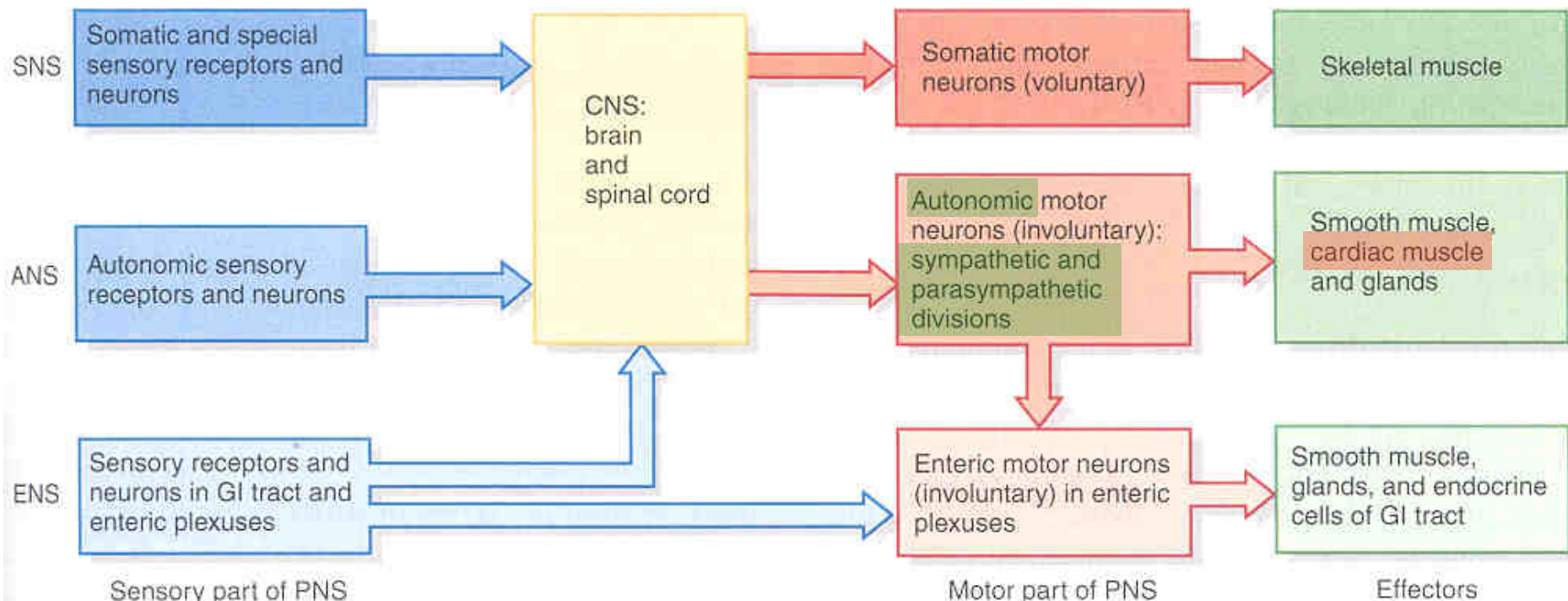


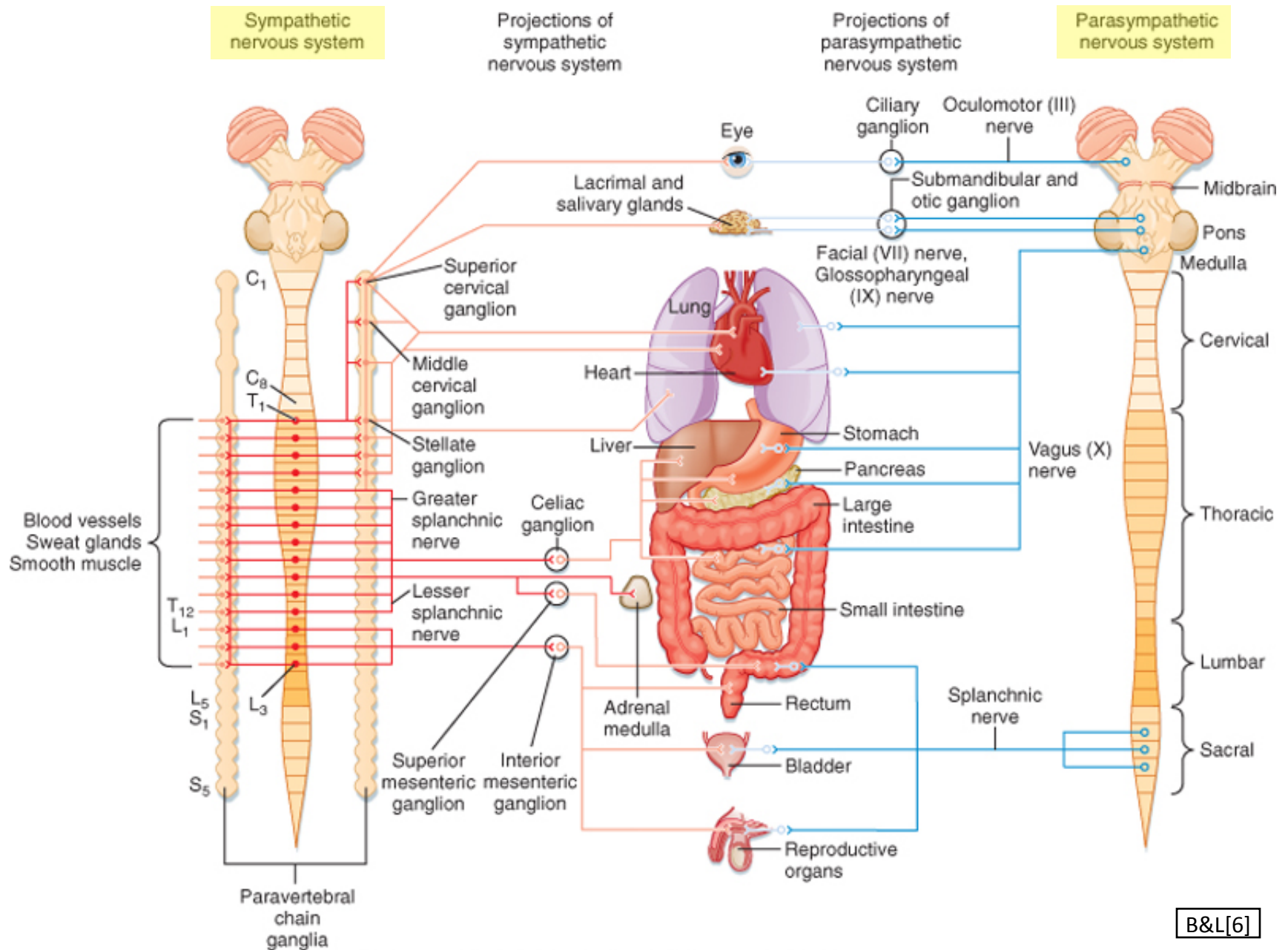
Figure 9.2 Organization of the nervous system. Subdivisions of the PNS are the somatic nervous system (SNS), the autonomic nervous system (ANS), and the enteric nervous system (ENS).

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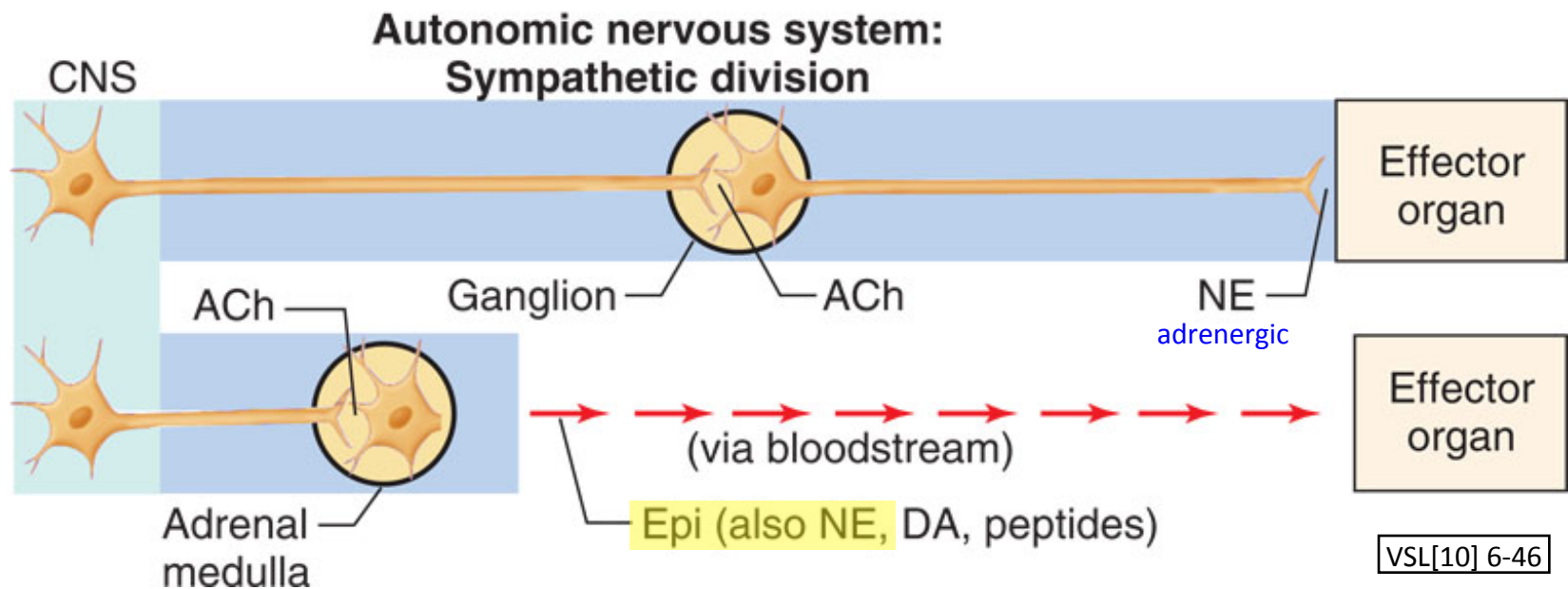
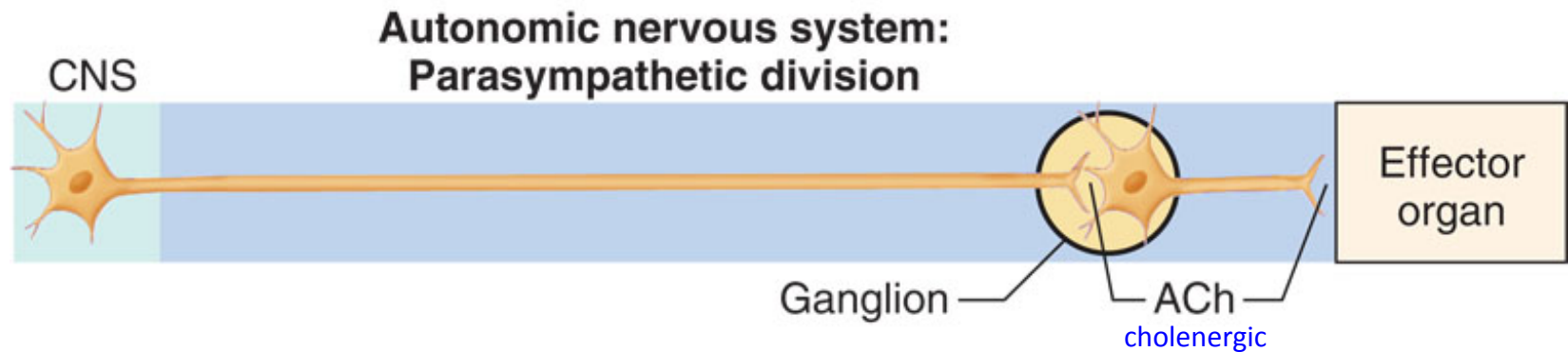
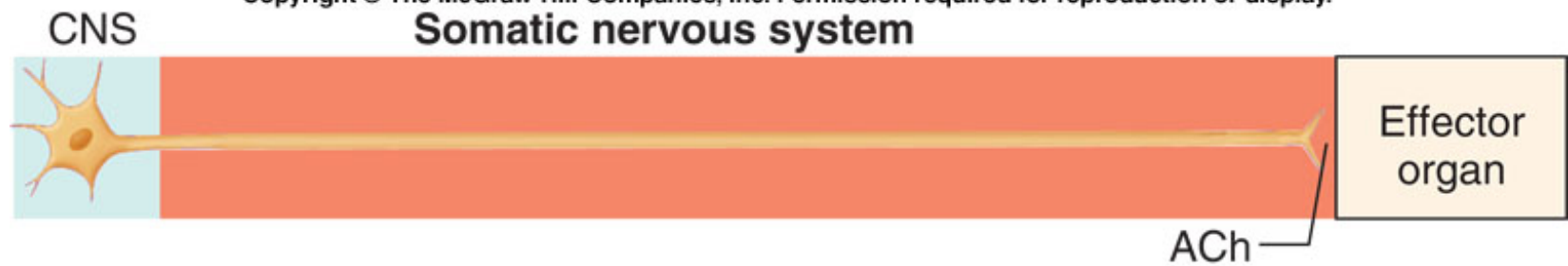
The SNS is under voluntary control; the ANS and ENS are involuntary.





B&L[6]

Figure 11-1 Schematic showing the sympathetic and parasympathetic pathways. Sympathetic pathways are shown in red and parasympathetic pathways in blue. Preganglionics are shown in darker shades and postganglionics in lighter shades.



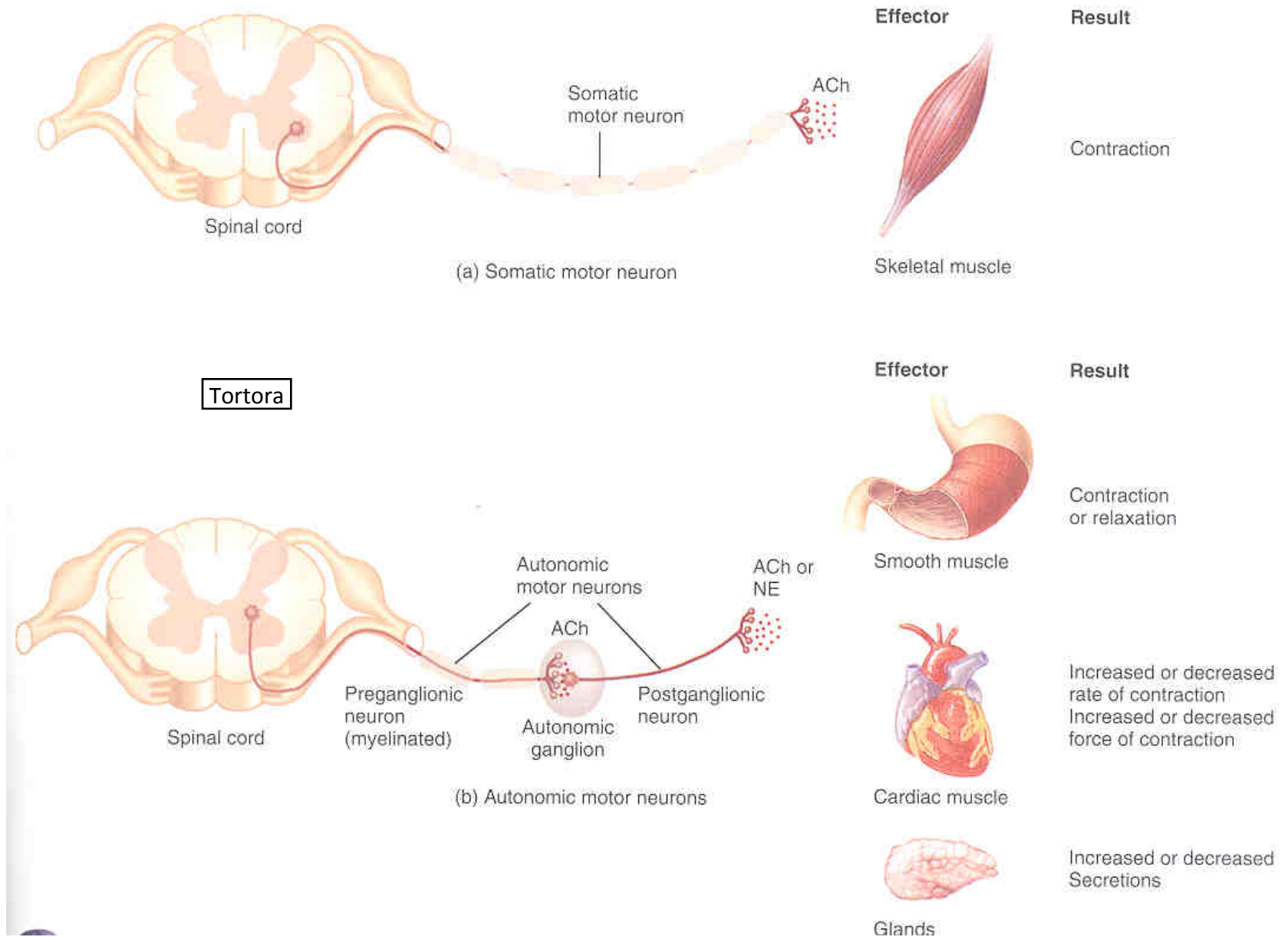
VSL[10] 6-46

Figure 11.1 Comparison of somatic and autonomic motor neuron pathways to their effector tissues.



Stimulation by the autonomic motor neurons can either excite or inhibit smooth muscle, cardiac muscle, and glands.

Stimulation by somatic motor neurons always causes contraction of skeletal muscle.



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TABLE 6-10

*Locations of Receptors for Acetylcholine,
Norepinephrine, and Epinephrine*

I. Receptors for acetylcholine (cholinergic, parasympathetic)

a. Nicotinic receptors

On postganglionic neurons in the autonomic ganglia

At neuromuscular junctions of skeletal muscle

On some central nervous system neurons

b. Muscarinic receptors

On smooth muscle

On cardiac muscle

On gland cells

On some central nervous system neurons

On some neurons of autonomic ganglia (although the great majority of receptors at this site are nicotinic)

II. Receptors for norepinephrine and epinephrine (adrenergic, sympathetic)

On smooth muscle

On cardiac muscle

On gland cells


On some central nervous system neurons

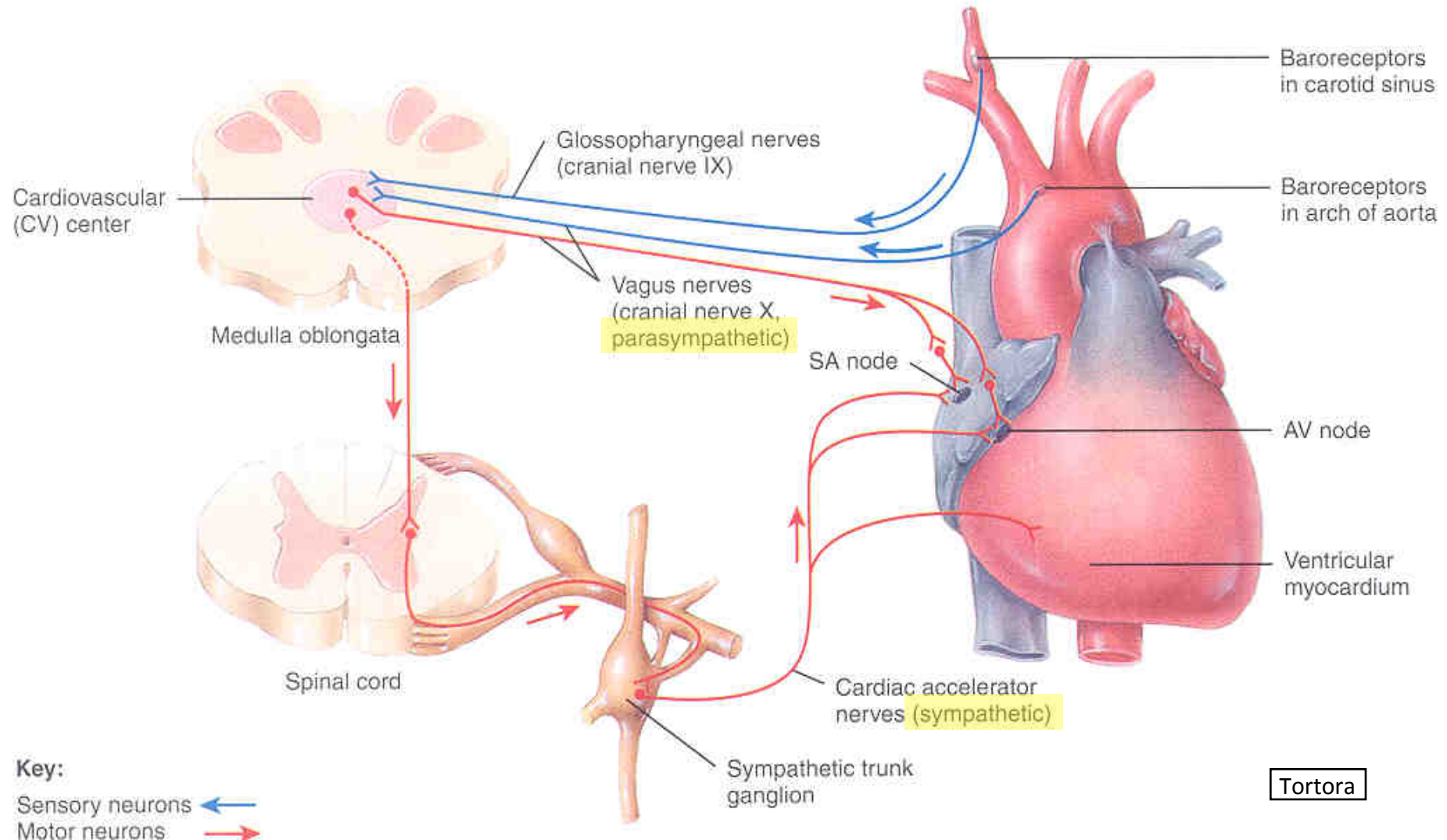
Effect(s) of Autonomic Nervous System on Heart and Circulation

Effector	Receptor	Adrenergic	Cholenergetic
SA node	β_1	\uparrow HR ++	\downarrow HR; vagal arrest +++
Atria	β_1	\uparrow contractility & conduction velocity ++	\downarrow contractility, (usually) \uparrow conduction velocity ++
AV node	β_1	\uparrow automaticity & conduction velocity ++	\downarrow conduction velocity; AV block +++
His-Purkinje system	β_1	\uparrow automaticity & conduction velocity +++	little effect
Ventricles	β_1	\uparrow contractility, conduction velocity, automaticity +++	\downarrow contractility; slight
Coronary arterioles	α, β_2	constriction +; dilation ++	dilation +
Veins - systemic	α, β_2	constriction ++; dilation ++	-----

Adapted from Table 11-1,
B&L[6+]

Figure 15.9 Autonomic nervous system regulation of heart rate.

 The cardiovascular center in the medulla oblongata controls both sympathetic and parasympathetic nerves that innervate the heart.



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END

Video 1, Module 9