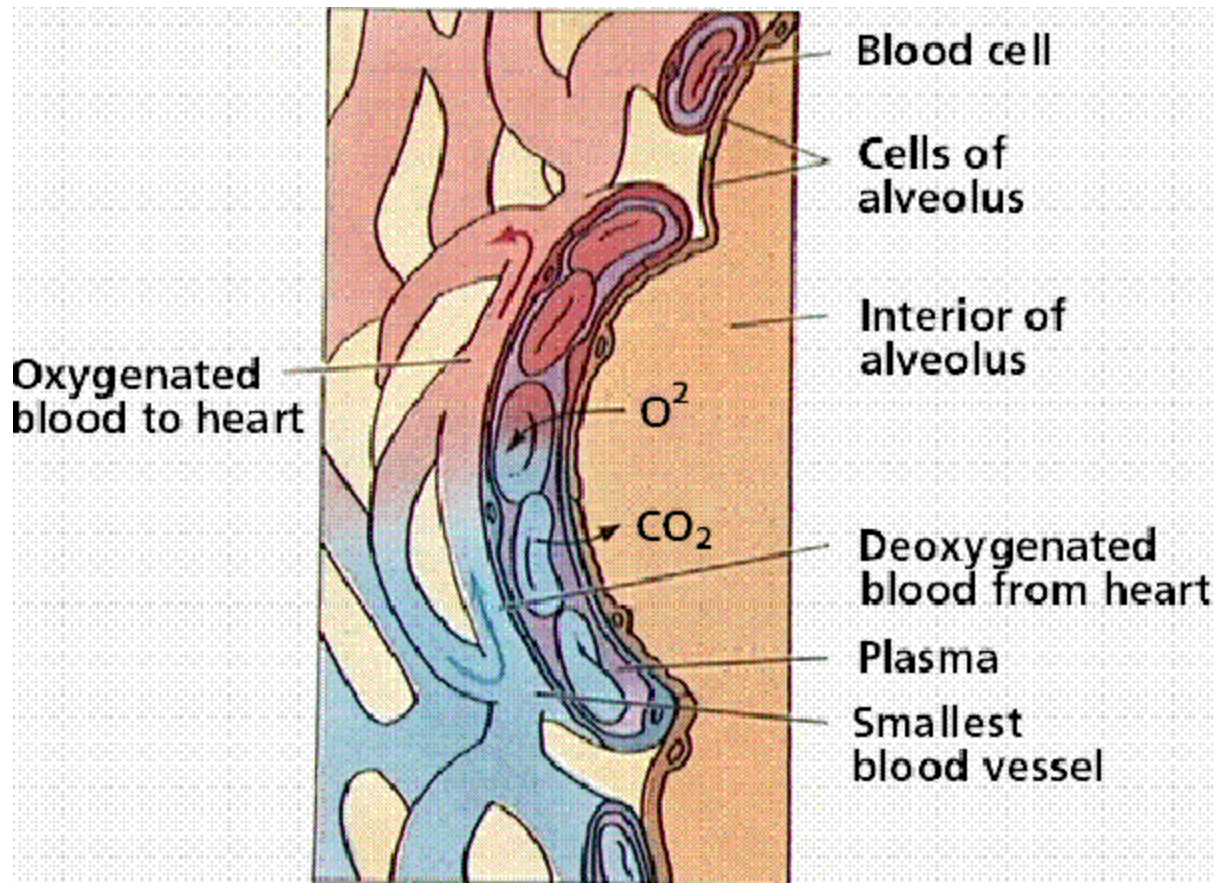


Hematose é a troca de gás oxigênio por gás carbônico nos alvéolos.

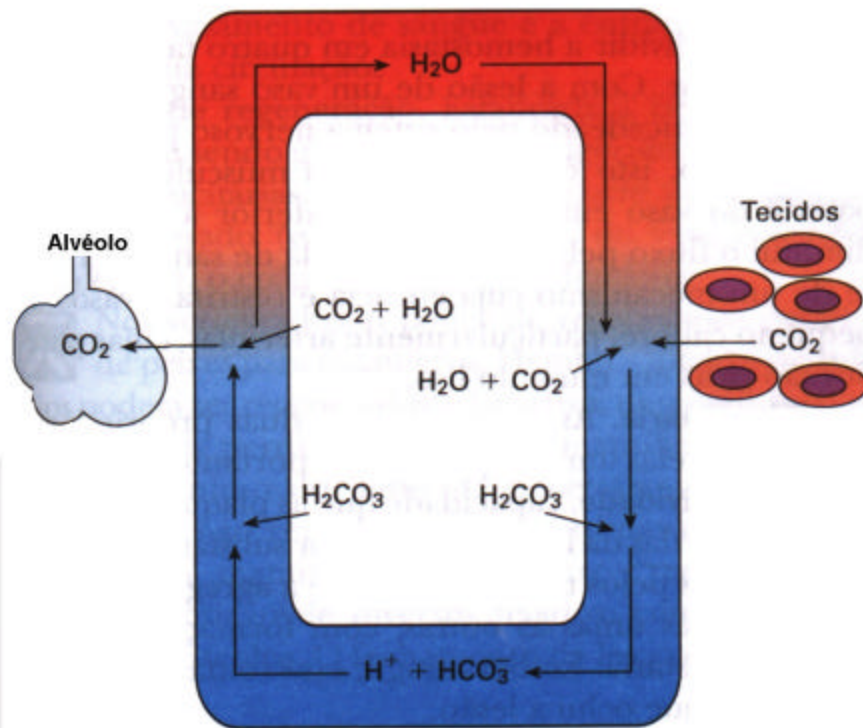
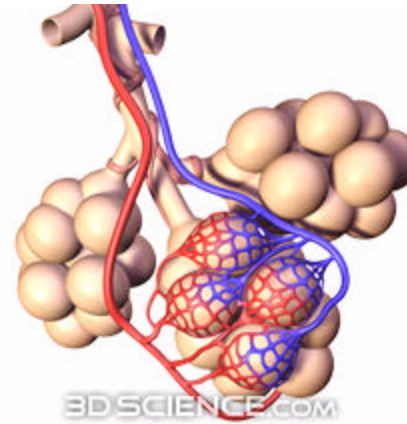
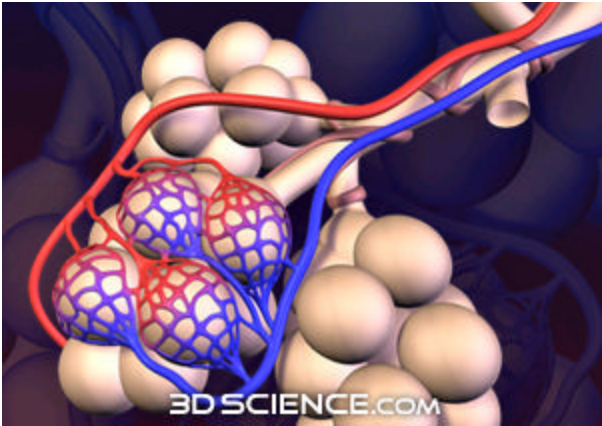


Referências

1. Glóbulos vermelhos carregados de anidrido carbônico.
2. Ar puro inalado pelos pulmões.
3. Sangue venoso.
4. O oxigênio penetra no sangue através da parede capilar.
5. Anidrido carbônico que se elimina do sangue.
6. Sangue arterial.
7. Glóbulos vermelhos que têm apanhado oxigênio.
8. Ar impuro exalado.

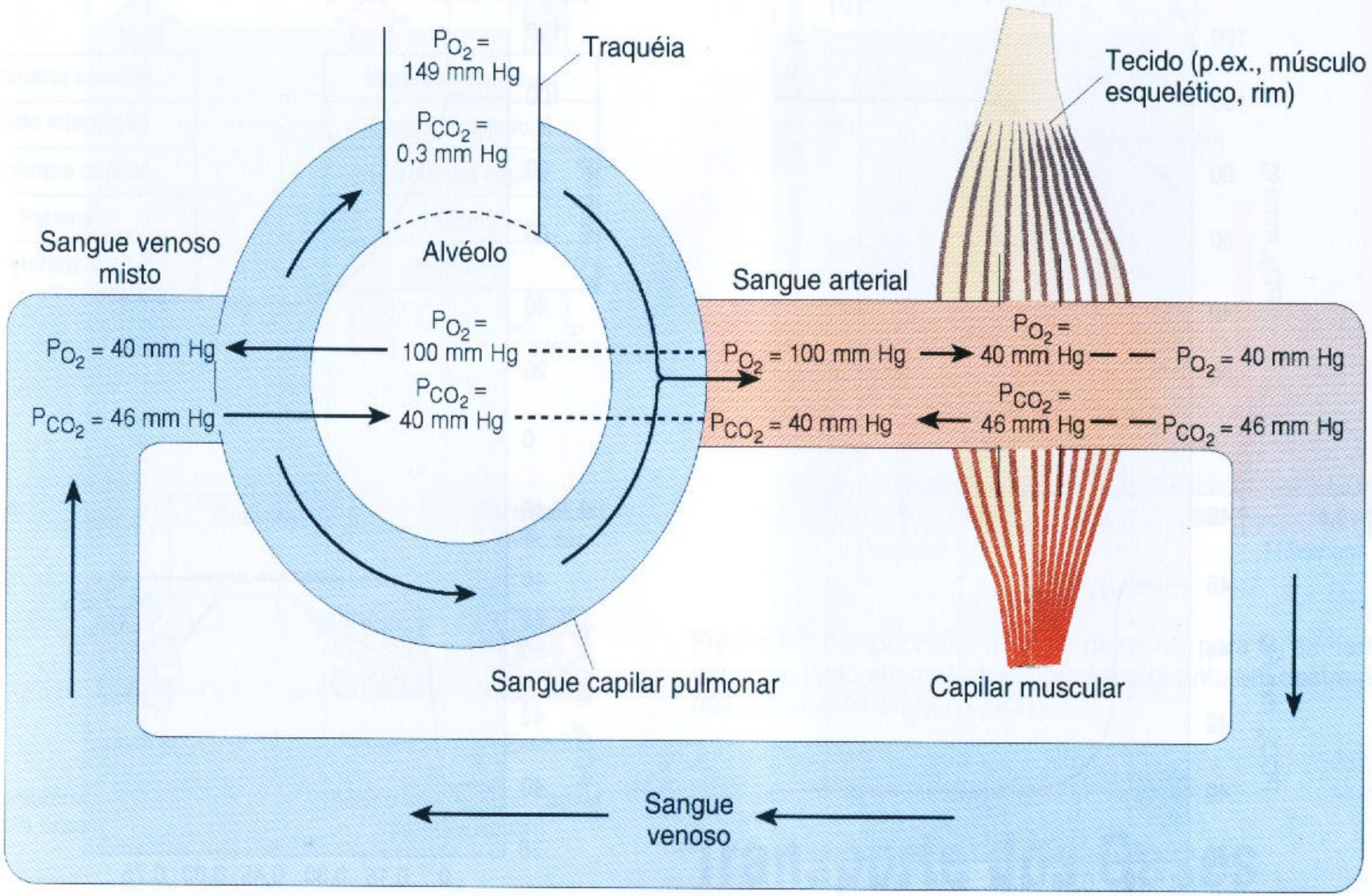


Transporte de gases respiratórios

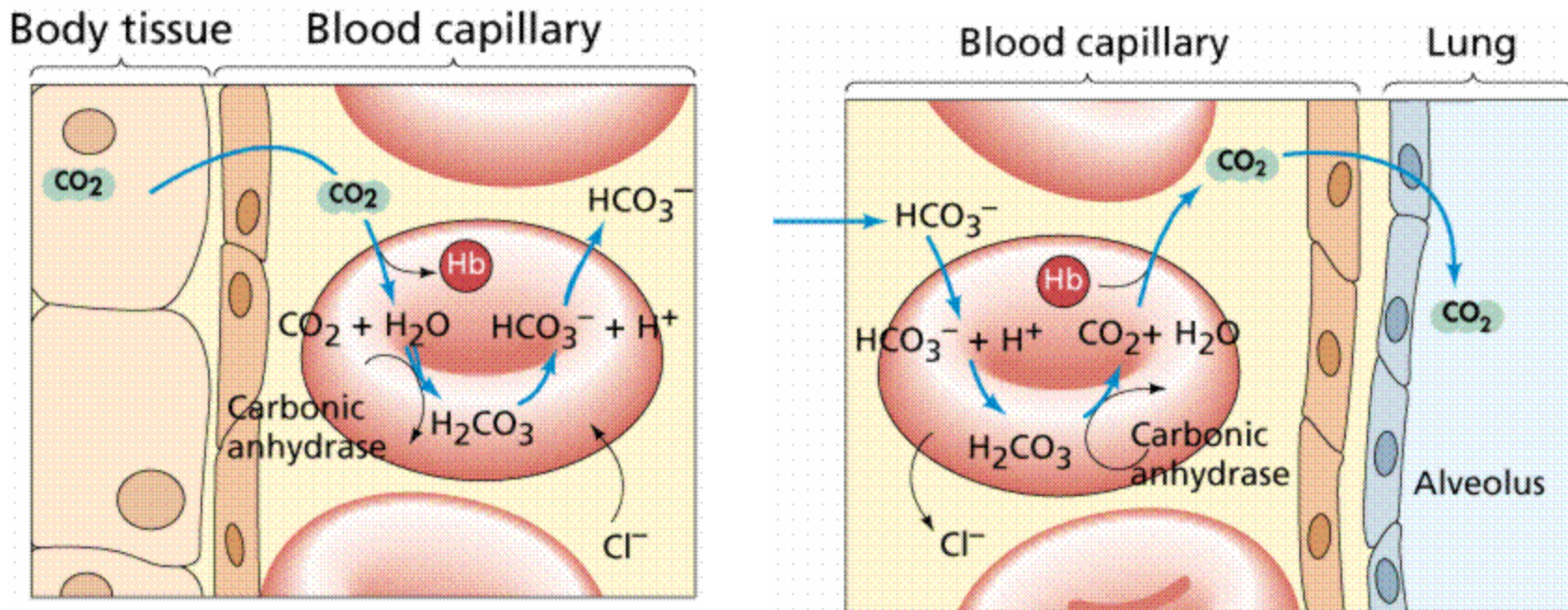


<http://www.afh.bio.br/resp/resp2.asp#ventila>

Ar inspirado
$P_{O_2} = 159 \text{ mm Hg}$
$P_{CO_2} = 0,3 \text{ mm Hg}$



Alvéolo e as trocas gasosas

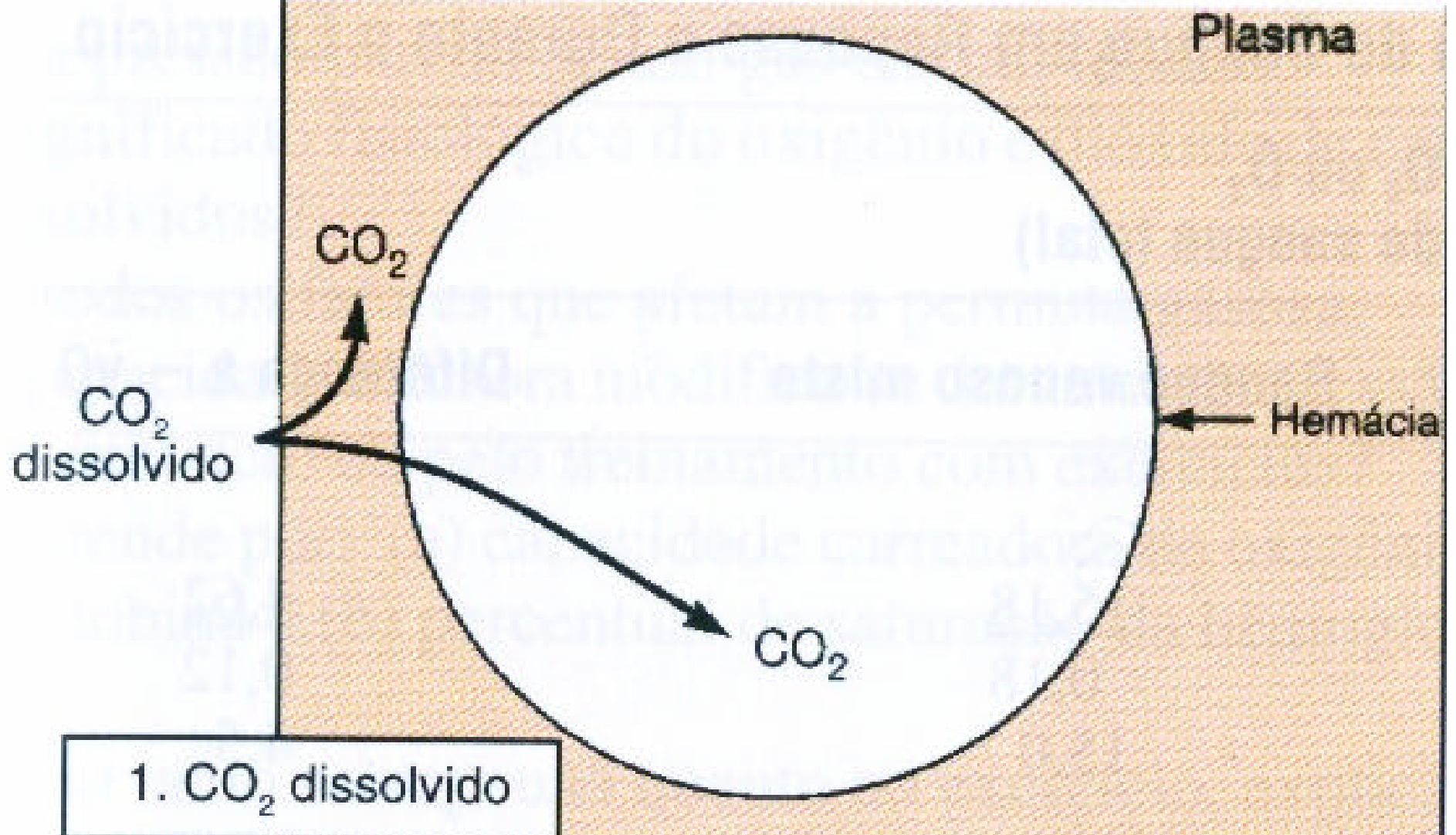


Sangue tecidual-capilar

Célula muscular

Membrana tecidual-capilar

Plasma



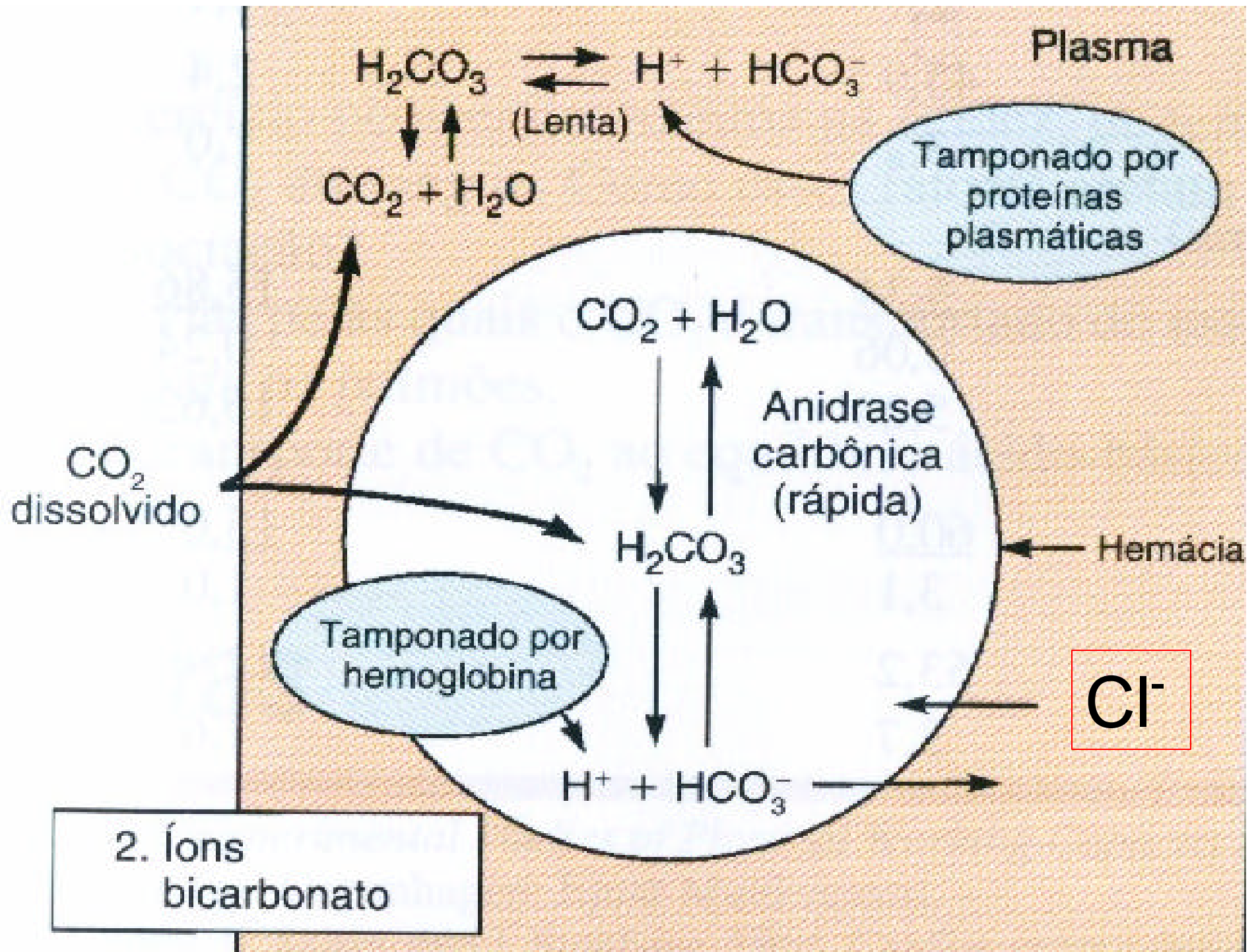
1. CO₂ dissolvido

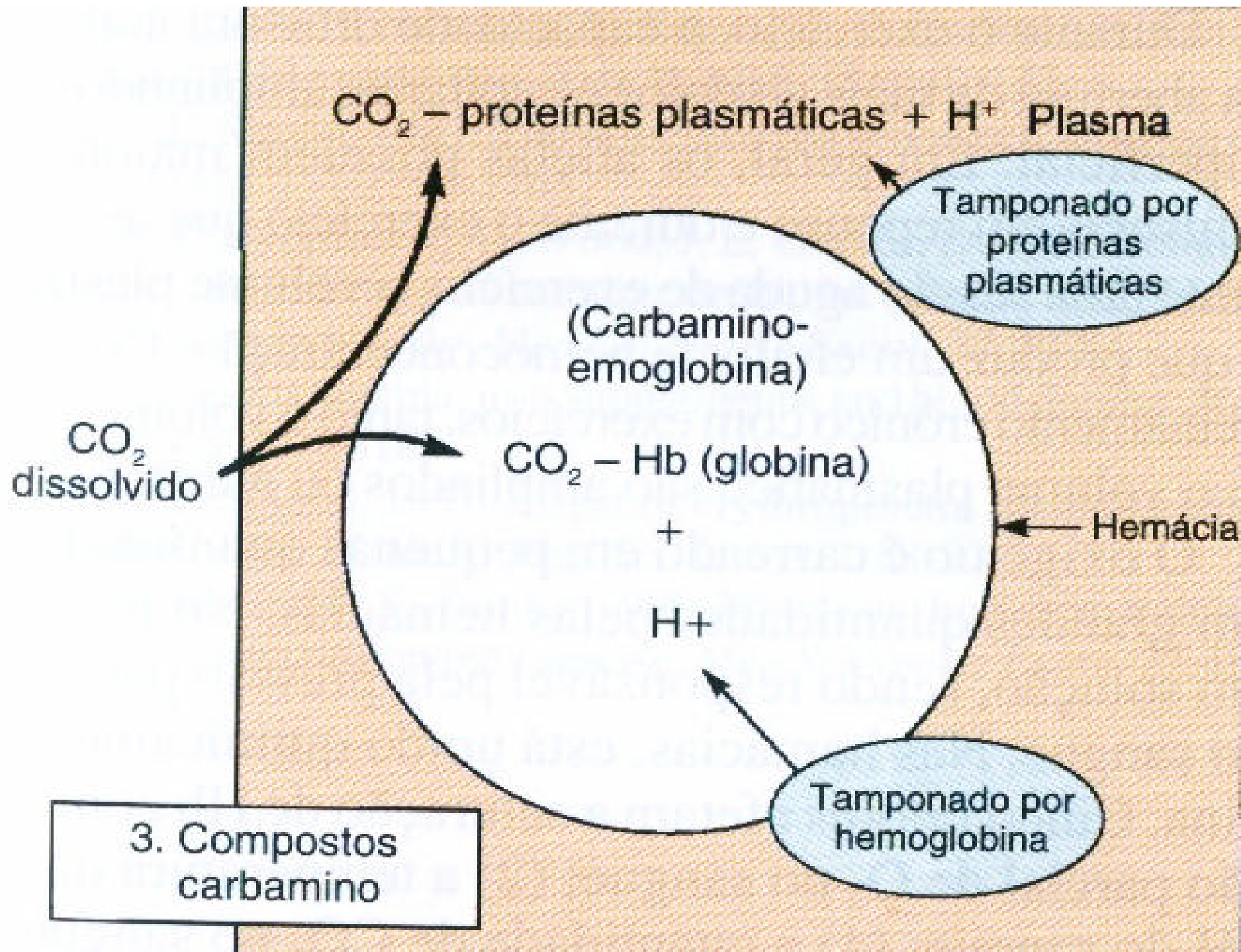
Hemácia

CO₂

CO₂

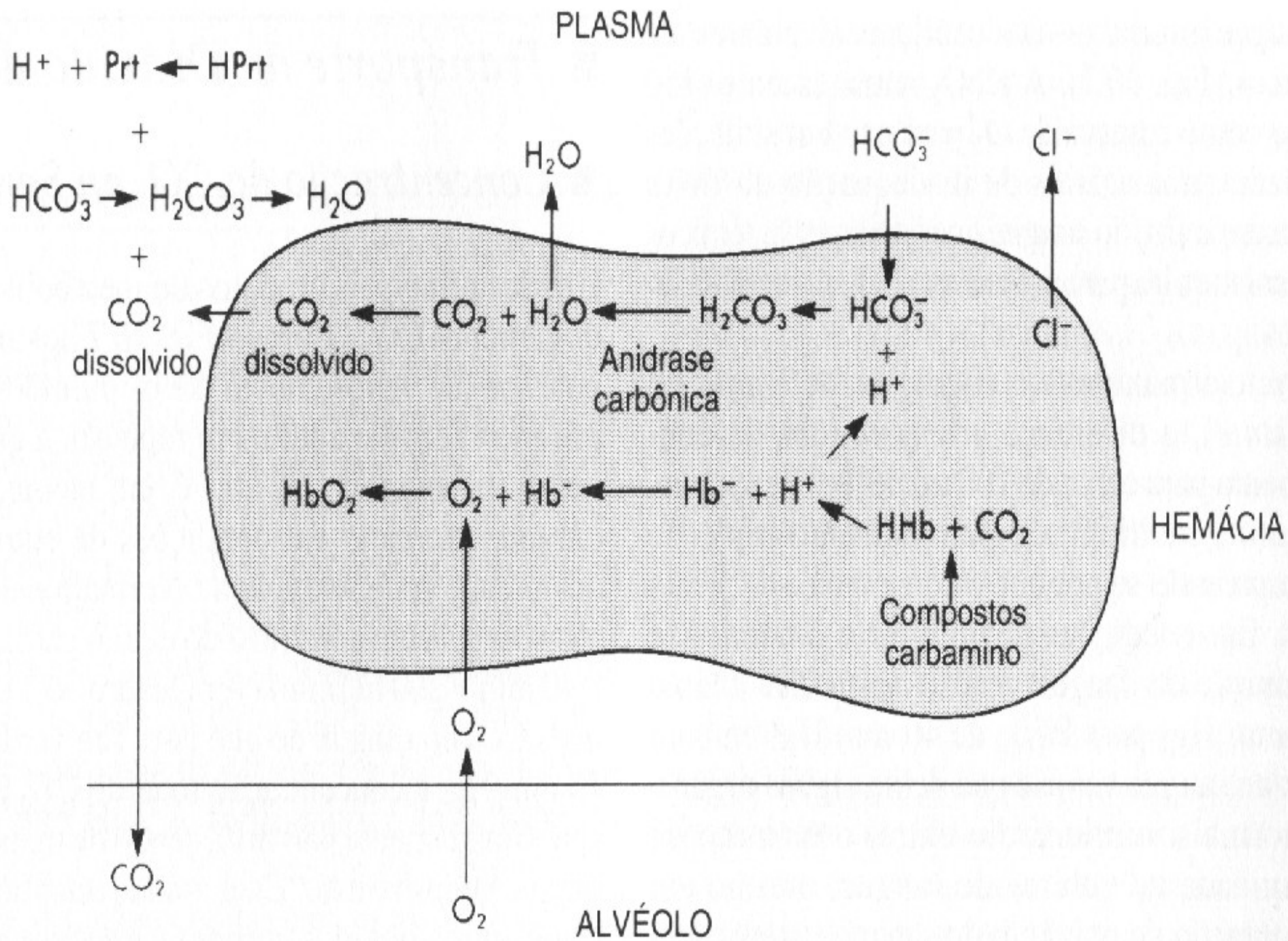
CO₂ dissolvido





Transporte de CO₂

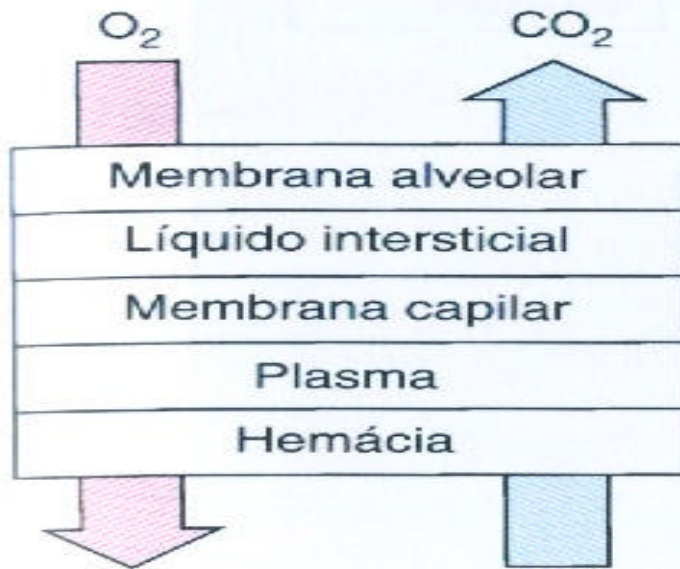
Formas de transporte	Plasma 10%	Eritrócito 90%
CO₂ dissolvido	5%	5%
Íons bicarbonato	5%	63%
Composto carbamino	< 1%	21%



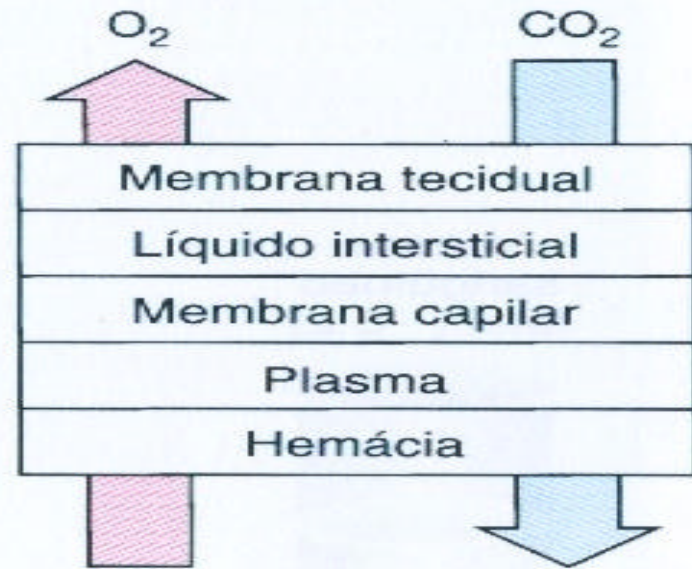
FATORES QUE AFETAM A DIFUSÃO GASOSA

- **espessura da membrana**
 - $>$ espessura $<$ difusão
- **superfície da barreira de difusão**
 - $>$ área $>$ troca
 - determinada pelo número de capilares funcionantes
- **solubilidade do gás**
 - CO_2 é 20 a 30 x mais solúvel
- **gradiente de difusão**
 - gradiente de pressão

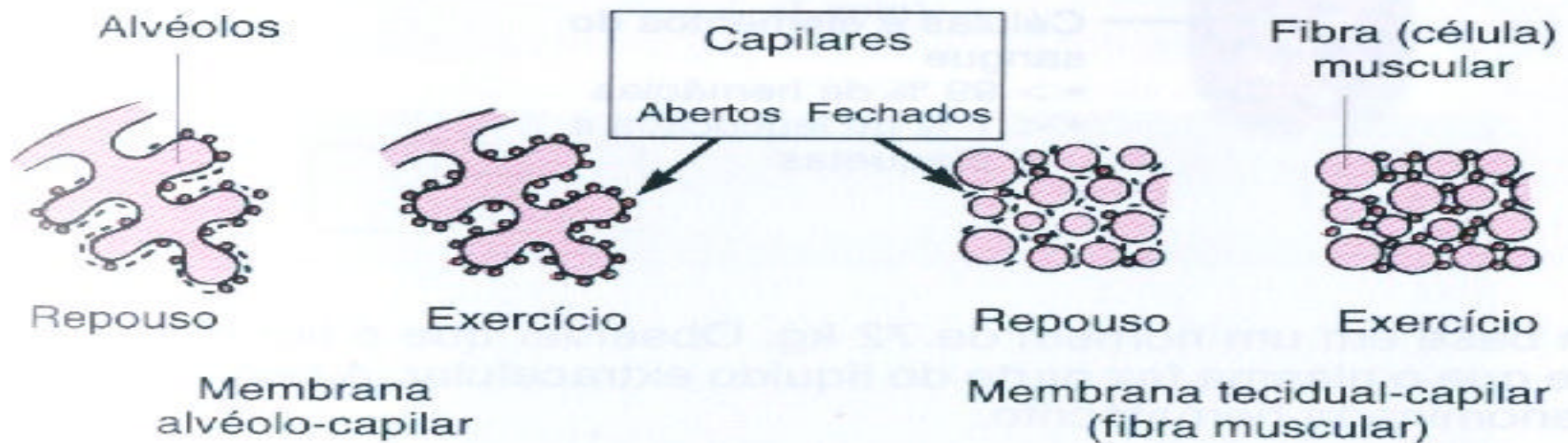
Via difusora alvéolo-capilar



Via difusora tecidual-capilar



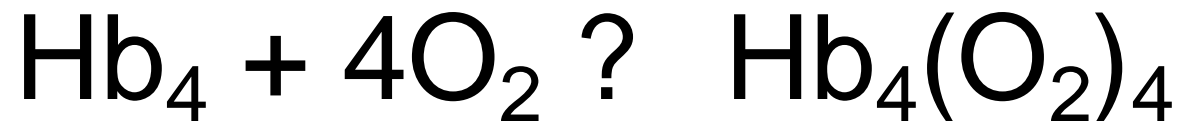
A



TRANSPORTE DE O₂



O₂ combina-se com a Hb na razão de
1,34 ml de O₂/g de Hb



EFEITO TRÓFICO ? a afinidade da Hb pelo O₂
? com a oxigenação

REGULAÇÃO DA VENTILAÇÃO

- CONTROLE NERVOSO

CENTRAL

- BULBO ? Formação Reticular

Centro **INSP**iratório x Centro **EXP**iratório
(inervação recíproca)

- PONTE ? Centros de modulação:
APNÉUSTICO x PNEUMOTÁCICO

REGULAÇÃO DA VENTILAÇÃO

- CONTROLE QUÍMICO
 - Quimioceptores centrais ? bulbo: respondem a variação de pH e indiretamente PCO_2
 - Quimioceptores periféricos ? Corpos Carotídeo e Aórtico: respondem a ? PCO_2 ? pH ? PO_2 ? atuam no CENTRO INSPIRATÓRIO