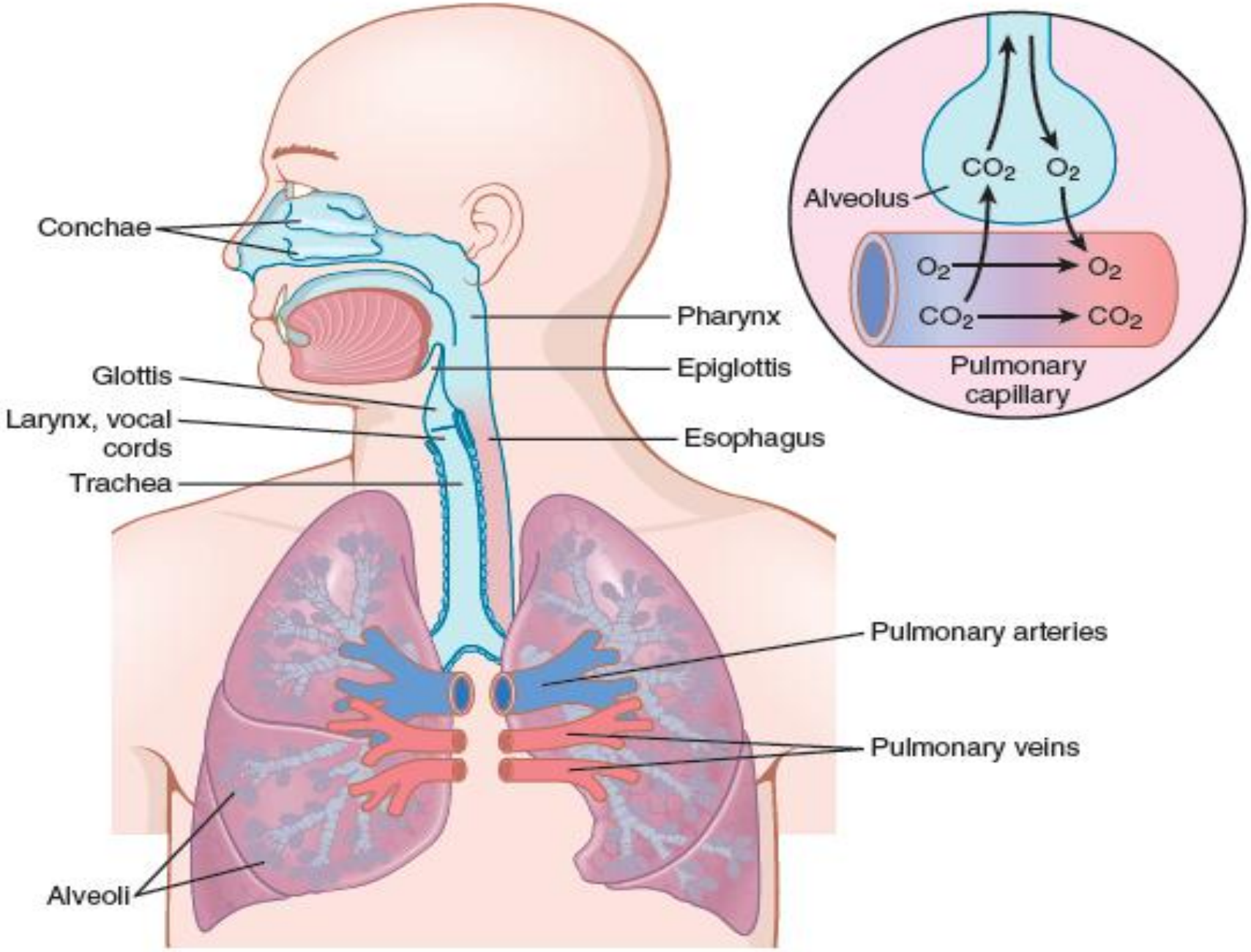


Figure 38-8. Respiratory passages.

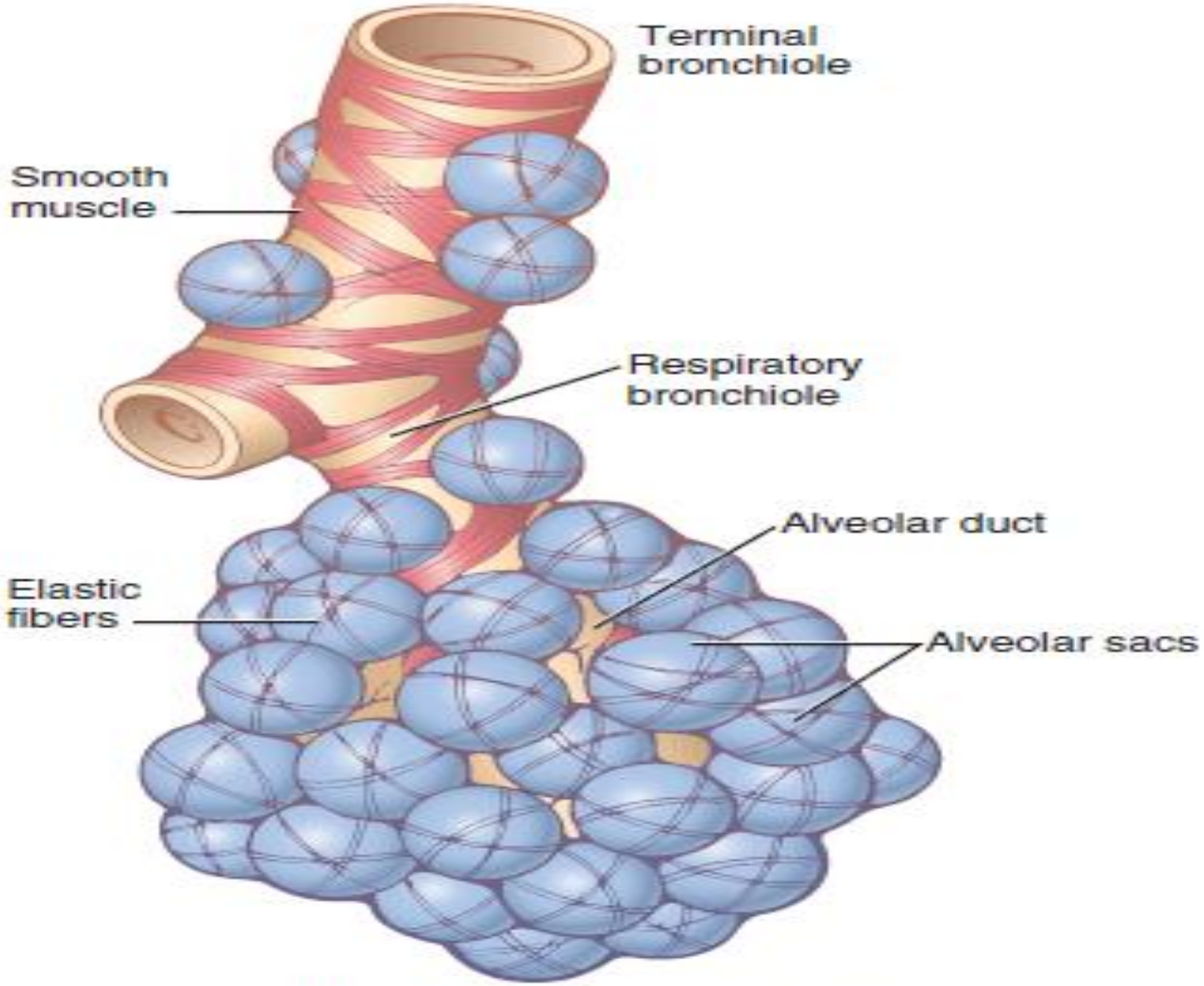
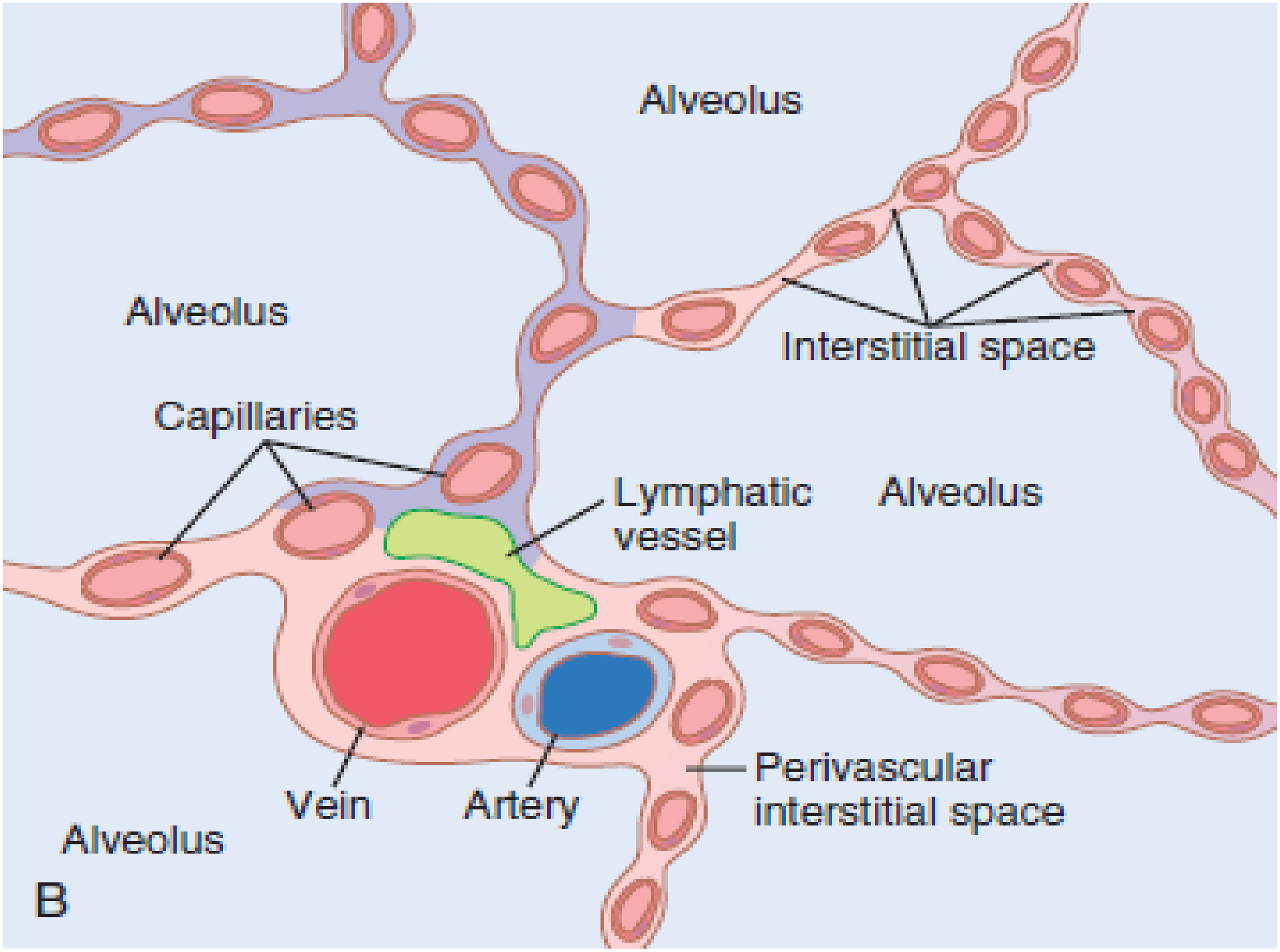
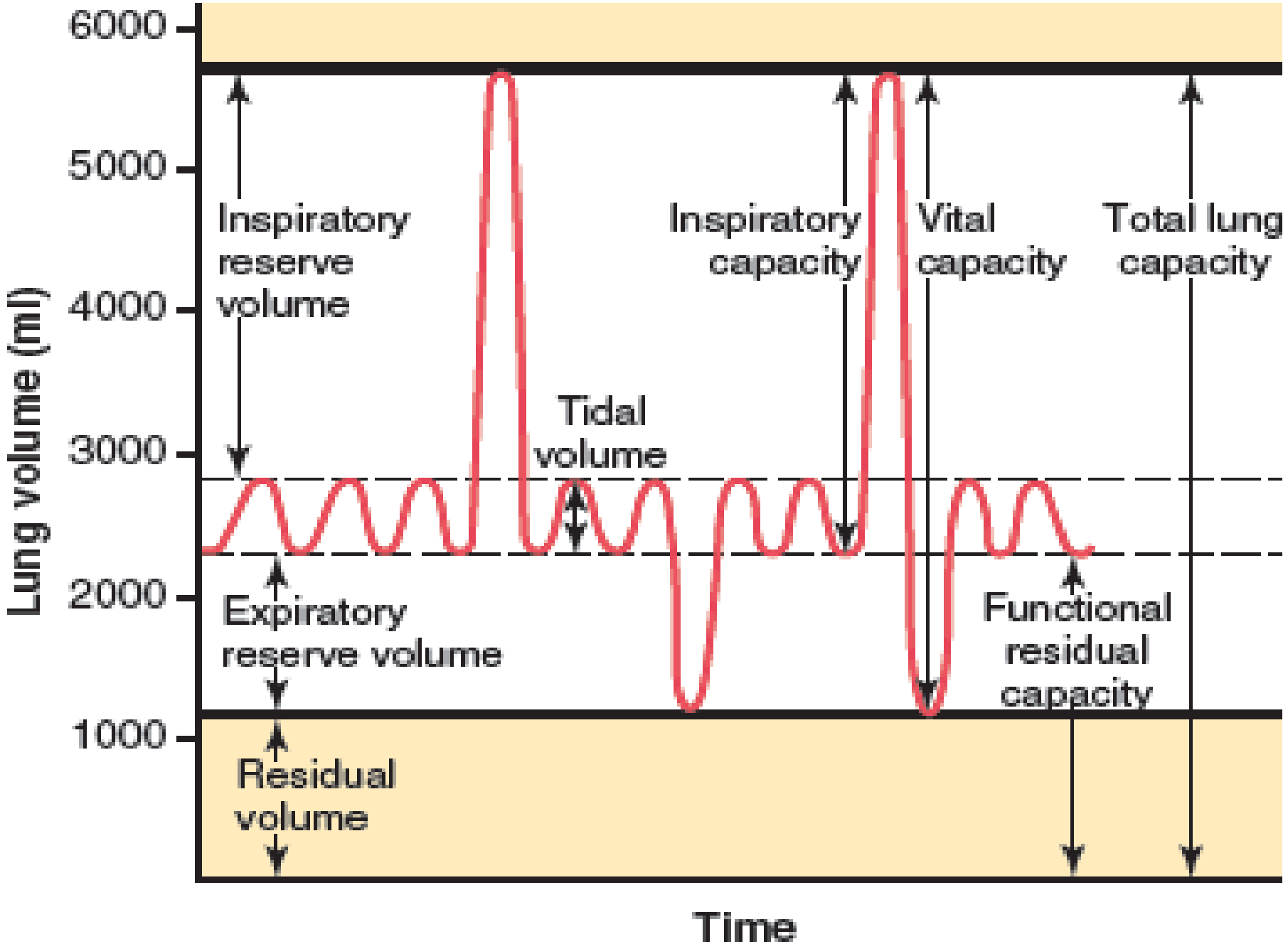


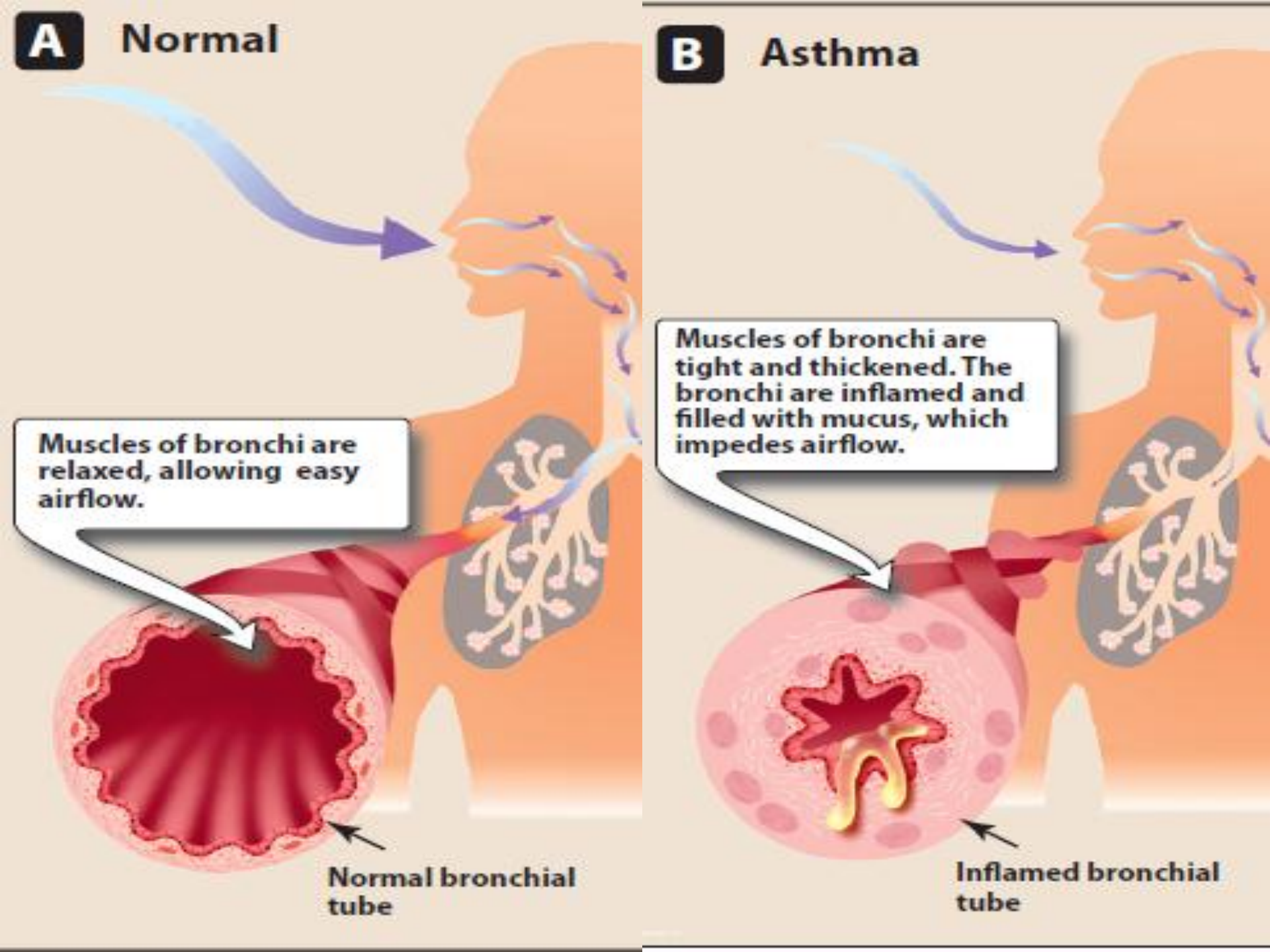
Figure 40-7. Respiratory unit.

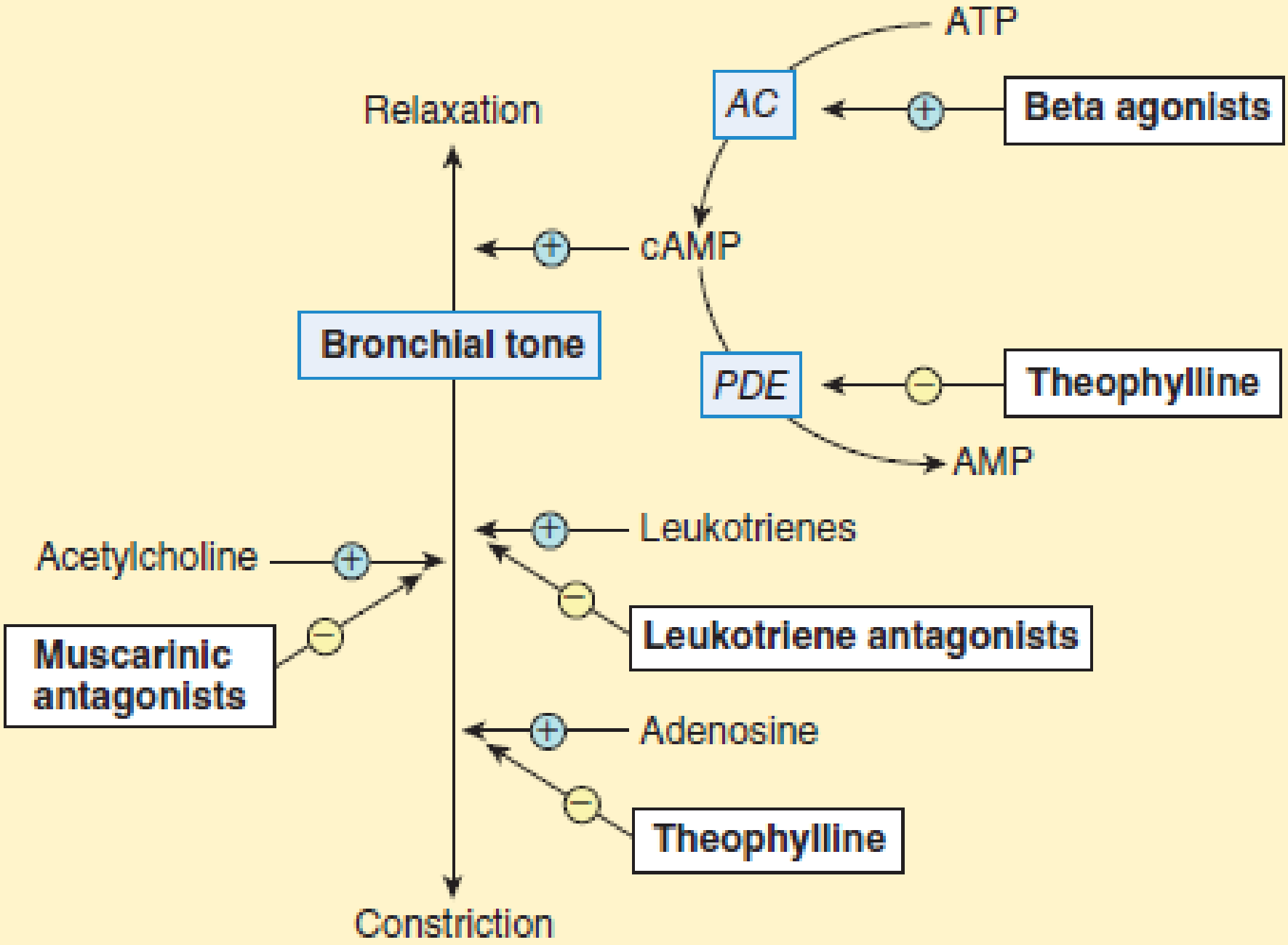

Alveolus
Alveolus
Interstitial space
Capillaries
Lymphatic vessel
Alveolus
Vein
Artery
Perivascular interstitial space
Alveolus
B

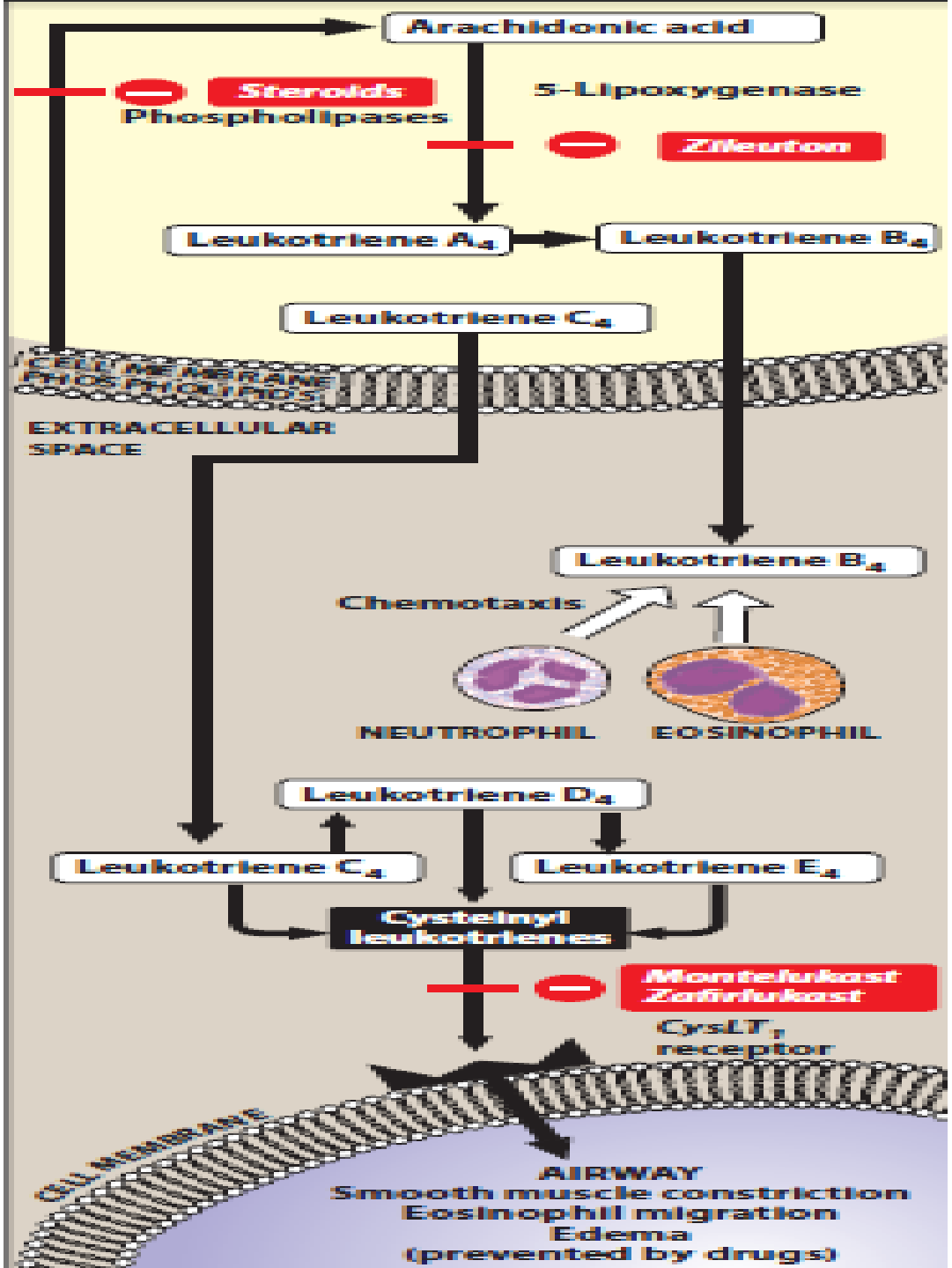

6000
5000
4000
3000
2000
1000
Lung volume (ml)
Inspiratory reserve volume
Tidal volume
Expiratory reserve volume
Residual volume
Inspiratory capacity
Vital capacity
Total lung capacity
Functional residual capacity
Time

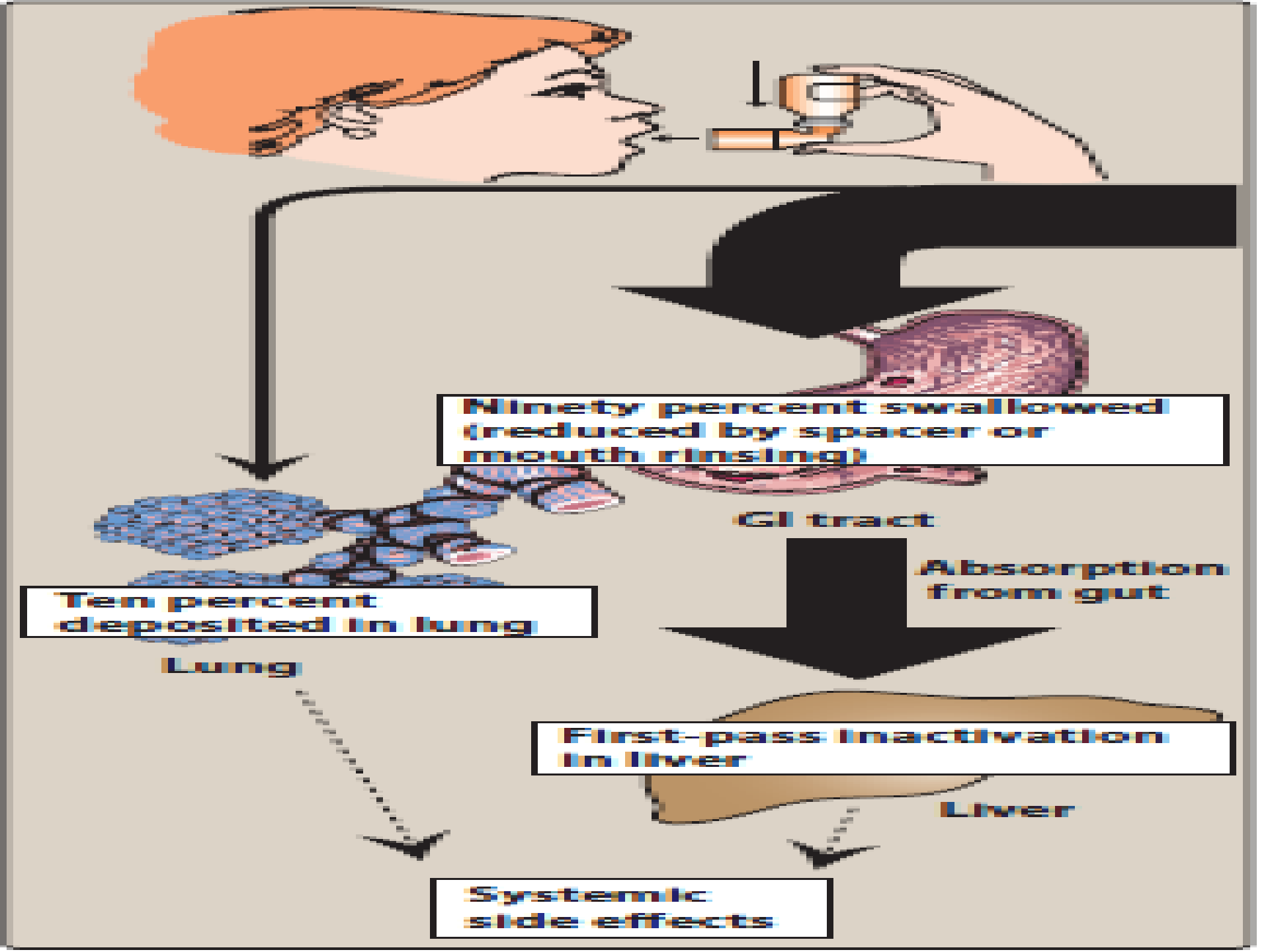
MEDICATION	INDICATION
SHORT-ACTING β_2 ADRENERGIC AGONISTS	
Albuterol PROAIR, PROVENTIL, VENTOLIN	Asthma, COPD
Levalbuterol XOPENEX	Asthma, COPD
LONG-ACTING β_2 ADRENERGIC AGONISTS	
Arformoterol BROVANA	COPD
Formoterol FORADIL, PERFOROMIST	Asthma, COPD
Indacaterol ARCAPTA	COPD
Salmeterol SEREVENT	Asthma, COPD
INHALED CORTICOSTEROIDS	
Beclomethasone BECONASE AQ, QVAR	Allergic rhinitis, Asthma, COPD
Budesonide PULMICORT, RHINOCORT	Allergic rhinitis, Asthma, COPD
Ciclesonide ALVESCO, OMNARIS, ZETONNA	Allergic rhinitis
Fluticasone FLONASE, FLOVENT	Allergic rhinitis, Asthma, COPD
Mometasone ASMANEX, NASONEX	Allergic rhinitis, Asthma
Triamcinolone NASACORT AQ	Allergic rhinitis
LONG-ACTING β_2 ADRENERGIC AGONIST/CORTICOSTEROID COMBINATION	
Formoterol/budesonide SYMBICORT	Asthma, COPD
Formoterol/mometasone DULERA	Asthma, COPD
Salmeterol/fluticasone ADVAIR	Asthma, COPD
Vilanterol/fluticasone BREO ELLIPTA	COPD
SHORT-ACTING ANTICHOLINERGIC	
Ipratropium ATROVENT	Allergic rhinitis, COPD
LONG-ACTING ANTICHOLINERGIC	
Aclidinium bromide TUDORZA PRESSAIR	COPD
Tiotropium SPIRIVA	COPD
LEUKOTRIENE MODIFIERS	
Montelukast SINGULAIR	Asthma, Allergic rhinitis
Zafirlukast ACCOLATE	Asthma
Zileuton ZYFLO CR	Asthma

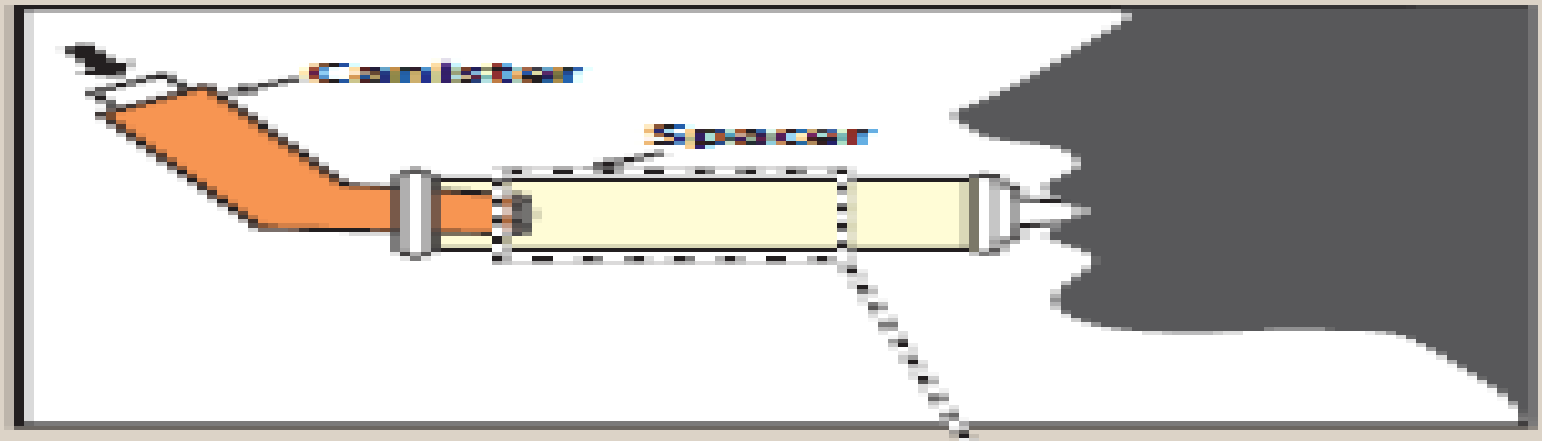
LEUKOTRIENE MODIFIERS	
Montelukast SINGULAIR	Asthma, Allergic rhinitis
Zafirlukast ACCOLATE	Asthma
Zileuton ZYFLO CR	Asthma
ANTIHISTAMINES (H_1-RECEPTOR BLOCKERS)	
Azelastine ASTELIN, ASTEPRO	Allergic rhinitis
Cetirizine ZYRTEC	Allergic rhinitis
Desloratadine CLARINEX	Allergic rhinitis
Fexofenadine ALLEGRA	Allergic rhinitis
Loratadine CLARITIN	Allergic rhinitis
α-ADRENERGIC AGONISTS	
Oxymetazoline AFRIN, DRISTAN	Allergic rhinitis
Phenylephrine NEOSYNEPHRINE, SUDAFED PE	Allergic rhinitis
Pseudoephedrine SUDAFED	Allergic rhinitis
AGENTS FOR COUGH	
Benzonatate TESSALON PERLES	Cough suppressant
Codeine (with guaifenesin) VARIOUS	Cough suppressant/expectorant
Dextromethorphan VARIOUS	Cough suppressant
Dextromethorphan (with guaifenesin) VARIOUS	Cough suppressant/expectorant
Guaifenesin VARIOUS	Expectorant
OTHER AGENTS	
Cromolyn NASALCROM	Asthma, Allergic rhinitis
Omalizumab XOLAIR	Asthma
Roflumilast DALIRESP	COPD
Theophylline ELIXOPHYLLIN, THEO-24, UNIPHYL	Asthma


A Normal
Muscles of bronchi are relaxed, allowing easy airflow.
Normal bronchial tube
B Asthma
Muscles of bronchi are tight and thickened. The bronchi are inflamed and filled with mucus, which impedes airflow.
Inflamed bronchial tube

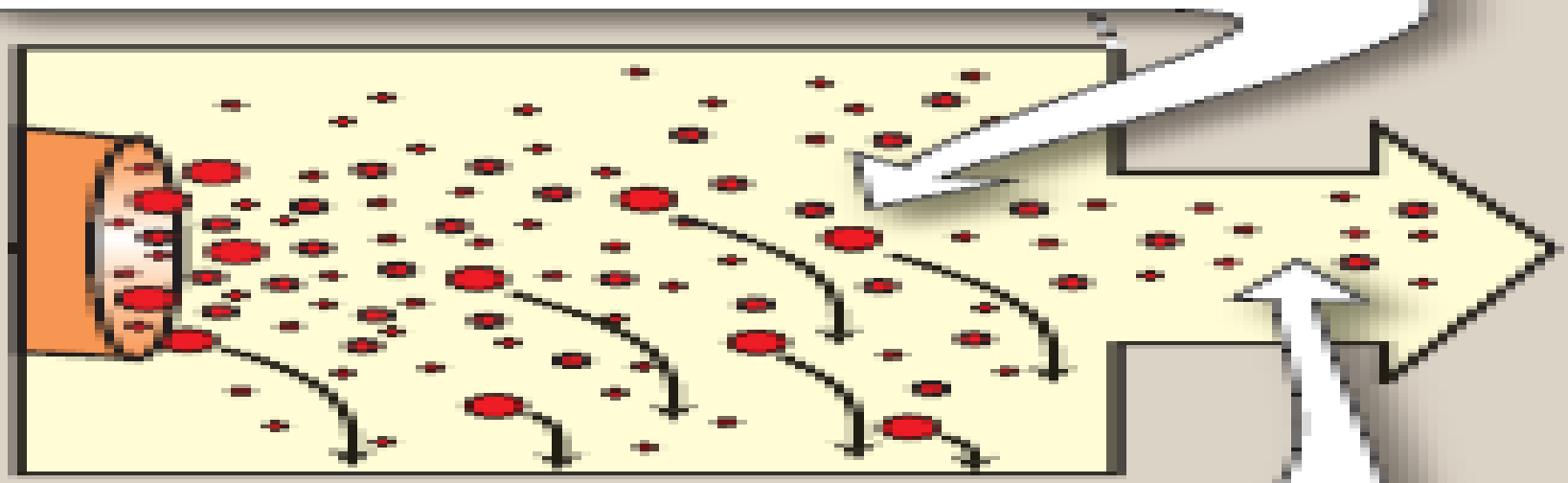

ATP
AC
Beta agonists
Relaxation
cAMP
Bronchial tone
PDE
Theophylline
AMP
Leukotrienes
Acetylcholine
Leukotriene antagonists
Muscarinic antagonists
Adenosine
Theophylline
Constriction


Arachidonic acid
Steroids
Phospholipases
5-Lipoxygenase
Zileuton
Leukotriene A_4
Leukotriene B_4
Leukotriene C_4
CELL MEMBRANE PHOSPHOLIPIDS
EXTRACELLULAR SPACE
Leukotriene B_4
Chemotaxis
NEUTROPHIL
EOSINOPHIL
Leukotriene D_4
Leukotriene C_4
Leukotriene E_4
Cysteinyl leukotrienes
Montelukast
Zafirlukast
$CysLT_1$ receptor
CELL MEMBRANE
AIRWAY
Smooth muscle constriction
Eosinophil migration
Edema
(prevented by drugs)


Ninety percent swallowed (reduced by spacer or mouth rinsing)
GI tract
Absorption from gut
Ten percent deposited in lung
Lung
First-pass inactivation in liver
Liver
Systemic side effects



Large particles of aerosol are deposited in the chamber before the patient inhales.



Inhaled aerosol is enriched in small particles that more readily travel to the small airways.

H^1 ANTIHISTAMINES

Alcaftadine LASTACAFT
Azelastine ASTELIN, OPTIVAR
Bepotastine BEPREVE
Brompheniramine LO-HIST, VAZOL
Cetirizine ZYRTEC
Chlorpheniramine CHLOR-TRIMETON
Clemastine TAVIST ALLERGY
Cyclizine MAREZINE
Cyproheptadine
Desloratadine CLARINEX
Diphenhydramine BENADRYL
Dimenhydrinate DRAMAMINE
Doxylamine UNISOM SLEEPTABS
Emedastine EMADINE
Fexofenadine ALLEGRA
Hydroxyzine VISTARIL, ATARAX
Ketotifen ALAWAY, ZADITOR
Levocetirizine XYZAL
Loratadine CLARITIN
Meclizine BONINE, ANTIVERT
Olopatadine PATANASE, PATANOL
Promethazine PHENERGAN

EXOCRINE EXCRETION

Increased production of nasal and bronchial mucus, resulting in respiratory symptoms.

BRONCHIAL SMOOTH MUSCLE

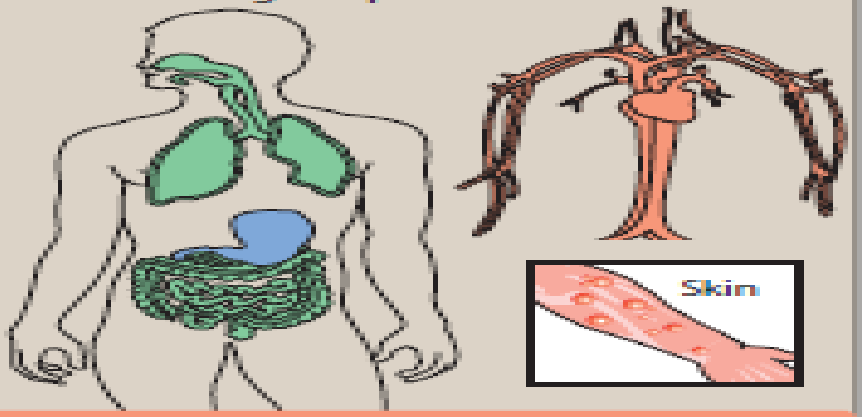
Constriction of bronchioles results in symptoms of asthma and decreased lung capacity.

INTESTINAL SMOOTH MUSCLE

Constriction results in intestinal cramps and diarrhea.

SENSORY NERVE ENDINGS

Causes itching and pain.



H_1 and H_2 Receptors

CARDIOVASCULAR SYSTEM

Lowers systemic blood pressure by reducing peripheral resistance. Causes positive chronotropism (mediated by H_2 receptors) and a positive inotropism (mediated by both H_1 and H_2 receptors).

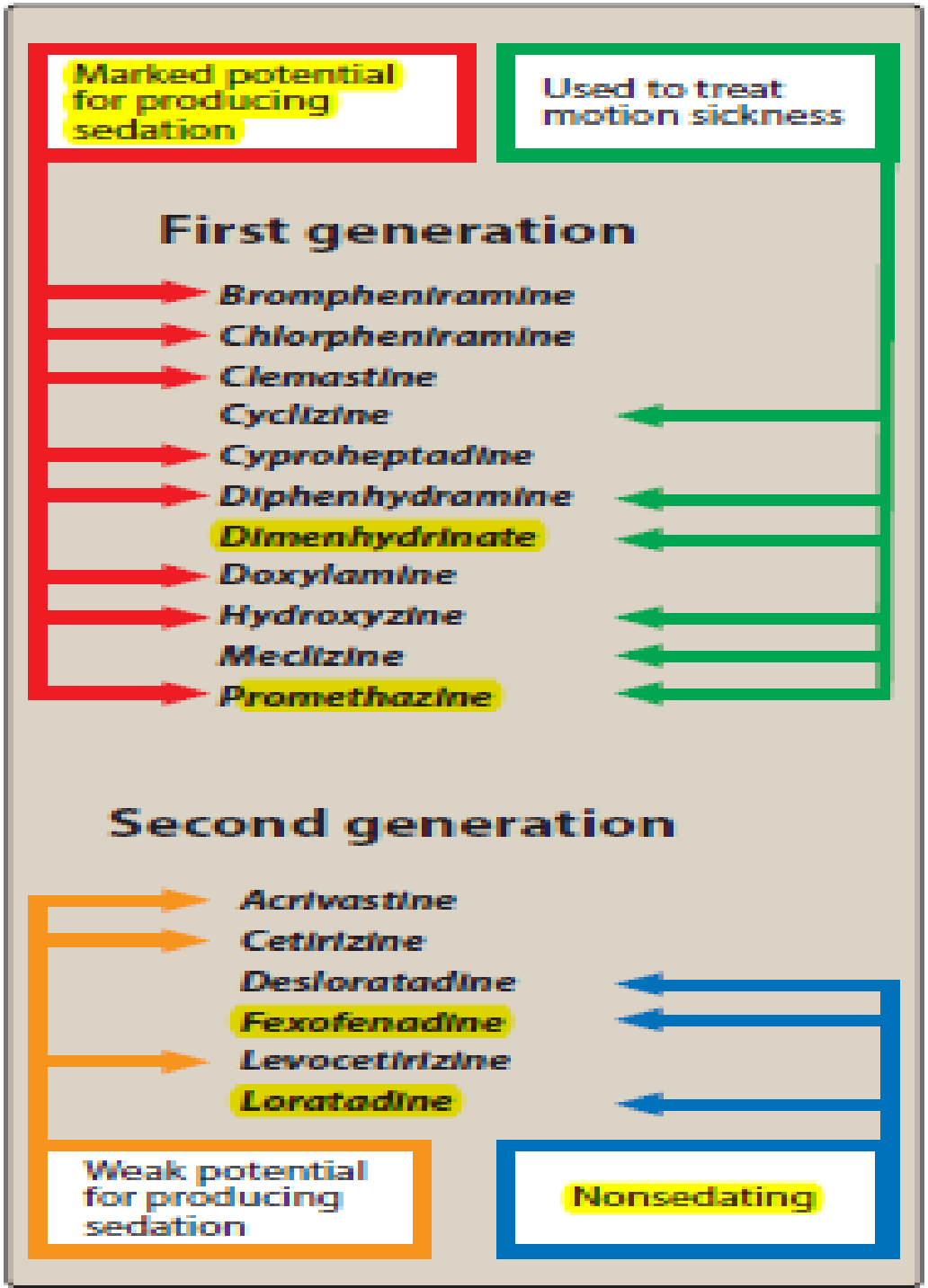
SKIN

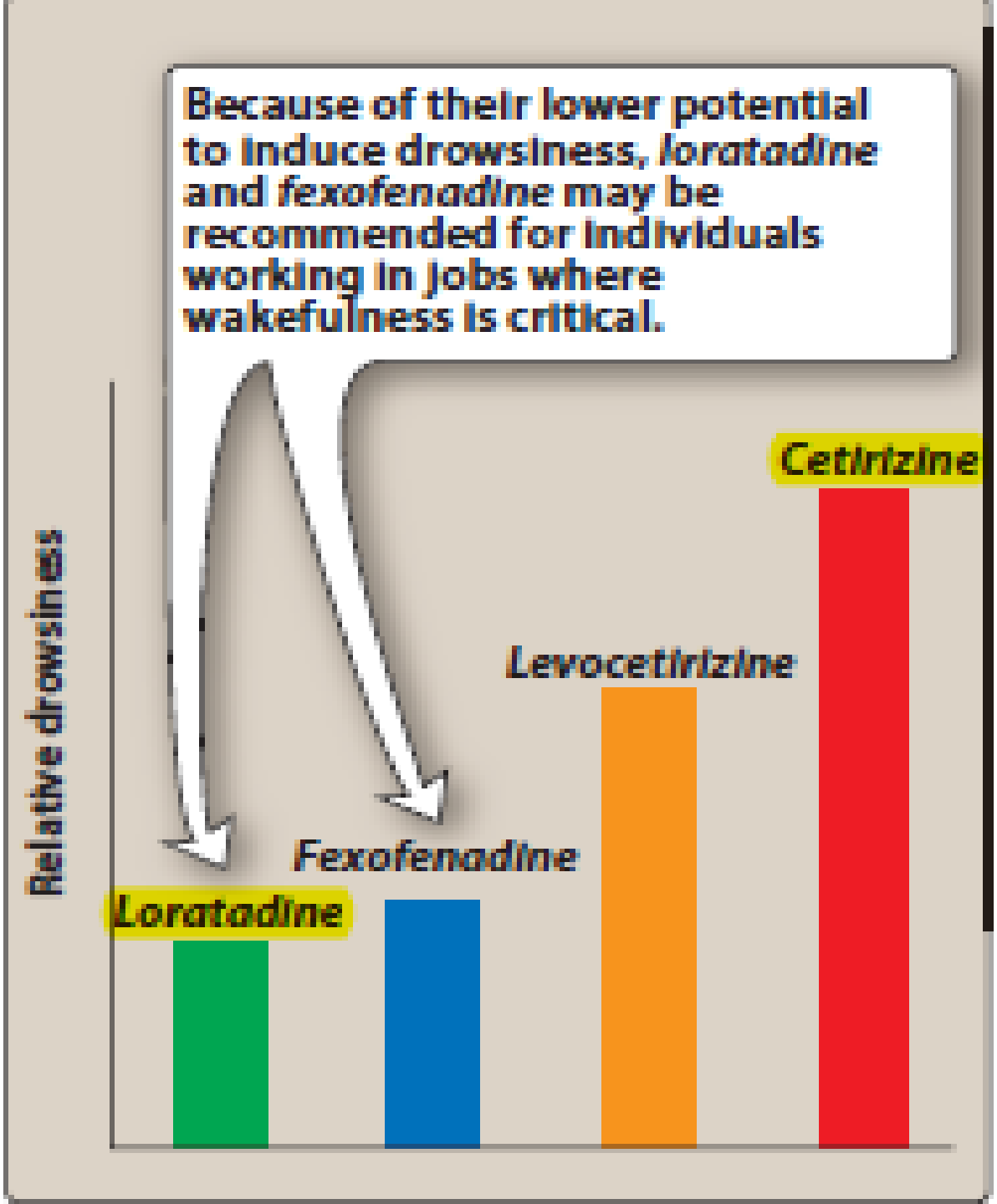
Dilation and increased permeability of the capillaries results in leakage of proteins and fluid into the tissues. In the skin, this results in the classic "triple response": wheal formation, reddening due to local vasodilation, and flare ("halo").

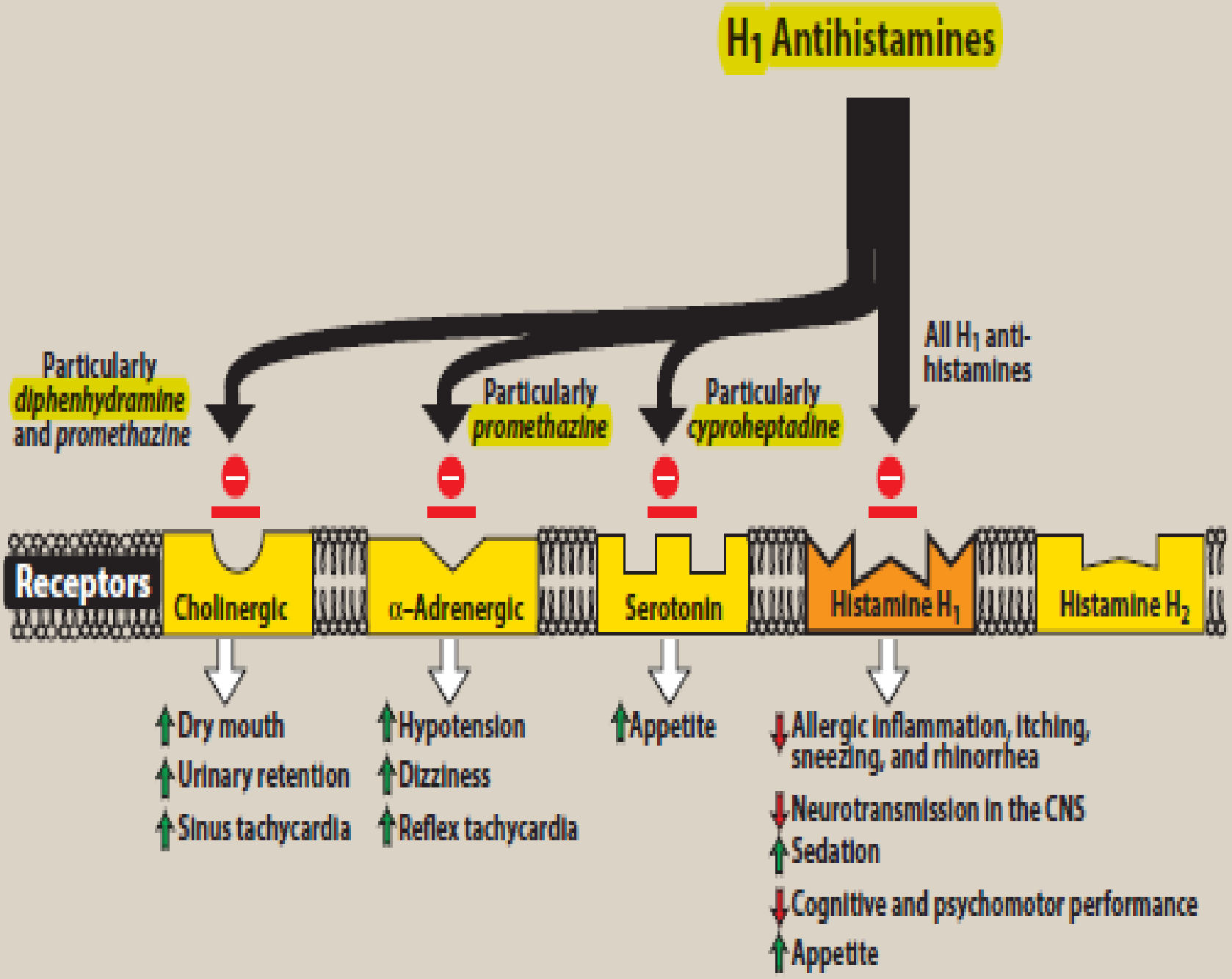
H_2 Receptors

STOMACH

Stimulation of gastric hydrochloric acid secretion.


Marked potential for producing sedation
Used to treat motion sickness
First generation
Brompheniramine
Chlorpheniramine
Clemastine
Cyclizine
Cyproheptadine
Diphenhydramine
Dimenhydrinate
Doxylamine
Hydroxyzine
Meclizine
Promethazine
Second generation
Acrivastine
Cetirizine
Desloratadine
Fexofenadine
Levocetirizine
Loratadine
Weak potential for producing sedation
Nonsedating


Because of their lower potential to induce drowsiness, *loratadine* and *fexofenadine* may be recommended for individuals working in jobs where wakefulness is critical.
Relative drowsiness
Loratadine
Fexofenadine
Levocetirizine
Cetirizine


H1 Antihistamines
All H1 anti-histamines
Particularly diphenhydramine and promethazine
Particularly promethazine
Particularly cyproheptadine
Receptors
Cholinergic
α-Adrenergic
Serotonin
Histamine H1
Histamine H2
Dry mouth
Urinary retention
Sinus tachycardia
Hypotension
Dizziness
Reflex tachycardia
Appetite
Allergic inflammation, itching, sneezing, and rhinorrhea
Neurotransmission in the CNS
Sedation
Cognitive and psychomotor performance
Appetite