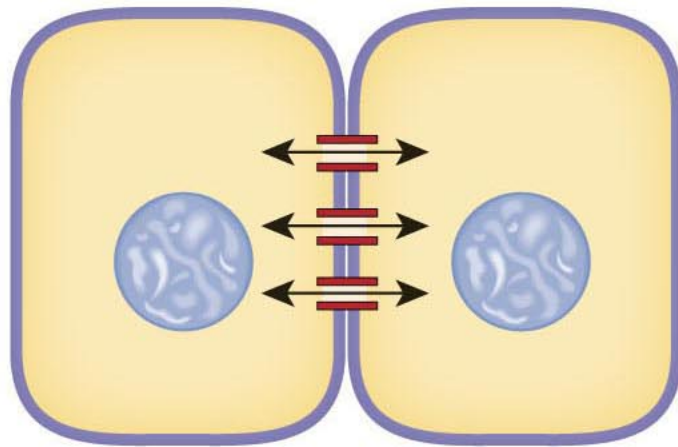
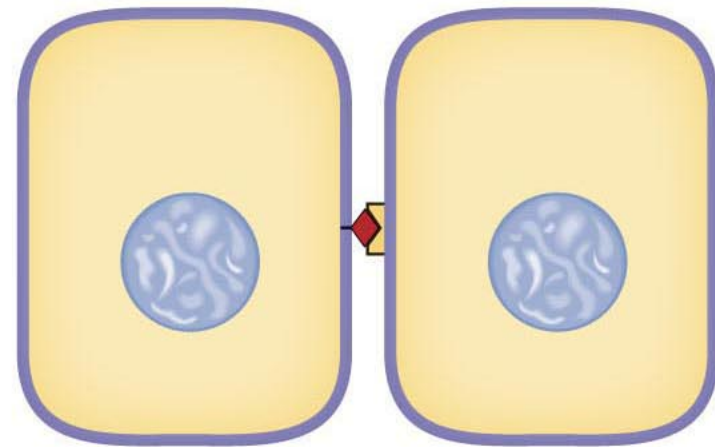


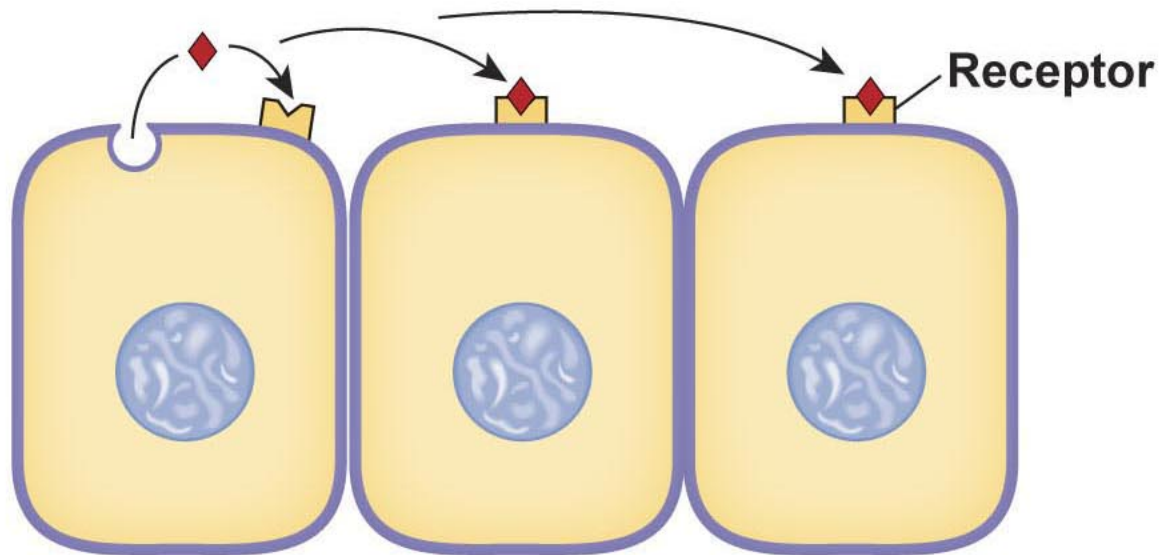
Figure 6-1



(a) Gap junctions



(b) Contact-dependent signals



(c) Autocrine signals and paracrine signals

Figure 6-2

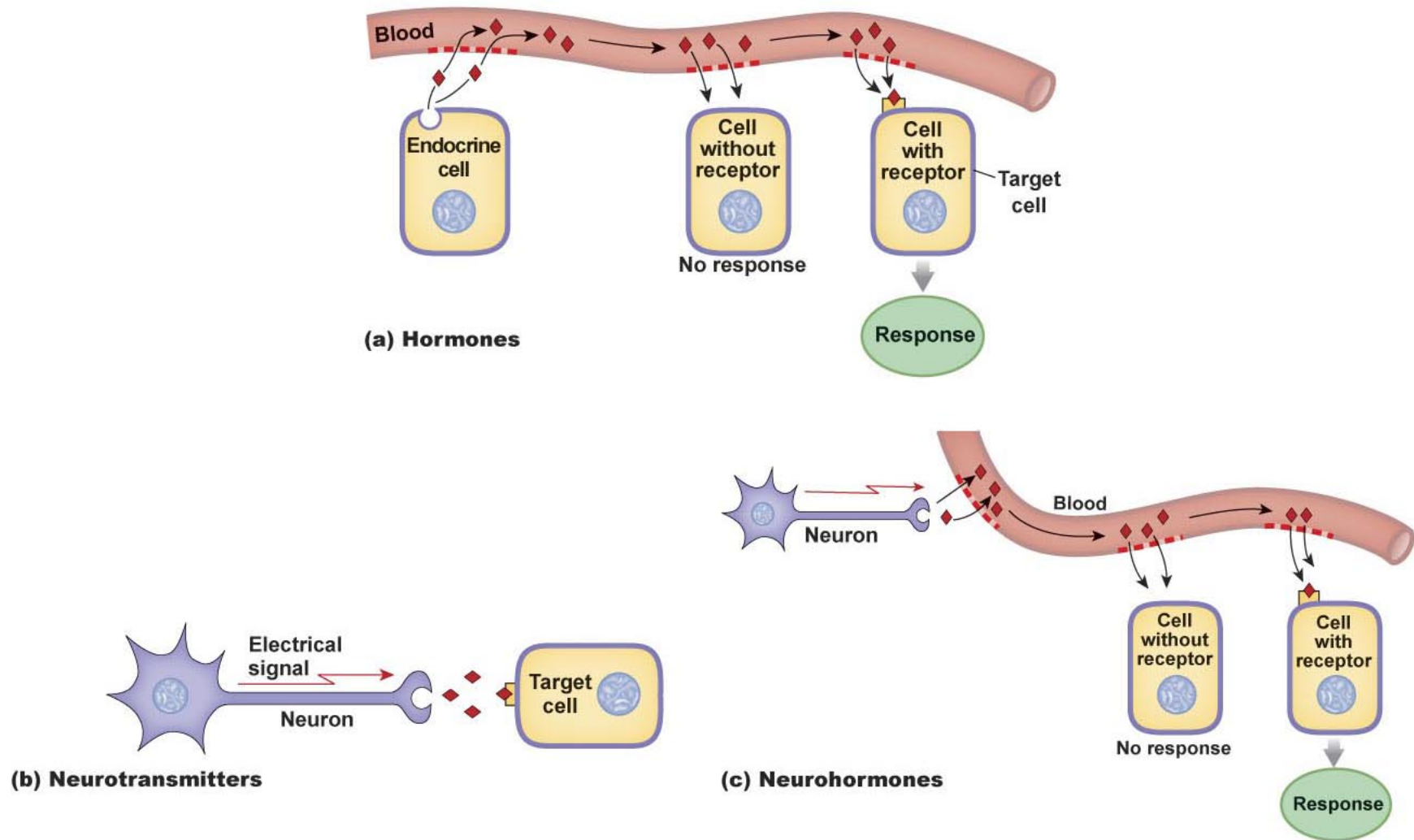


Figure 6-3

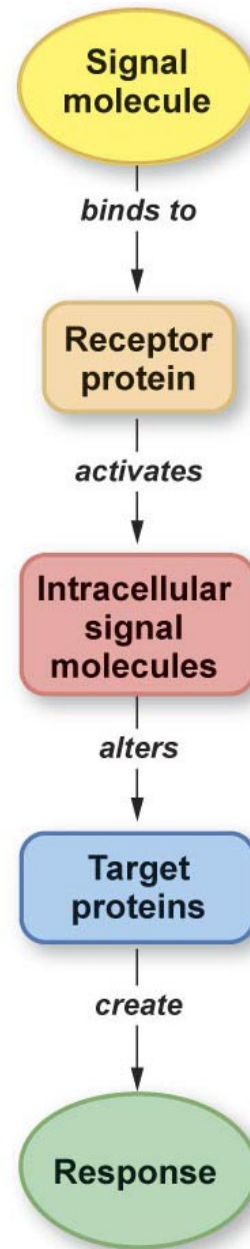


Figure 6-4, overview

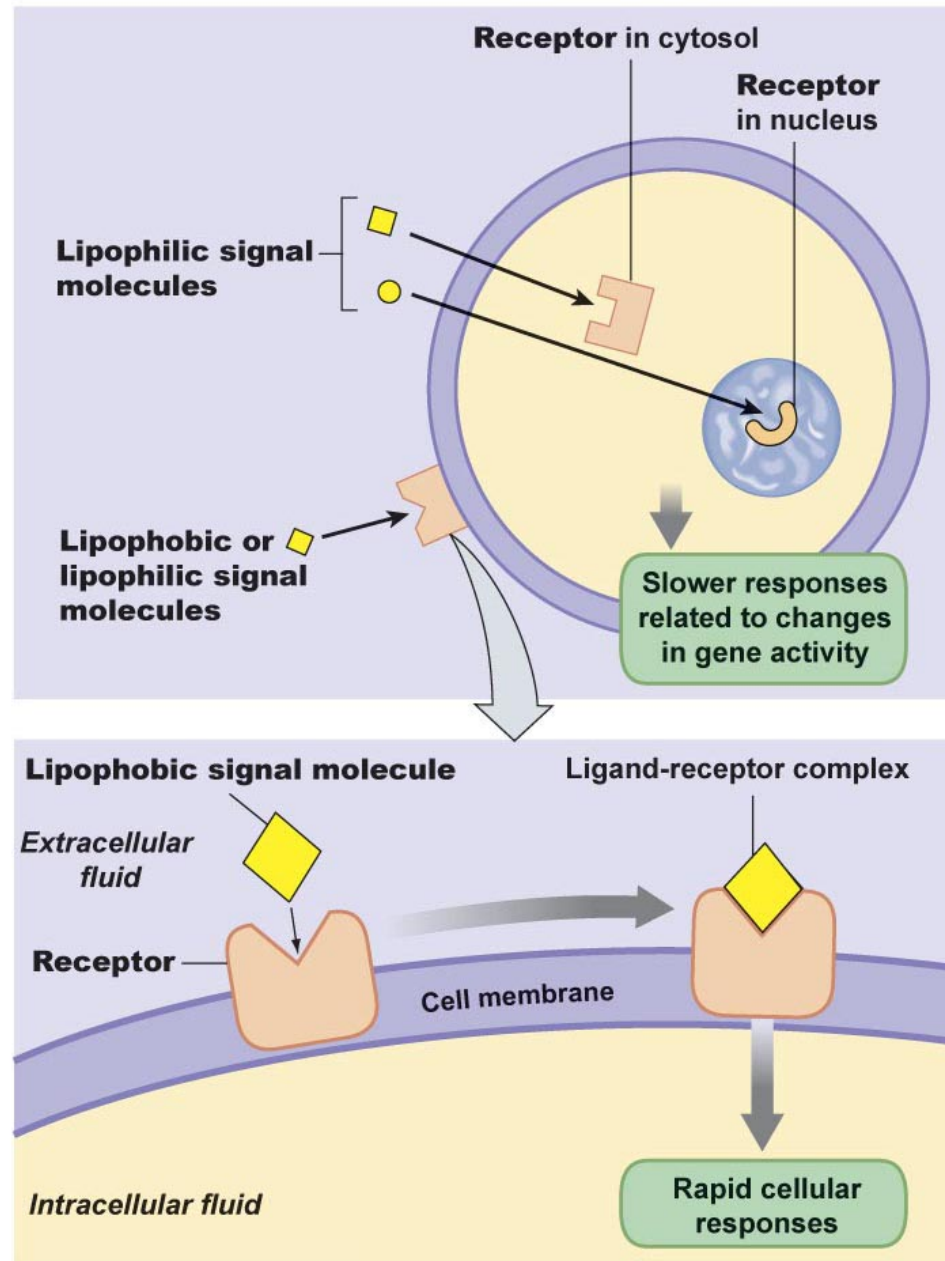
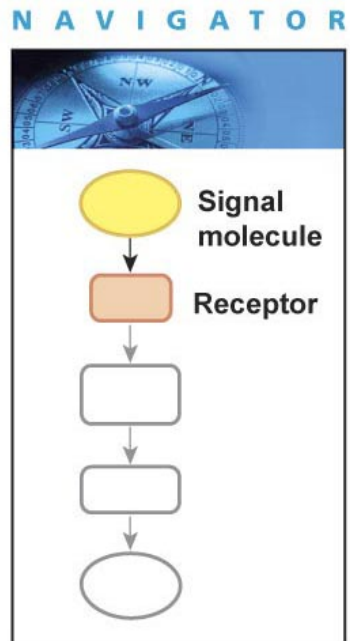


Figure 6-5

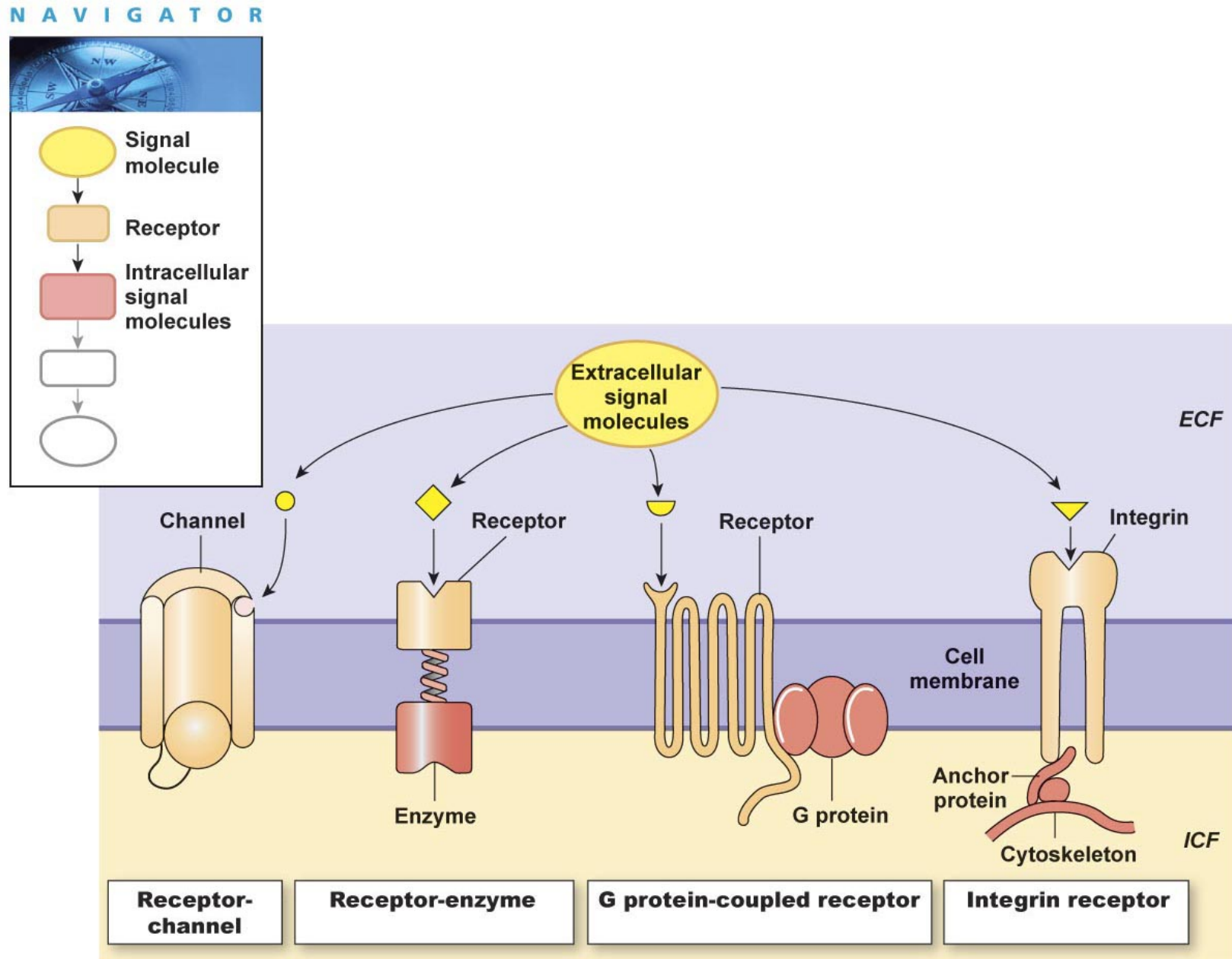


Figure 6-6

Signal transduction converts one form of signal into a different form.

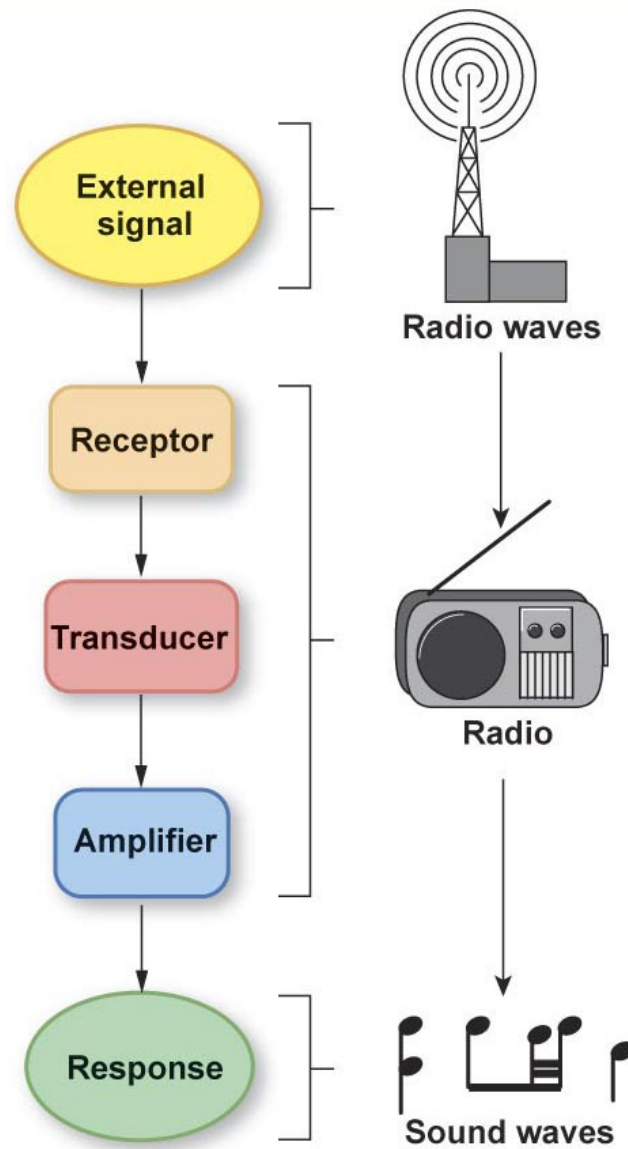


Figure 6-7

NAVIGATOR

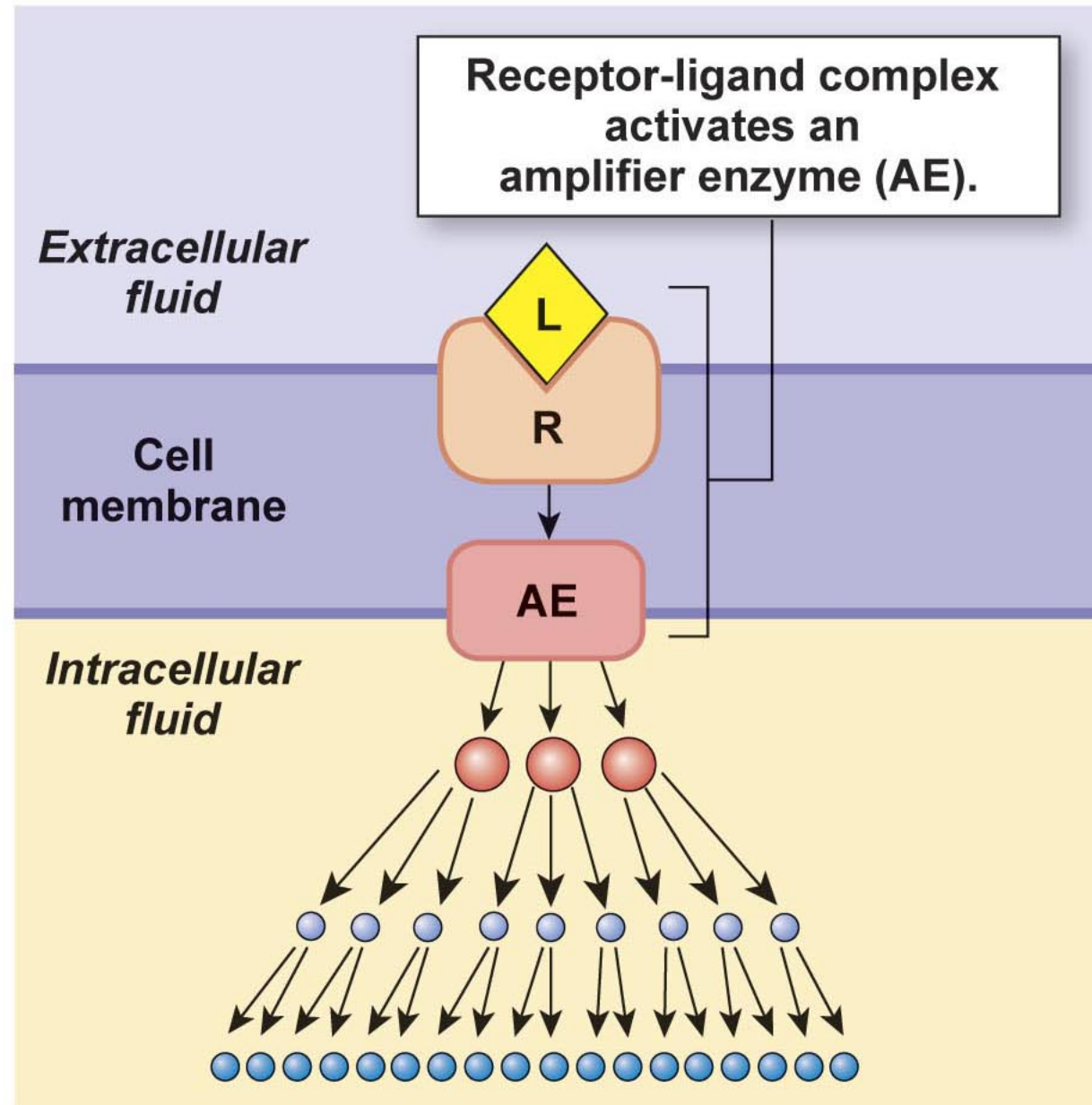
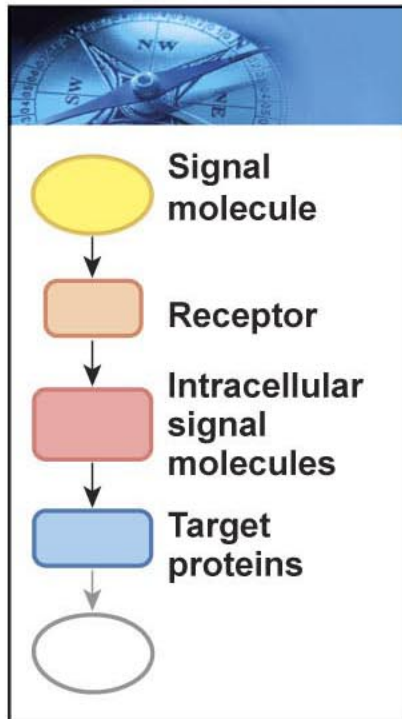


Figure 6-8

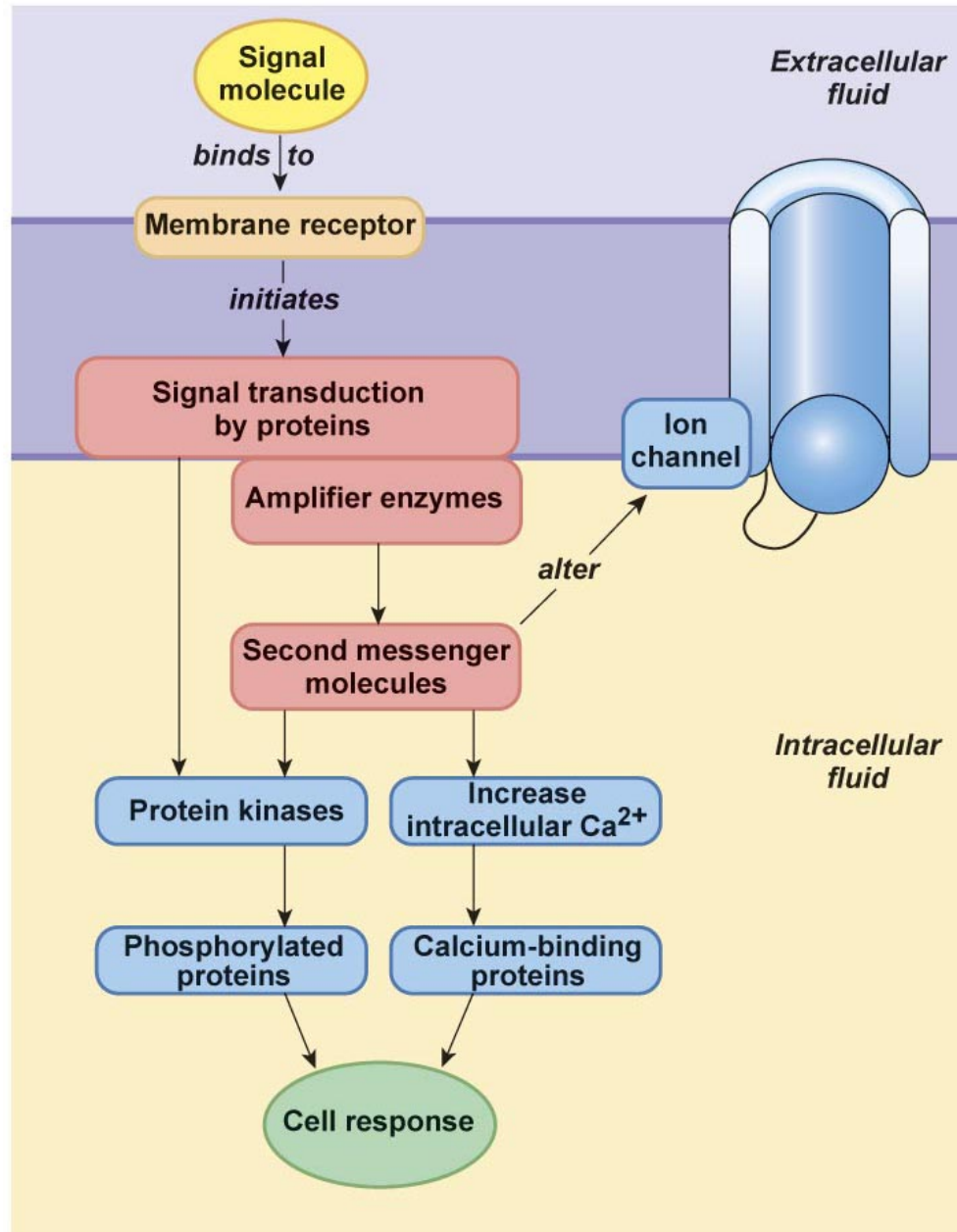
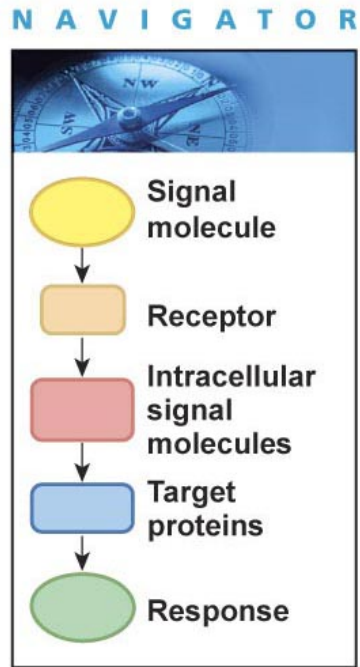


Figure 6-9

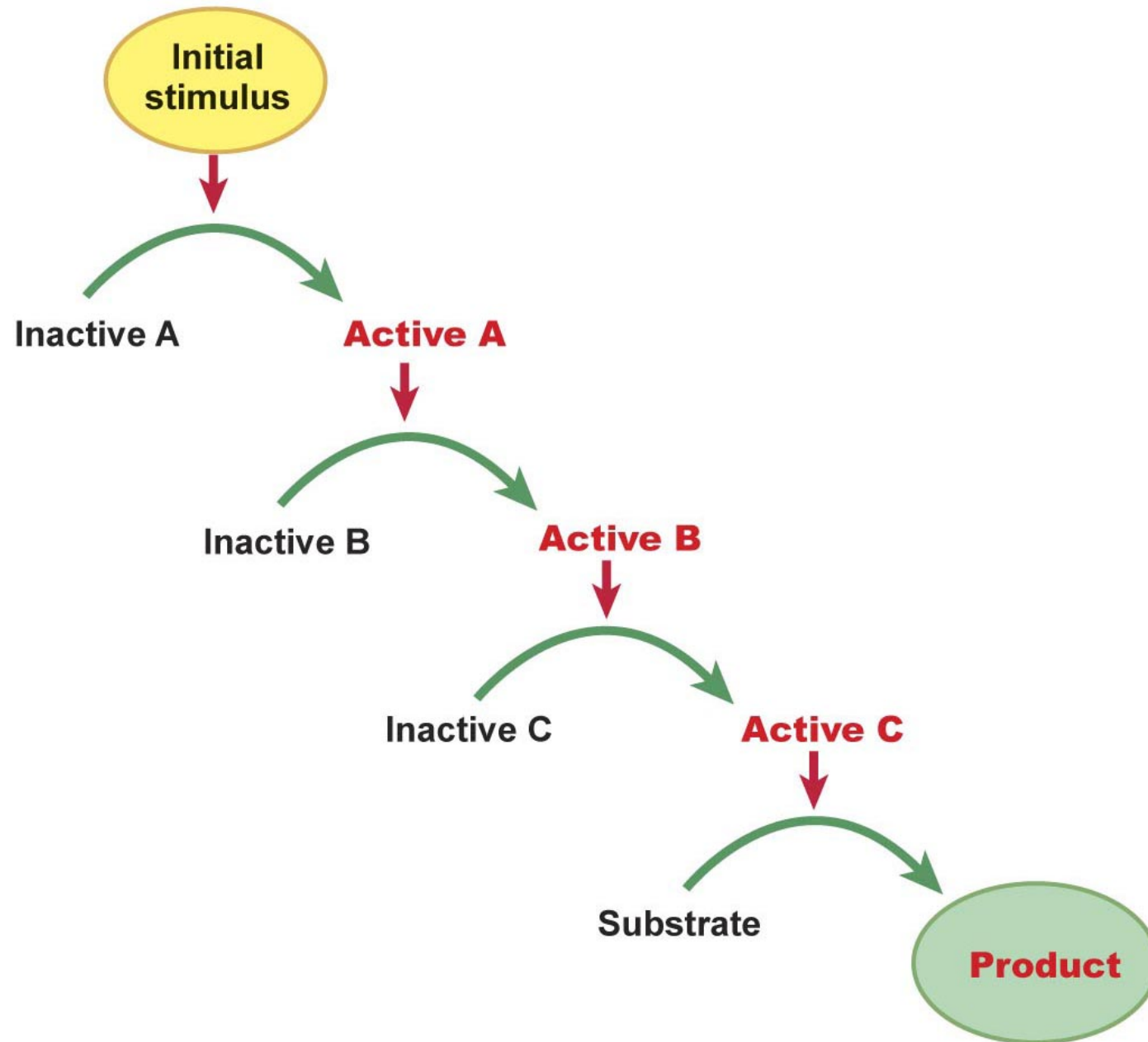


Figure 6-10

NAVIGATOR

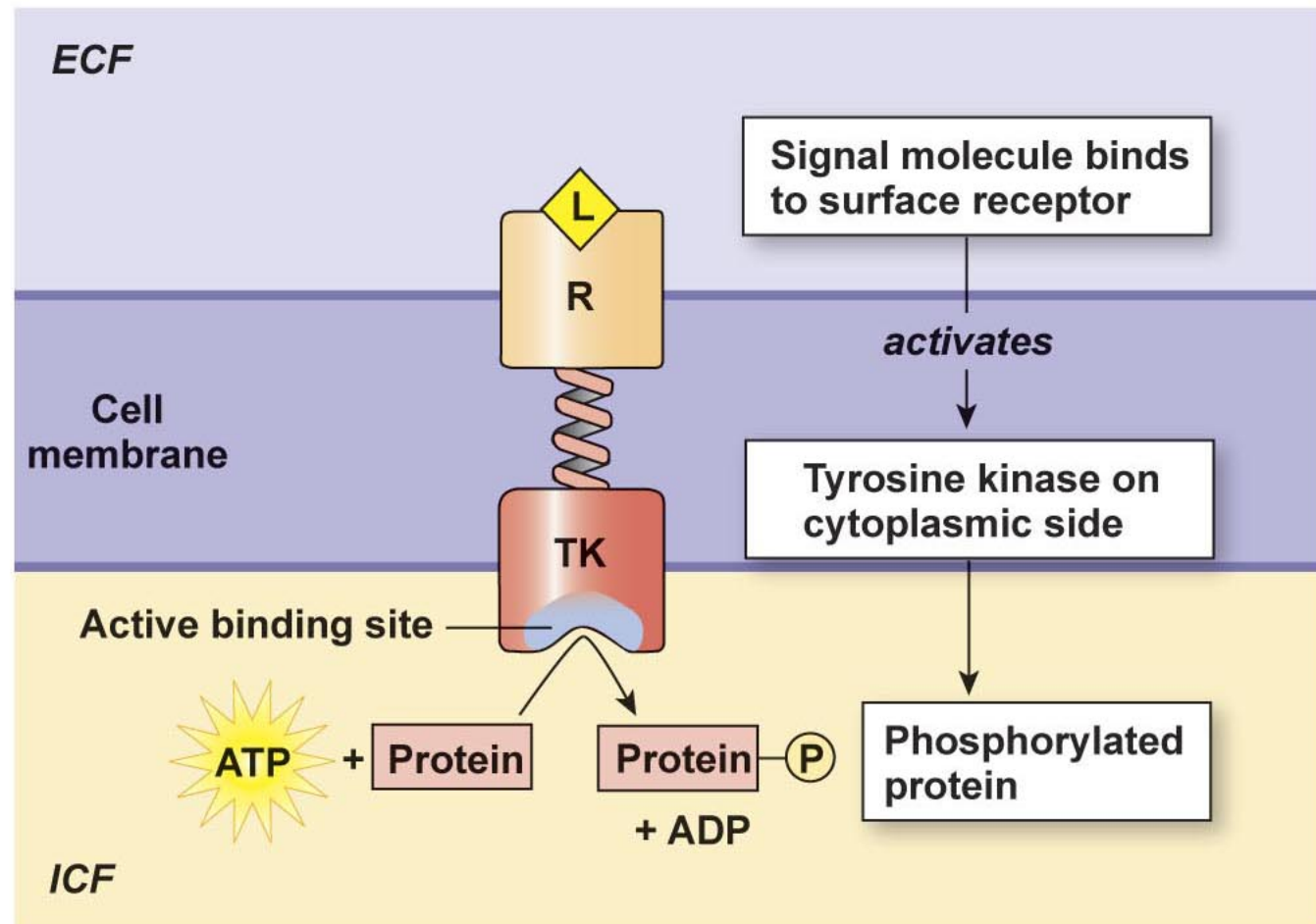
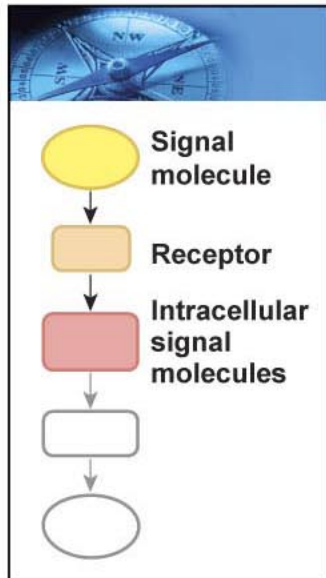
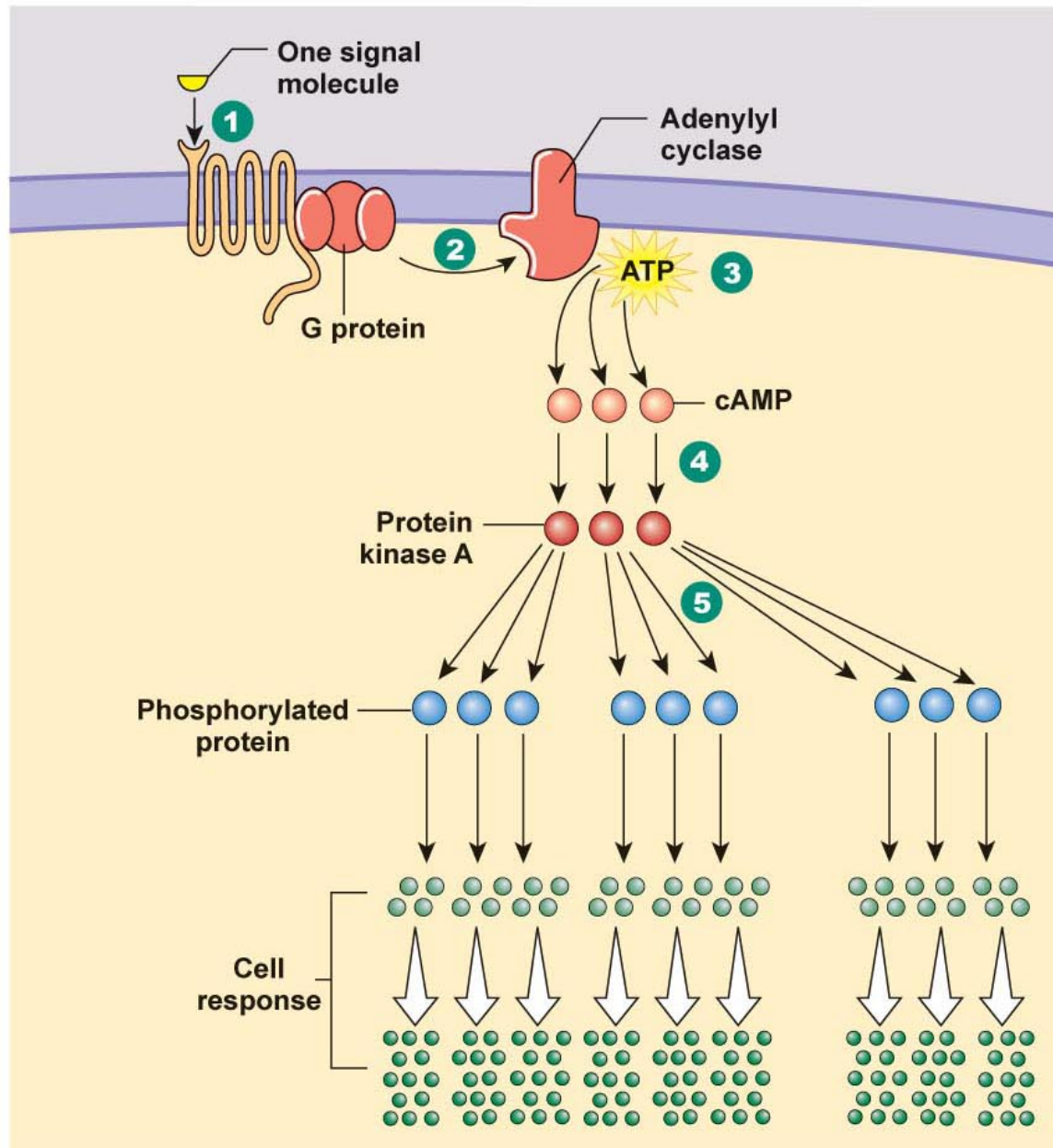


Figure 6-11



1 Signal molecule binds to G protein-linked receptor, which activates the G protein.

2 G protein turns on adenylyl cyclase, an amplifier enzyme.

3 Adenylyl cyclase converts ATP to cyclic AMP.

4 cAMP activates protein kinase A.

5 Protein kinase A phosphorylates other proteins, leading ultimately to a cellular response.

Figure 6-13

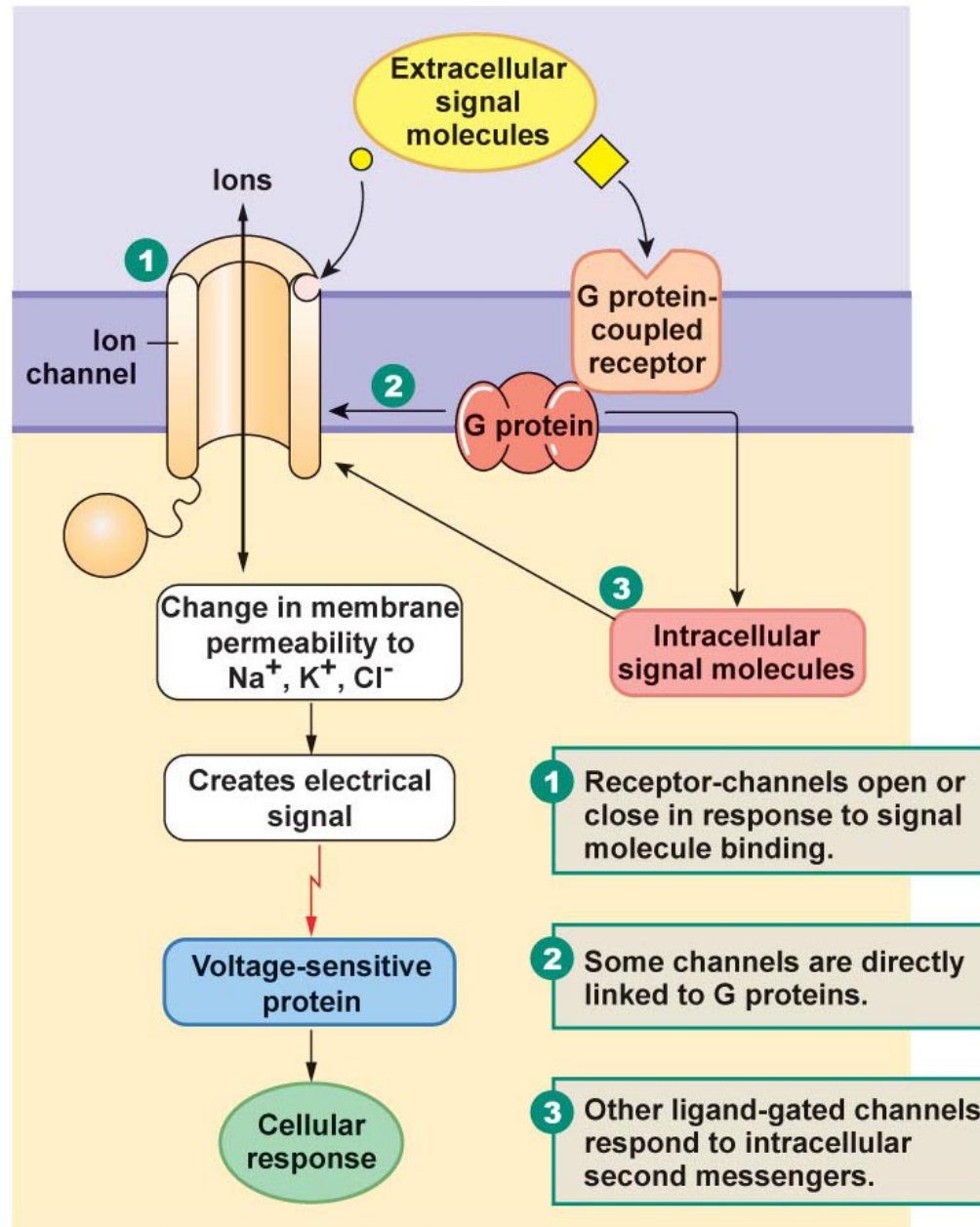


Figure 6-14

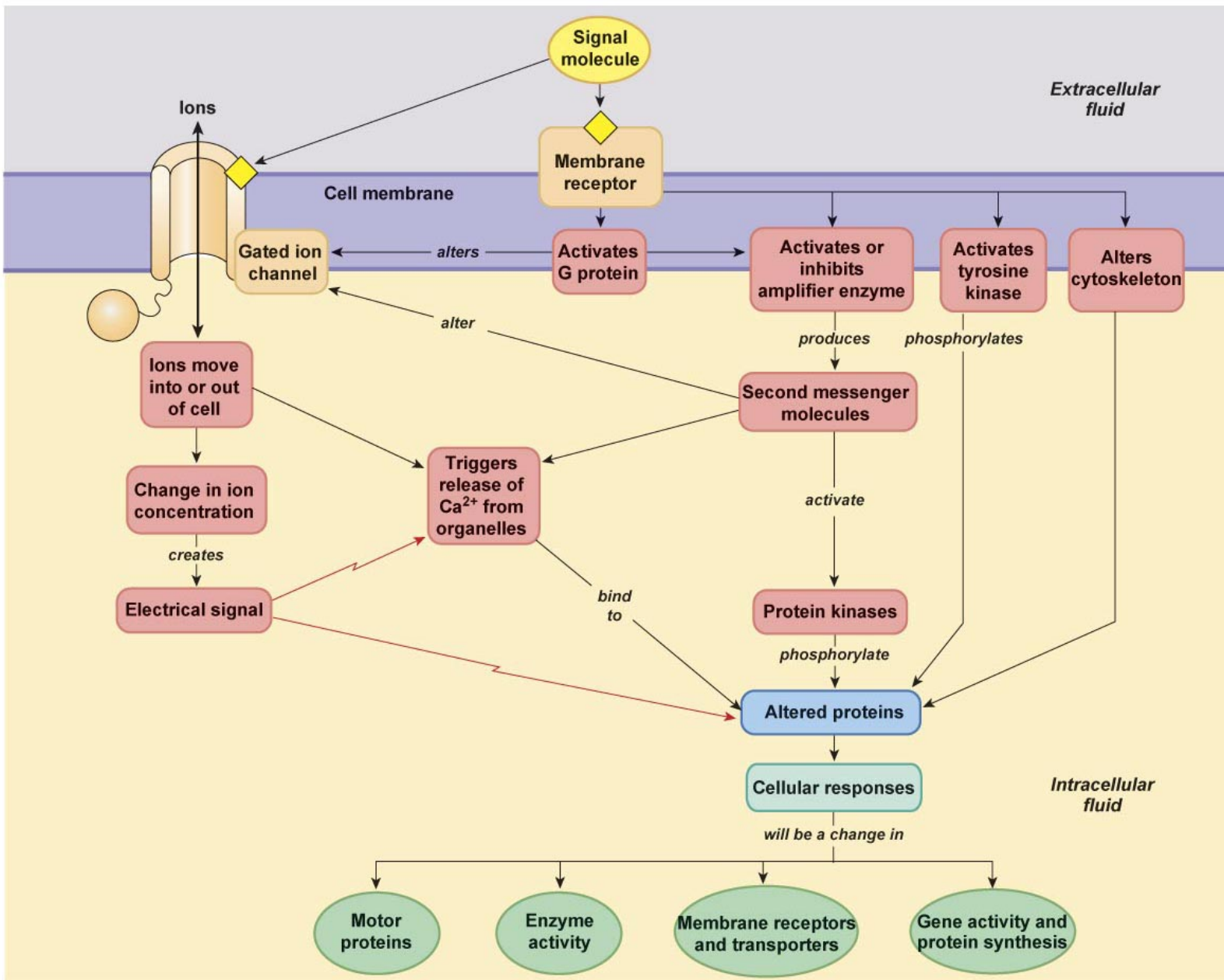


Figure 6-15

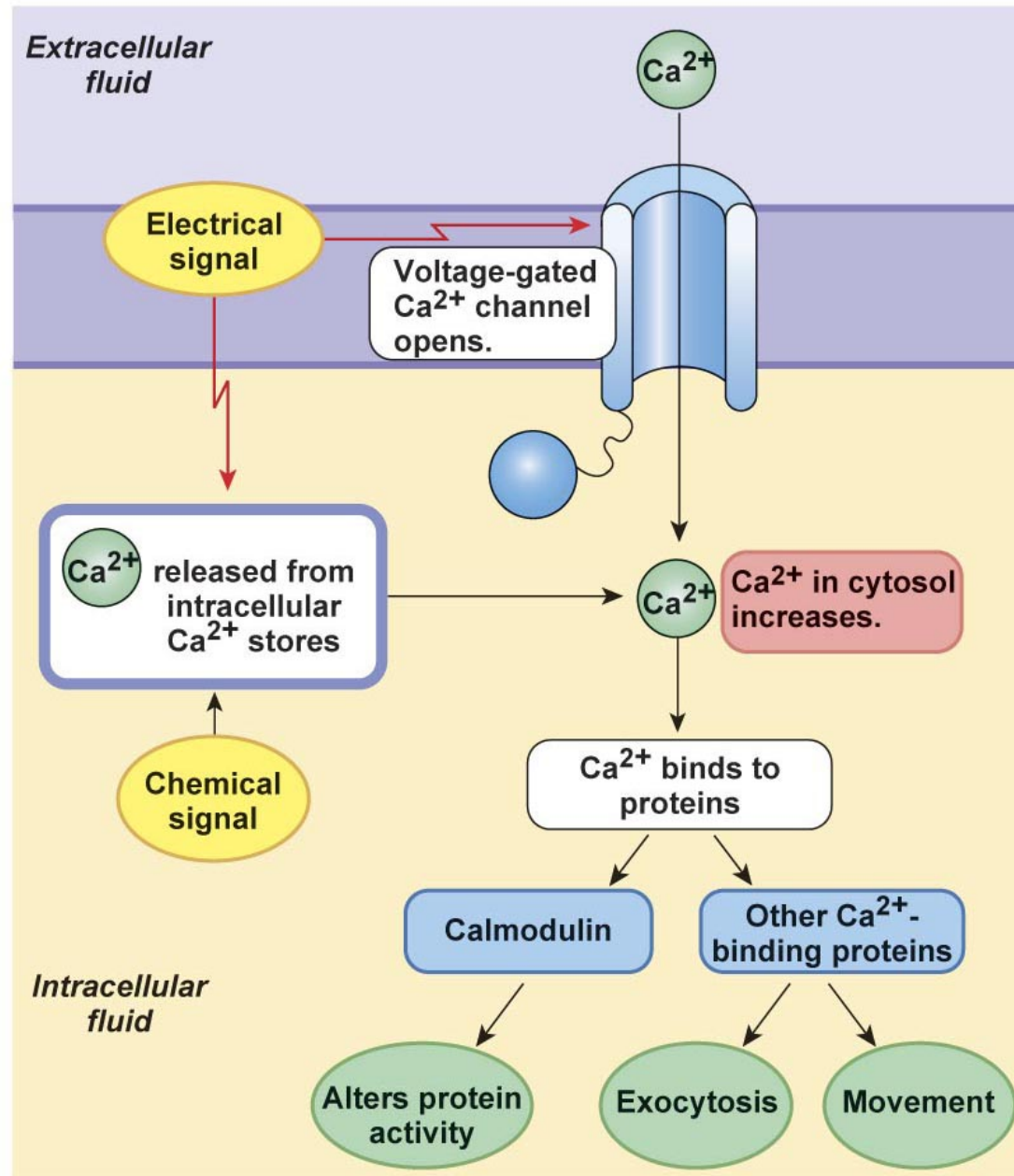


Figure 6-17

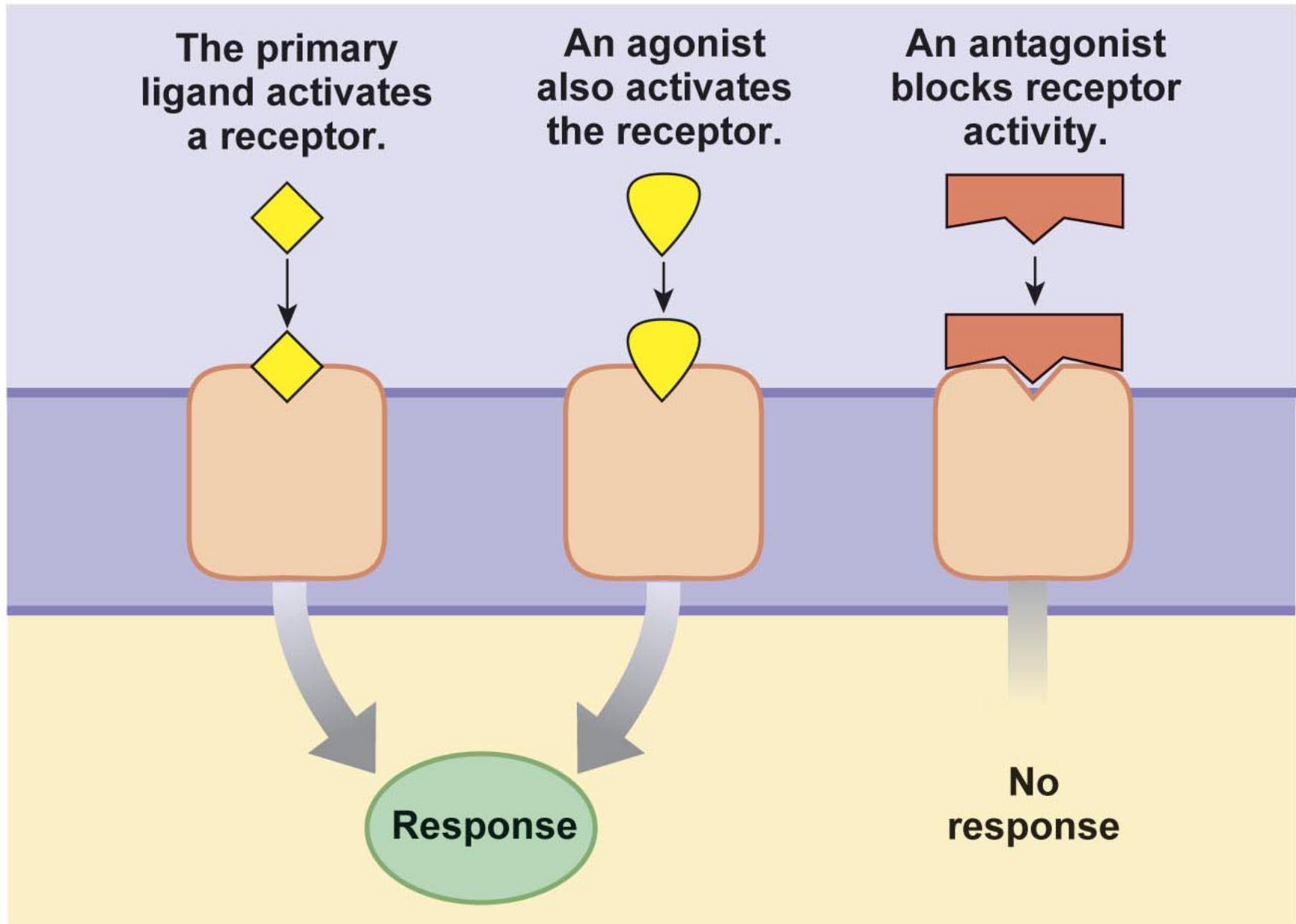


Figure 6-18

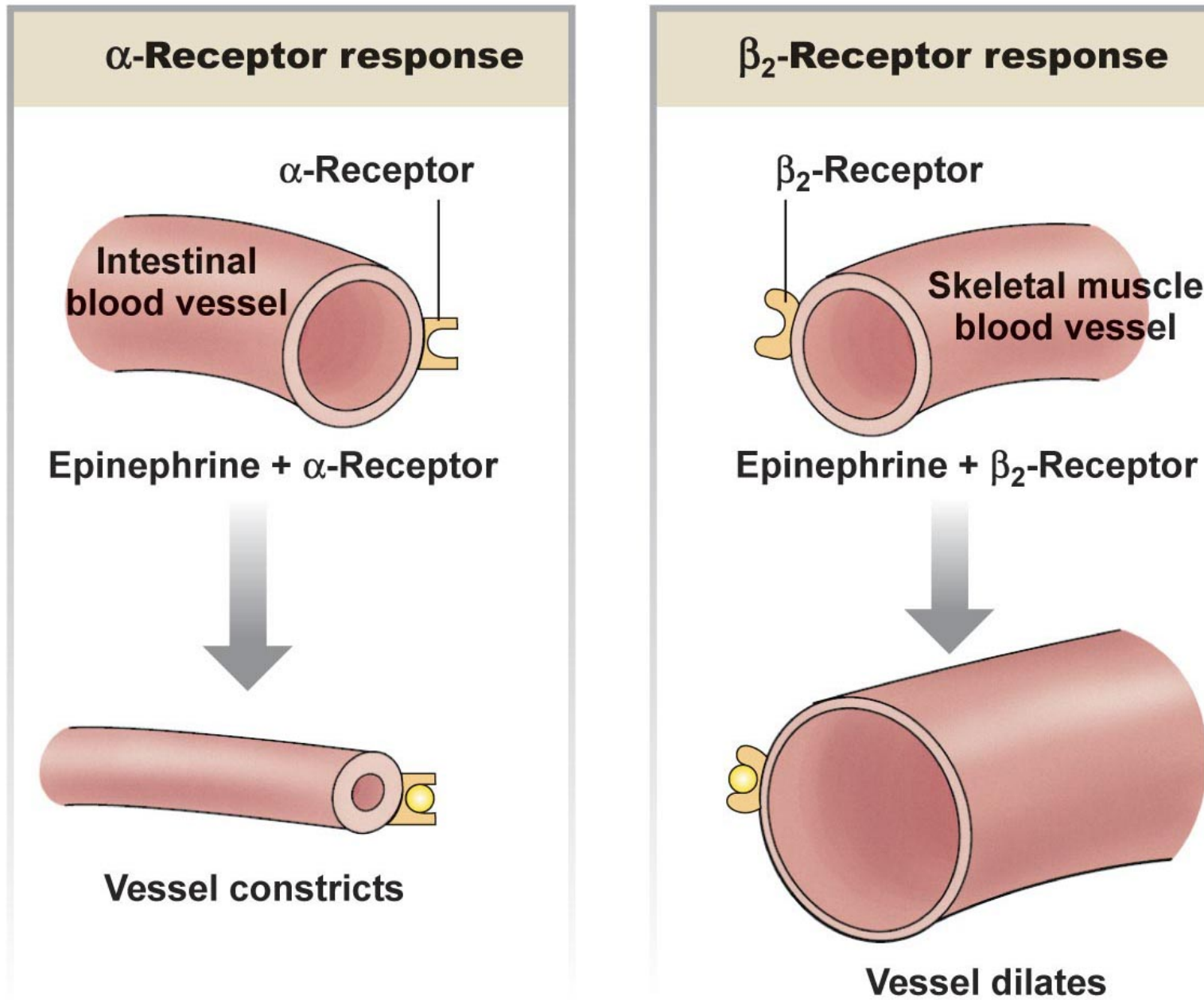


Figure 6-19

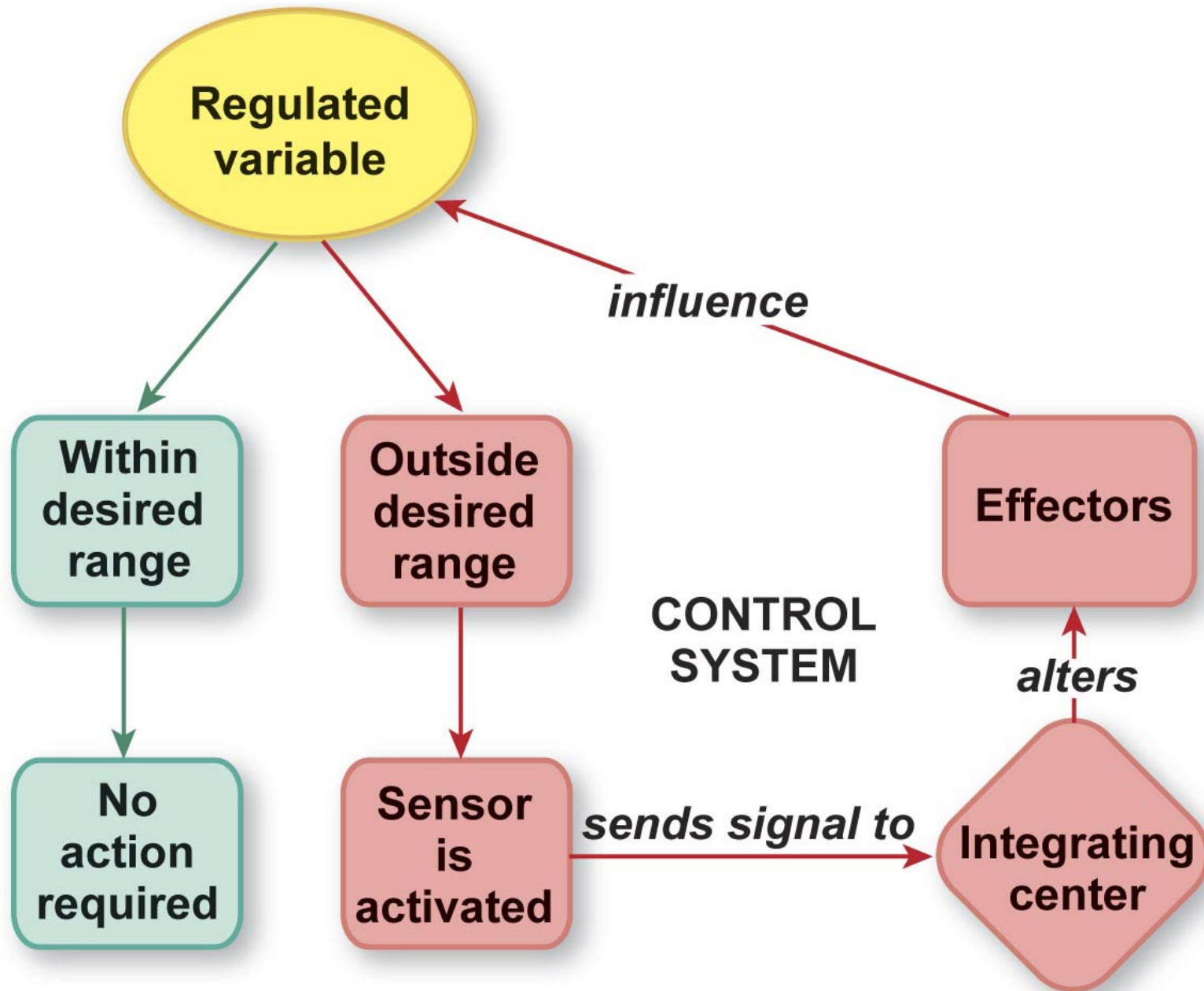


Figure 6-20, overview

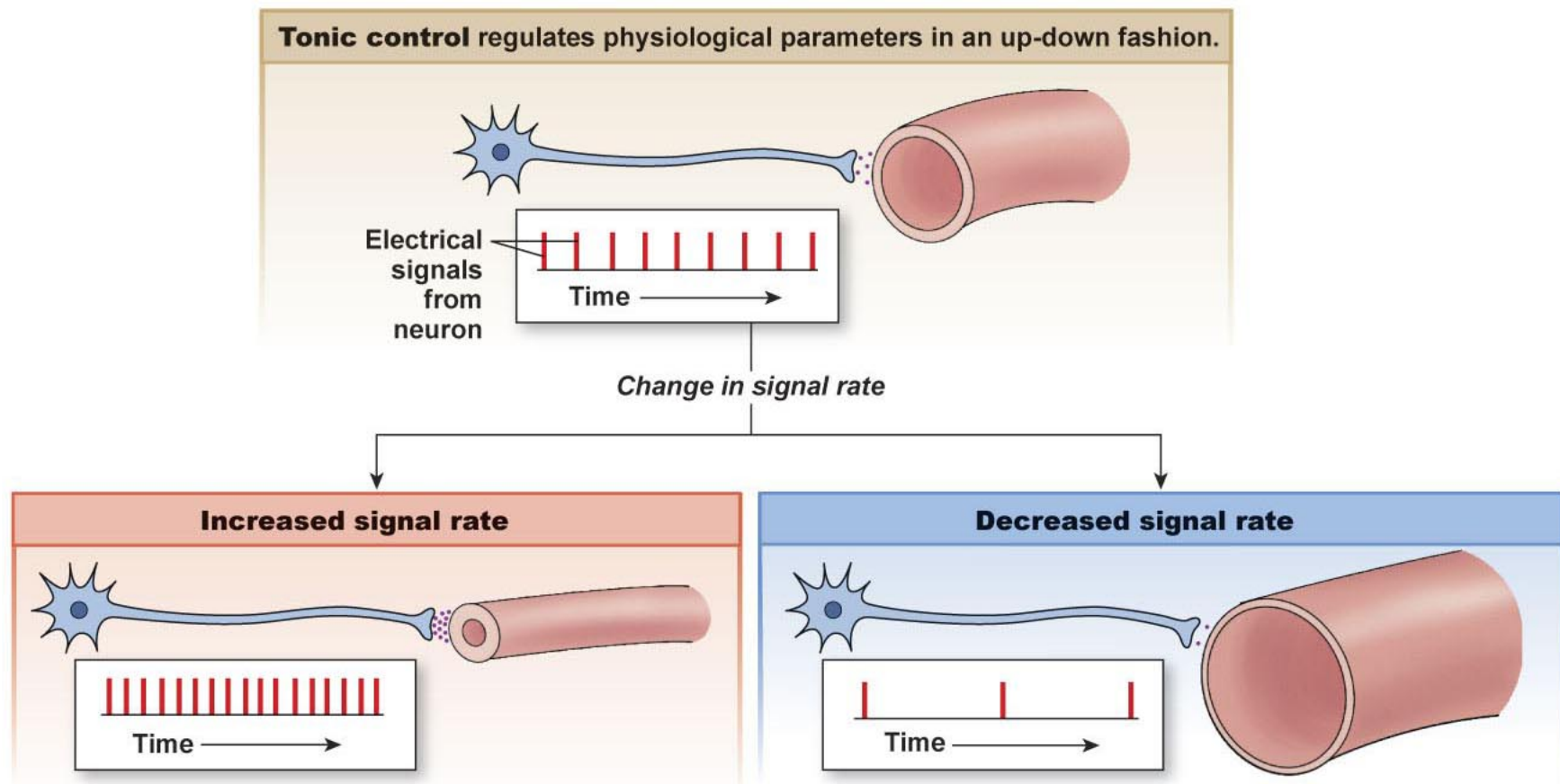


Figure 6-21, overview

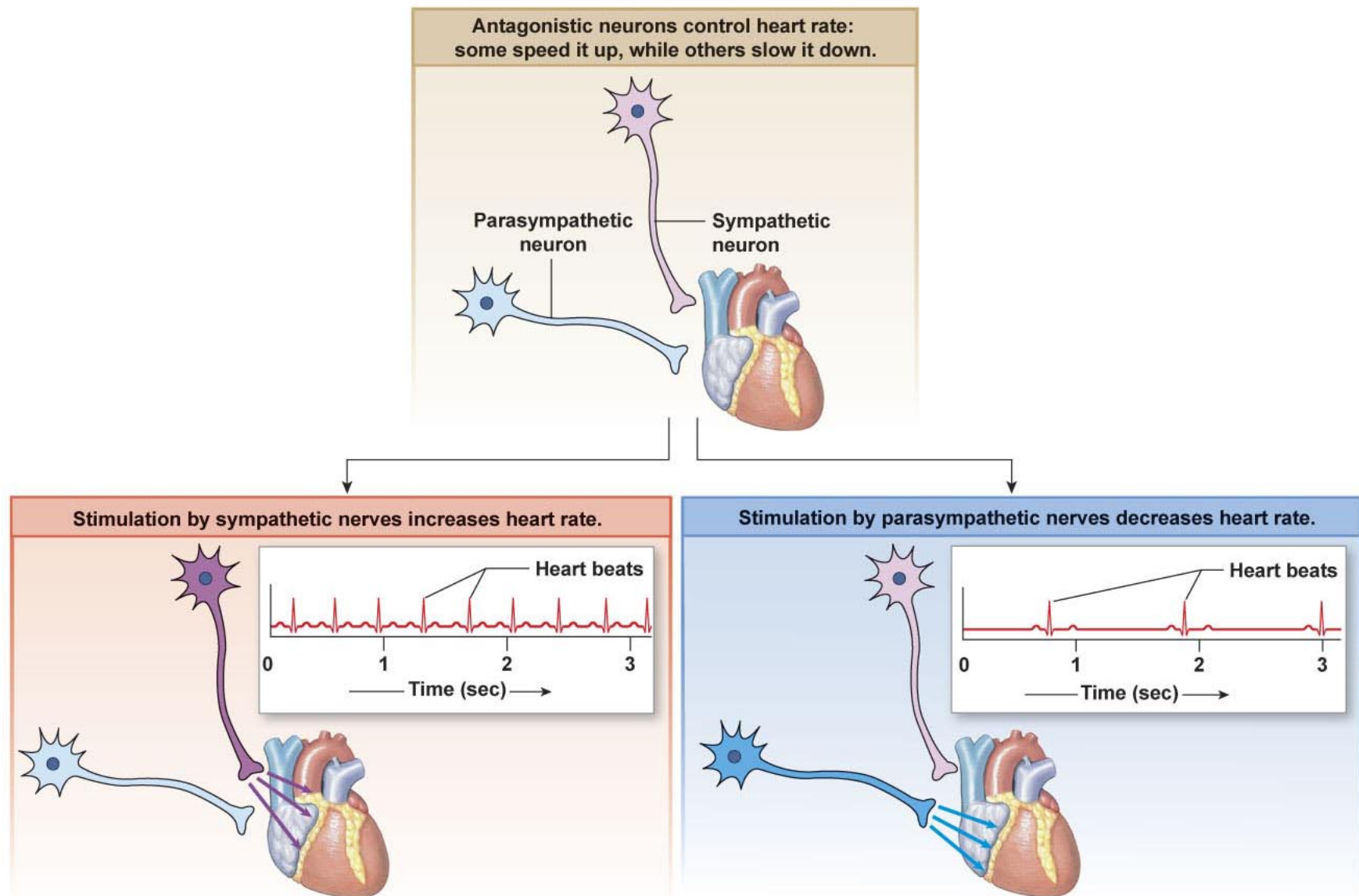


Figure 6-24, overview

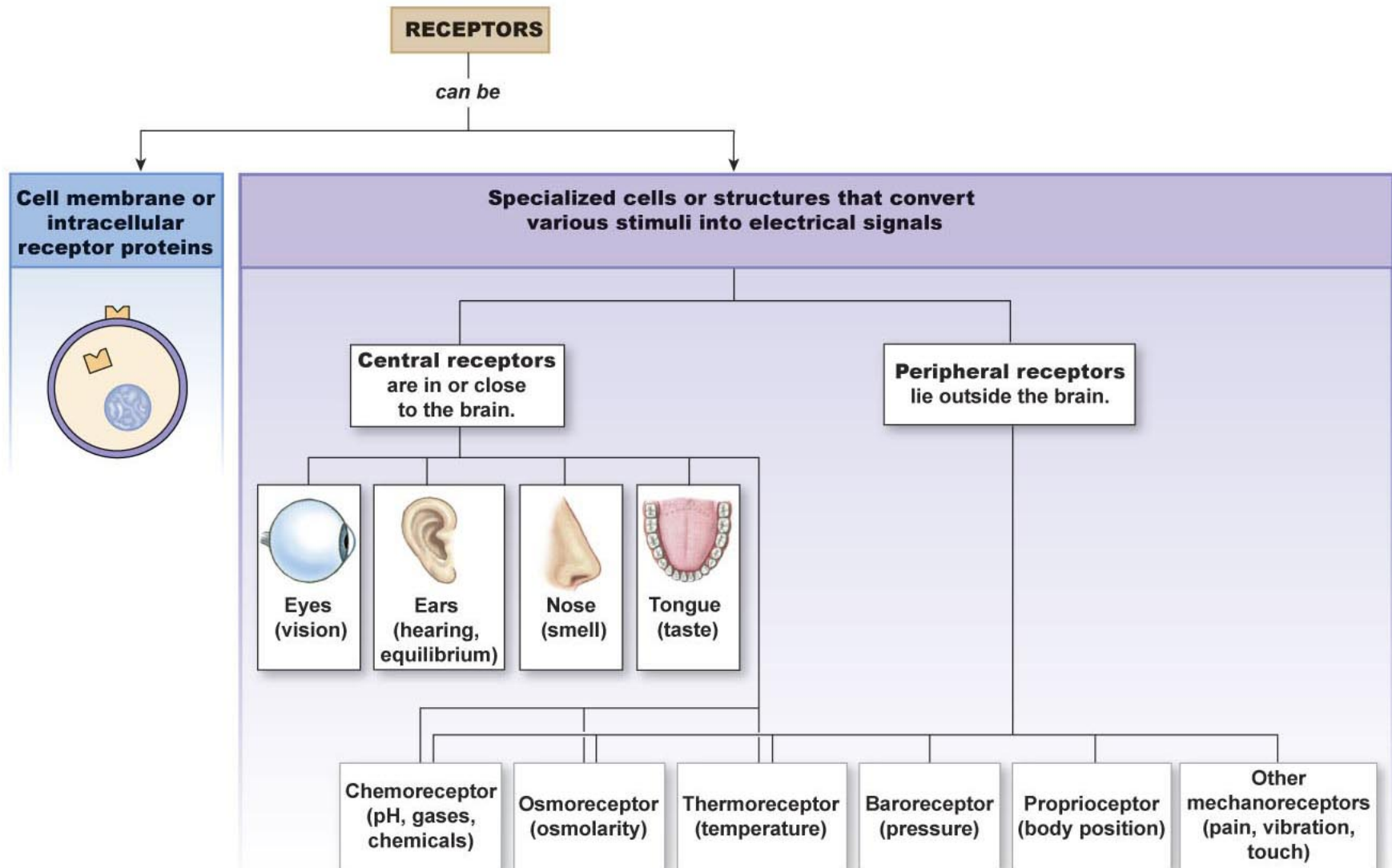


Figure 6-25, overview

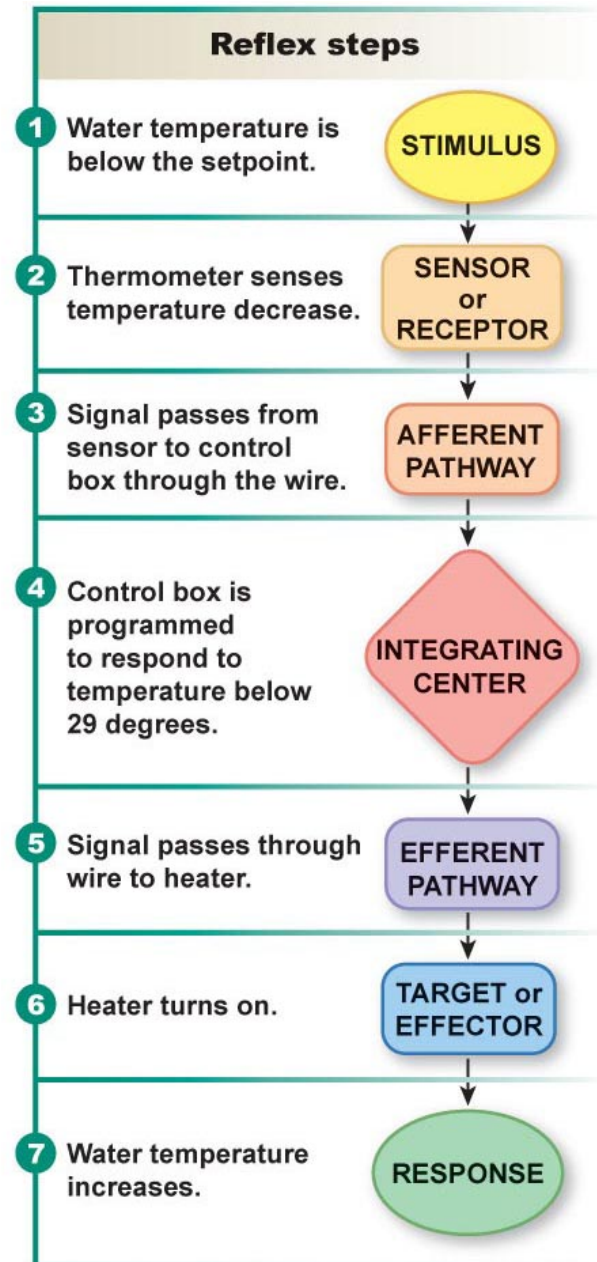
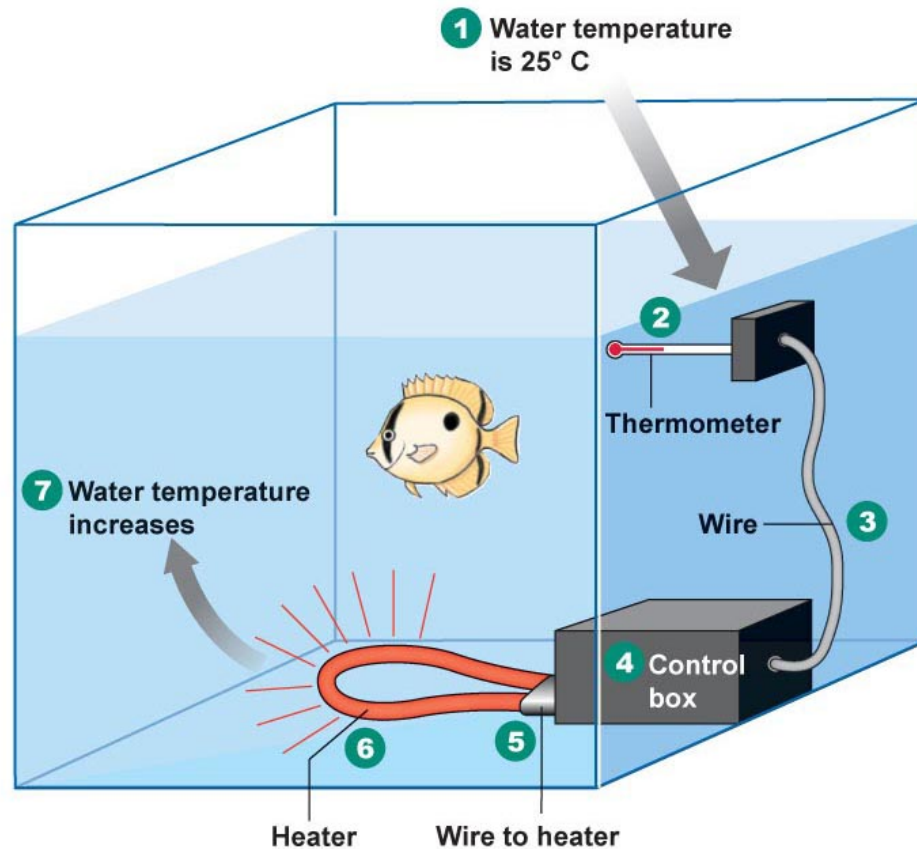


Figure 6-26

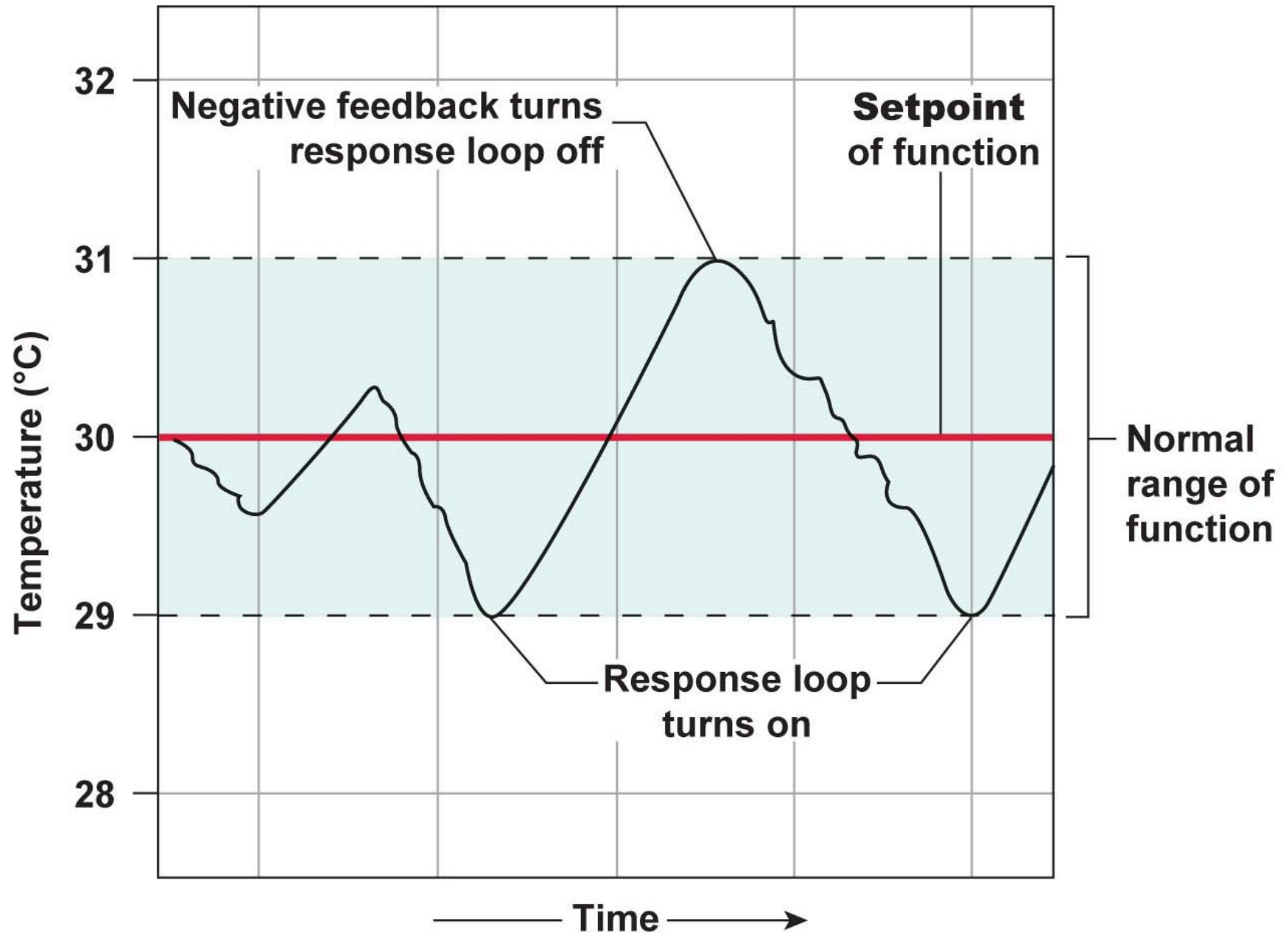


Figure 6-27

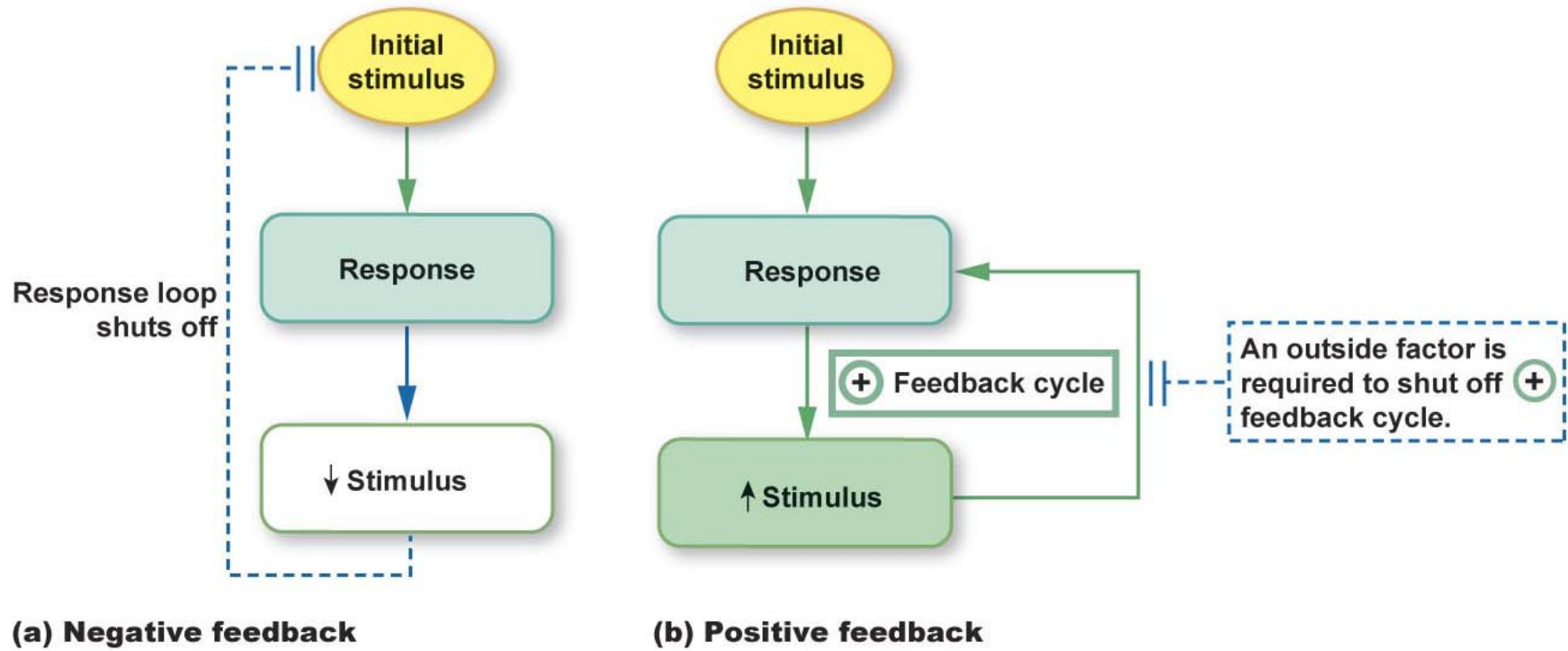


Figure 6-28

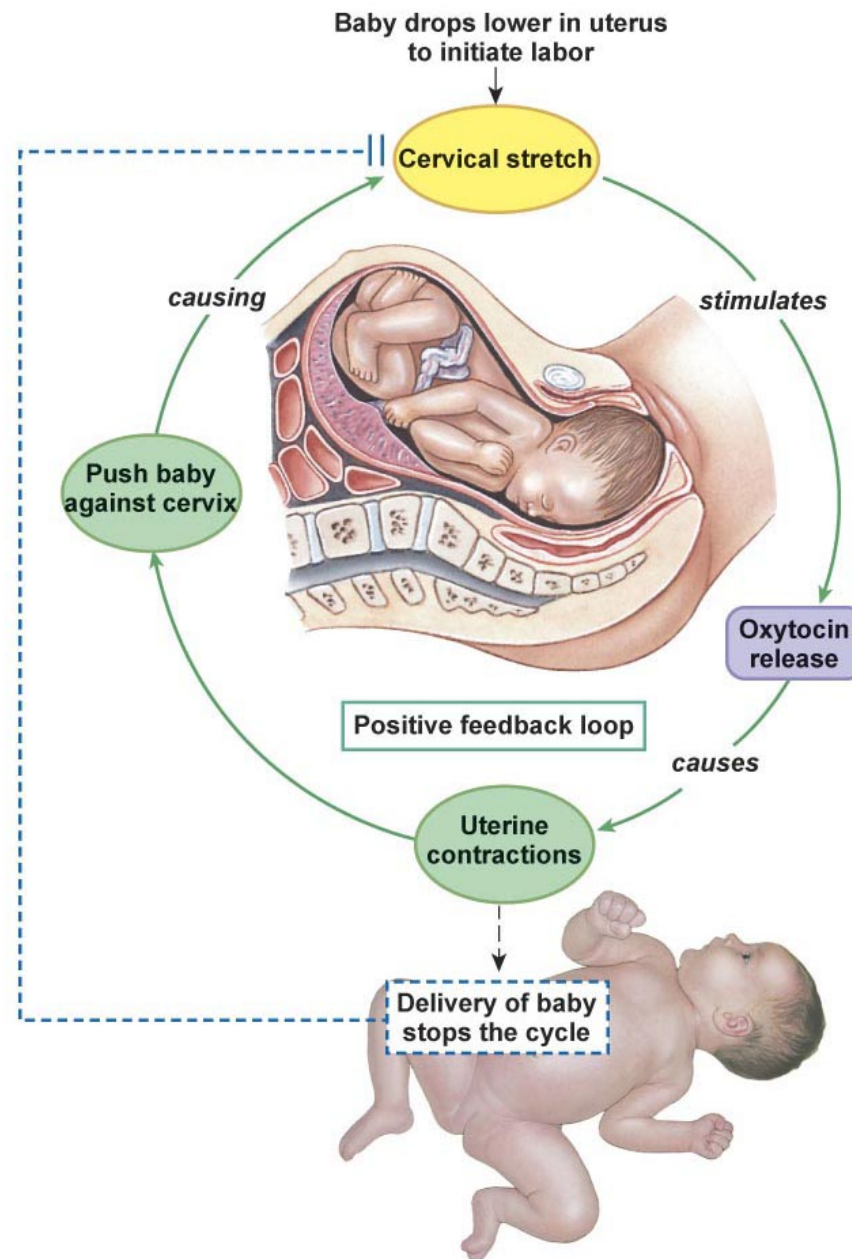


Figure 6-30, overview

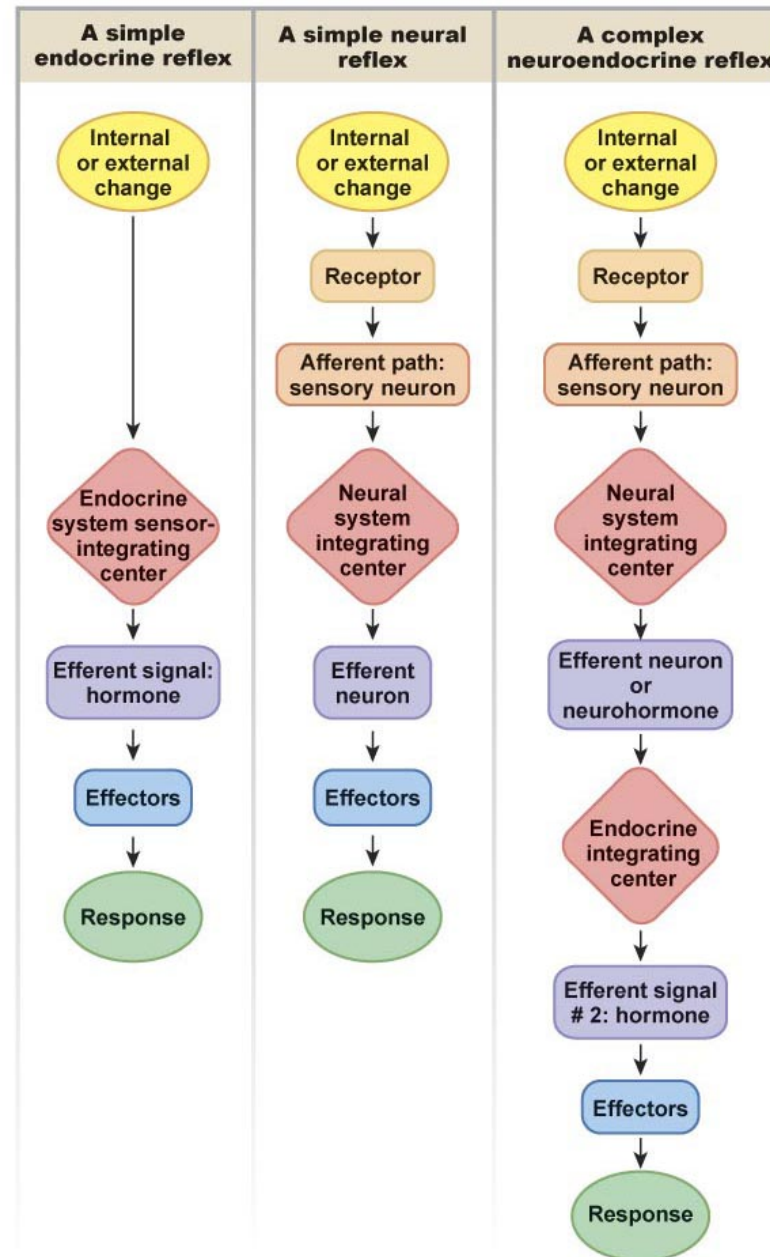


Figure 6-31, overview

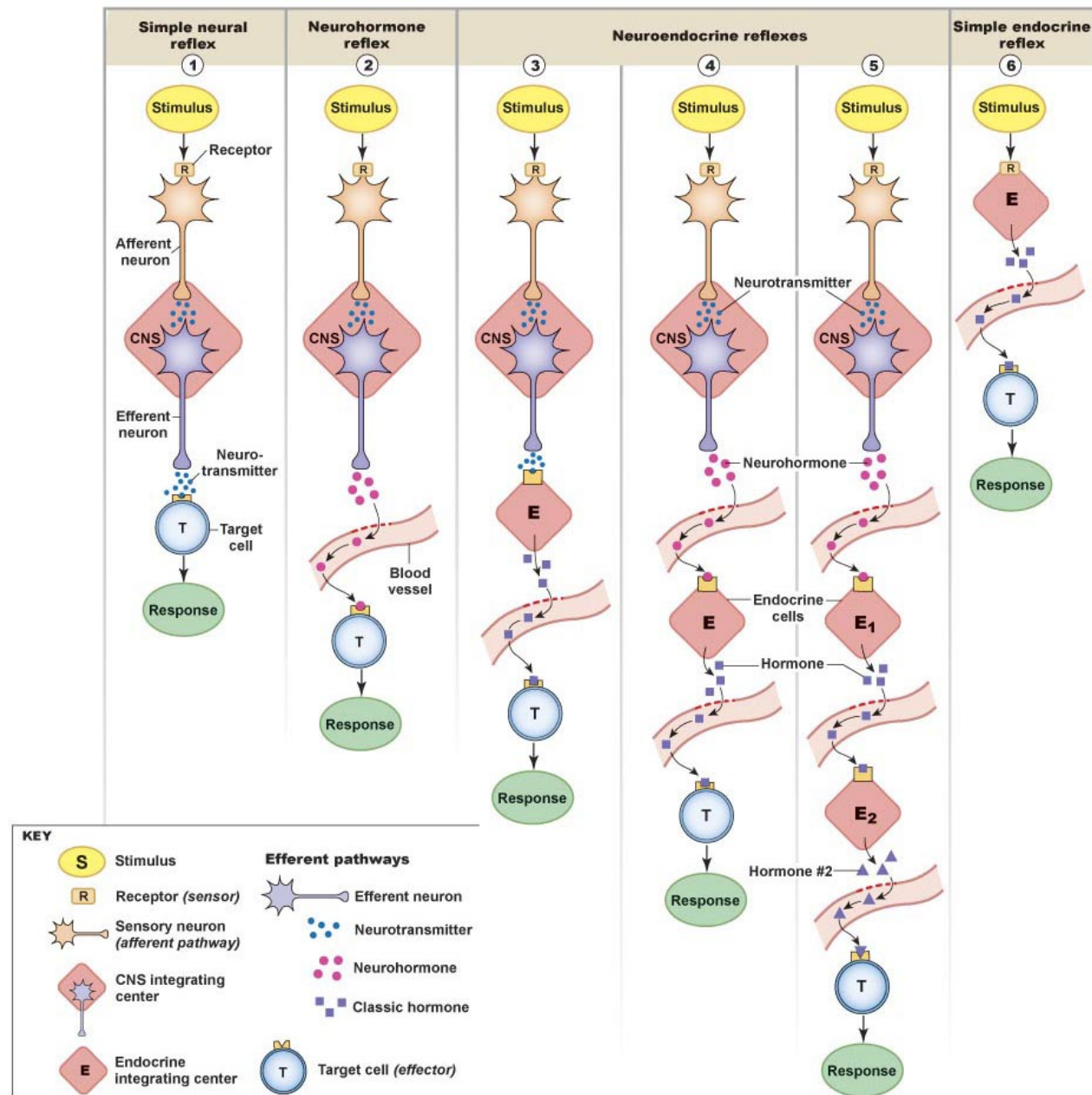


Table 6-4

TABLE 6-4 Comparison of Neural and Endocrine Control		
PROPERTY	NEURAL REFLEX	ENDOCRINE REFLEX
Specificity	Each neuron terminates on a single target cell or on a limited number of adjacent target cells.	Most cells of the body are exposed to a hormone. The response depends on which cells have receptors for the hormone.
Nature of the signal	Electrical signal passes through neuron, then chemical neurotransmitters pass the signal from cell to cell. In a few cases, signals pass cell-to-cell through gap junctions.	Chemical signals are secreted in the blood for distribution throughout the body.
Speed	Very rapid.	Distribution of the signal and onset of action are much slower than in neural responses.
Duration of action	Usually very short. Responses of longer duration are mediated by neuromodulators.	Duration of action is usually much longer than in neural responses.
Coding for stimulus intensity	Each signal is identical in strength. Stimulus intensity is correlated with increased frequency of signaling.	Stimulus intensity is correlated with amount of hormone secreted.

Table 6-5

TABLE 6-5		Comparison of Neural, Neuroendocrine, and Endocrine Reflexes		
	NEURAL	NEUROENDOCRINE	ENDOCRINE	
Sensor or receptor	Special and somatic sensory receptors	Special and somatic sensory receptors	Endocrine cell	
Afferent pathway	Afferent sensory neuron	Afferent sensory neuron	None	
Integrating center	Brain or spinal cord	Brain or spinal cord	Endocrine cell	
Efferent pathway	Efferent neuron (electrical signal and neurotransmitter)	Efferent neuron (electrical signal and neurohormone)	Hormone	
Effector(s)	Muscles and glands, some adipose tissue	Most cells of the body	Most cells of the body	
Response	Contraction and secretion primarily; may have some metabolic effects.	Change in enzymatic reactions, membrane transport, or cell proteins	Change in enzymatic reactions or membrane transport or cell proteins	