Index

adipose tissue, brown, white
sympathetic supply, 113
adrenal medulla. (see subchapter 4.5)
adrenaline
functions (Figure 4.19), 117
circulating adrenaline and noradrenaline, 114–117
preganglionic sympathetic neurons, 114
adrenaline
sensitization of nociceptors, 116
venular plasma extravasation synovia, 116
adrenaline, noradrenaline
plasma concentrations (Figure 4.18), 114
airways
sympathetic supply, 113
allostasis, 2, 229
concept, definition, 361–362
allostasis and systemic diseases, 362
amygdala
autonomic reactions during anger and fear (Figure 11.13), 381
anesthesia
effects of in animal experiments, 84
anterior spino-thalamic tract, 60
area postrema (AP) and gastrointestinal functions, 343–346
role of gastrointestinal hormones (Figure 10.31), 343–346
area postrema (AP) and gastrointestinal tract
role of corticotropin-releasing hormone (CRH), 345
role of thyrotropin-releasing hormone (TRH), 343
role of tumor necrosis factor α (TNFα), 346
arrangement of the recording from peripheral sympathetic neurons (Figure 3.3), 79
autonomic and respiratory regulation, integration of cardiovascular and respiratory reflexes (Figure 10.26), 337
common cardiorespiratory network, concept (Figure 10.26), 336–339
common central oscillator model, 336–339
irradiation model, 336–339
autonomic dysreflexia, after spinal cord transection, 283–285
autonomic effector cells innervation, 203–205
autonomic functions, central representations
levels of integration, 228–229
autonomic ganglia, functions in vivo prevertebral sympathetic ganglia, 185
autonomic ganglia
degree of convergence and divergence and body size, 170–172
strong and weak synaptic inputs, 172–179
synaptic transmission, overview (Box 6.1), 168
autonomic ganglia, functions in vivo parasympathetic ganglia, 189
paravertebral sympathetic ganglia, 184
autonomic ganglia, synaptic transmission
convergence and divergence (Figure 6.2), 170–172
autonomic ganglion cells
relay and integrative functions (Figure 6.10), 187
autonomic motor cortices anterior cingulate cortex, 64
autonomic nervous system definitions (Figures 1.1, 1.4), 9–11
autonomic nervous system functions levels of integration (Figure 3.2), 74–75
autonomic nervous system
brain and body (Figure 0.1), 3
early fascination with little brains and sympathies, 30–31
autonomic neural unit
structure and function (Figure 6.7), 179–181
autonomic spinal systems and somatomotor systems coordination, 287
autonomic systems
specificity of central circuits, 76
autonomic target organs and tissues responses to activation of autonomic neurons (Table 1.2), 18–22
axon reflex see Note 2 of Chapter 2
axon tracer methods, 76
baroreceptor reflexes
blood pressure control, 309–318
caudal ventrolateral medulla (Figure 10.13), 313–314
inhibition in spinal cord, 314
inhibition in the rostral ventrolateral medulla (RVLM, Figure 10.12), 311–318
modulation of (Figure 10.14), 316–317
parasympathetic cardiomotor neurons (Figure 10.10), 312
phasic/tonic control of arterial blood pressure, 310
sympathetic cardiovascular neurons (Figure 10.10), 311–318
wiring diagram (Figure 10.10), 310–313
Bayliss, W.M. (1880–1924)
axon reflex, 69
behavioral patterns, autonomic responses in allostasis, 363
body functions represented in the forebrain and mesencephalon, general aspects (Figure 11.1, Table 11.1), 362–365
concept expressed graphically (Figure 11.1), 363
conditioned emotional responses (Figure 11.8, Table 11.1), 374–377
defense reactions (Table 11.1), 369–374
diving (Figure 11.2), 365–366
freezing reaction (Table 11.1), 378
skeletal muscle effort (exercise) (Figures 11.3, 11.4), 367–368
syncope, neurally mediated, 377
Table 11.1. 353
tonic immobility (Table 11.1), 377–378
top-down telencephalic control, 362–365
vigilance reaction (Table 11.1), 378
Bernard, Claude (1813–1878), 31
fixity of the internal milieu, 2
internal milieu, 355
Bichat, Marie Francois Xaver (1771–1802)
animal life, organic life, 31
blood vessels
integration of neural and non-neural signals (Figure 7.9), 219
local and remote controls (Figure 7.9), 217–219
bradykinin-induced plasma extravasation in knee joint
inflammation, role of sympathetic postganglionic neurons (Figure 7.10), 220
C1 (adrenergic) neurons
emergency situations (Figure 10.6), 304
Cajal, Ramon y (1852 – 1934)
interstitial cells of Cajal, 149
Cannon, Walter Bradford (1871–1945), 11
adrenal medulla, function, 358–359
Cannon–Bard Theory of emotions (Figure 11.10), 378
fright, fight and flight responses, 358
functioning of the autonomic nervous system, consequences of, 360–361
homeostasis, 2
James–Lange theory of emotions, 356–357
sympathico-adrenal system, concept, 355–359
thalamic theory of emotions, 357
The Wisdom of the Body, 355–359
Cannon, Walter Bradford (1871–1945)
The Wisdom of the Body, 76
cardiac pain
vagal afferents, 49
cardiogenic hypothesis, 365
cardiomotor neurons
sympathetic, 112
cardiovascular and respiratory networks
integration in lower brain stem (Figure 10.20), 327–330
cardiovascular center in the medulla oblongata
discovery of, 295–296
caudal pressure area (CPA) (Figure 10.14), 317
central autonomic systems, anatomy
investigation tools (Figure 8.1), 231–233
central encoding of visceral events
a general model (Figure 2.9), 54–56
chemoreceptor reflexes in vasoconstrictor neurons
function of ventrolateral medullas (Figures 10.13, 10.16), 318–321
chemical reflexes
sympathetic neurons, in, 318–321
chemoreceptor reflexes
cutaneous vasoconstrictor neurons, 321
chromaffin tissues, 26
conditioned emotional response (CER) generation of, technique, 395
conditioned emotional responses cardiovascular reactions (Figure 11.8, Table 11.1), 374–377
hypothalamus, integration of cardiovascular reactions in CER, 376
confrontational defense. see defense reactions
converging sympathetic preganglionic segmental origin, 172
cutaneous vasoconstrictor neurons
central warming (Figure 3.5), 82
reflex pattern, animal (Figure 4.5), 93–95
cutaneous vasoconstrictor neurons, animal
spontaneous activity, 93
Darwin, Charles (1809–1882)
The expression of the emotions … (1872), 379
defense of the gastrointestinal tract and enteric nervous system
gut-associated lymphoid tissue (GALT), 155–158
defense reactions integrated in the mesencephalon
afferent projections to the PAG from the body (Figure 11.6), 373
projections of cortex and hypothalamus to the PAG (Figure 11.7), 373–374
projections of the PAG to the medulla oblongata (Figure 11.6), 371
types of defense reaction organized in the periaqueductal gray (Figure 11.5), 369–371
diving responses
cortically induced cardiovascular responses (Figure 11.2), 365–366
dorsal vagal complex (DVC), 246
dorsal vagal complex and gastrointestinal tract
integration of medullary circuits and forebrain (Figure 10.30), 345
integration, a concept, 342–345
effectors cells and organs
parasympathetic nervous system (Table 1.2), 15
sympathetic nervous system (Table 1.2), 14
emotional feelings and expression activity in visceral afferent neurons, 53
emotions, basic
autonomic reactions, patterns of (Figure 11.12), 380
central representation of emotions and autonomic responses (Figure 11.13), 381
facial expression of (Figure 11.11), 379
types of (Figure 11.11), 379–380
emotions, basic anger and fear
amygdala, role in organization (Figure 11.13), 381
central representation (Figure 11.13), 381
encoding of visceral events in the activity of afferent and central neurons
a concept, 53–54
enteric nervous system
anatomy (Figure 5.1), 135–137
brain of the gut, 142
dorsal motor nucleus of the vagus (DMNX), 158
integrative functioning, concept (Figure 5.3), 141–143
interneurons (Figure 5.2, Table 5.1), 140–141
intrinsic primary afferent neurons (IPANs) (Figure 5.2), 137–139
motor neurons (Figure 5.2, Table 5.1), 139–140
neural afferent feedback from gastrointestinal tract to CNS, 142
neurochemical coding (Table 5.1), 141
parasympathetic control (Figure 5.15), 143
parasympathetic control, brain stem (Figure 5.15), 158–159
protection of the gastrointestinal tract (Figure 5.14), 155–158
regulation of secretion and transmural transport (Figure 5.13),
secretomotor neurons (Table 5.1), 139
sensorimotor programs, 141
sympathetic control (Figure 5.16), 143, 159
types of neurons (Figure 5.2), 137
failure of autonomic control, 4
final autonomic pathway definition, functional characteristics, 73–74
flight see defense reactions
Four System Network Model of Larry Swanson, 2
freezing reaction autonomic responses in (Table 11.1), 378
functional hierarchical organization autonomic systems, 75
Galen, Aelius (129–199 AV or, 131–216 AC)
concept of regulation of body functions, 30
ganglia, parasympathetic cranial (Figure 1.4), 18
ganglia, sympathetic, 12–13
ganglia, sympathetic paravertebral non-nicotinic synaptic transmission in vivo, 192–196
Gaskell, Walter Holbrook (1847–1916) autonomic nervous system, 31
gastrointestinal tract and brain, an overview (Figure 10.27), 339–341
 genetic-molecular aspects sympathetic postganglionic neurons (Figure 4.24), 128
ganglion (Figures 1.2, 1.3), 12
Hagbarth, Carl-Eric (1926–2005) microneurography, 82
Harvey, William (1578–1657) de motu cordis . . ., 30
Hess, Walter Rudolf (1881–1973), 11
ergotropic, trophotropic functions of the autonomic nervous system, 359
generalizing concept of the functioning of the autonomic nervous system, consequences of, 360–361
organization of the autonomic nervous system, dichotomous, 359
Heymans, Cornelle (1892–1968) baroreceptor reflexes, 309
hindgut, defection reflexes enteric nervous system (Figure 9.9a), 276–278
spinal mechanisms (Figure 9.9), 276–278
homeostasis concept, definition, 361–362
hyperhydrosis, patients and vibration sudomotor reflex, 132
hypothalamic cats and defense behavior, 395
hypothalamus anatomy, functional (Figure 11.14), 384–387
behavior control column (Figure 11.15d, Table 11.2), 387
circadian timing network (Figure 11.15b), 386
functional model, concept (Figure 11.16), 387–391
hypothalamic visceral pattern generator (Figure 11.15 c), 384–386
integrative functions (Table 11.2), 384
neuroendocrine motor zone (Figure 11.15a), 384
illness/sickness responses vagal afferents, 42
immune system hypothalamsus, 117–120
sympathetic control, 117–121
sympathetic final pathway, 117–120
inflammation in synovia, bradykinin-induced sympathetic postganglionic neurons, role of (Figures 7.10, 7.11), 219–222
inspiration-type neurons sympathetic, 113
intensity theory neural encoding of visceral events (Figure 2.8), 53
interdigestive motility pattern migrating myoelectric complex (MMC), 143
internal milieu and brain, 1
interoception and spinal ascending pathways, 56–60
interstitial cells of Cajal pacemaker potential (Figure 5.11), 152
interstitial cells of Cajal (ICC) myogenic activity and enteric neurons, 152–154
interstitial cells of Cajal (ICC), 139
slow waves, 149–151
intestinofugal neurons extraspinal intestinointestinal reflexes, 140
intrinsc cardiac nervous system “little brain of the heart”, 191
intrinsc primary afferent neurons (IPANS) peristalsis (Figure 5.9), 146–148
intrinsc primary afferent neurons (IPANS), enteric assemblies (Figure 5.6), 146
James, William (1842–1910)
James–Lange theory of emotions (Figure 11.10), 356, 378
kidney sympathetic supply, 113
lamina I neurons projection to parabrachial nuclei (Figure 2.12), 61
supraspinal projection centers (Figure 2.11a), 57–60
lamina V and deeper laminae neurons supraspinal projection centers (Figure 2.11b), 59
Langley, John Newport (1852–1925)
autonomic nervous system, 31
autonomic nervous system, definitions (Figures 1.1, 1.4), 9–11
enteric nervous system, definition, 134
lateral spino-thalamic tract, 60
law of intestine, 145
Lövén reflexes in vasoconstrictor neurons Box 4.1, 90–91
lower brainstem general functions (Figure 10.1), 293
Ludwig, Carl Friedrich (1816–1895)
baroreceptor reflexes and cardiovascual control, 309
lumbar sympathetic system final autonomic pathways (Figure 4.25), 130
microneurography in humans (Figure 3.6), 82–83
motility-regulating neurons anal reflex (Figure 4.16), 109–110
pelvic viscera (Figures 4.15, 4.16), 109–110
motility-regulating neurons type 1
spinal reflex pathways (Figure 4.17), 109–112
motor system
definition (Figure 0.2), 3–4
muscle vasoconstrictor neurons
central reflex pathways (Figure 4.3), 89
humans, 96–97
reflex pattern, animal (Figure 4.1), 87–90
reflexes, humans, 97
spontaneous activity, 87
myenteric plexus (Auerbach’s plexus)
enteric nervous system (Figure 5.1), 134
myelinating myoelectric complex (MMC), 152–154
neurochemical coding, 77, see Subchapter 1.4
concept, 25
cutaneous vasoconstrictor neurons, 24
sympathetic postganglionic neurons (Table 1.3), 24
neuroeffector junction
characteristics, 207
morphology (Table 7.2), 205
neuroeffector transmission
arteriole (Figure 7.2), 205–209
electrophysiology, 205–209
junctial, extrajunctional receptors, 203
purinergic transmission, 209
smooth muscle, ileum (Figure 7.8), 215–217
vas deferens (Figure 7.3), 209
neuroeffector transmission, blood vessels
small arteries, arterioles (Figure 7.6), 213–215
veins, pulmonary artery, 215
neuroeffector transmission, heart
parasympathetic cardiomotor neurons (Figures 7.4, 7.5), 210–212
sympathetic cardiomotor neurons, 212–213
neuropeptides
parasympathetic neurons, 24
neuropeptides in autonomic neurons
neurochemical coding, idea of (Tabs. 1.3, 1.4), 22–25
neurophysiological recordings in animals
autonomic neurons, 78–82
neurophysiological recordings in humans
autonomic neurons (Figure 3.6), 82
nociceptors, sensitization of sympathetic postganglionic axons, role of, 222–223
non-adrenergic non-cholinergic (NANC) transmission
peripheral autonomic neurons, 201
non-nicotinic synaptic transmission in autonomic ganglia
enhancement of ongoing activity in vasoconstrictor neurons in vivo (Figure 6.14), 194
LHRH-like peptide (bullfrog), 192
pelvic ganglia (to vasodilator neurons), response to preganglionic stimulation, 196
reflexes in vasoconstrictor neurons in vivo (Figure 6.15), 194–195
unmyelinated sympathetic preganglionic axons, 193
nucleus tractus solitarii (NTS), 245–249
afferent and efferent connections (Figure 8.13), 248
afferent input, gastrointestinal tract (Figure 8.12), 247
concept of functioning (Figure 8.14), 247–249
projection to parabrachial nuclei (Figure 2.12), 61
visceral afferents, projection to (Figure 8.11), 246
parabrachial nuclei
projection to periaqueductal gray and hypothalamus (Figure 2.12), 61
parasympathetic and sympathetic nervous system
human (Figure 1.1), 10
parasympathetic final pathways
hindgut, 122
parasympathetic final pathways eye, 127
gastrointestinal tract, 126
hindgut, 122
lower urinary tract, 124
reproductive organs, 124
salivary glands, 127
parasympathetic neurons functional classification
reflex behavior (Table 4.6), 122–125
location (Table 1.1), 16
parasympathetic pathways
airways (Figure 4.23), 125–128
brain stem, 125–128
heart (Figure 4.22), 125–128
pelvic organs (Figure 4.21), 122–125
parasympathetic systems, sacral general functions, 272
parasympathetic vasodilator neurons
skin, 106
paravertebral ganglia (Figure 1.1), 12
Pavlov, Ivan (1849–1936)
conditioned autonomic reflex, 365
pelvic ganglia (Figure 1.1), 13
peripheral autonomic nervous system, in submammalian vertebrates
reptile (Figure 1.5), 30
teleost (Figure 1.5), 30
elasmobranch (Figure 1.5), 30
peristalsis, 145–148
colon (Figure 5.9), 148
small intestine (Figure 5.9), 148
piloerection
emotional arousal, 132
pilomotor neurons
activity, cat, 104
plethysmography, 131
postganglionic sympathetic neurons
sympathetic, 12–13
transmitter substances (Table 7.1), 200–202
postganglionic sympathetic
electrophysiological properties (Table 6.1), 181–184
long-afterhyperpolarizing (LAH) neurons (Table 6.1), 181–184
phasic neurons (Table 6.1), 181–184
tonic neurons (Table 6.1), 181–184
postsynaptic dorsal column pathway.
Porfour du Petit, Francois (1664–1741)
Hormone syndrome, 30
pre- and postganglionic sympathetic neurons
identification (Figure 3.4), 81
preganglionic neurons
classes
parasympathetic
pharyngeal
brain stem, 125–128
pelvic organs (Figure 4.21), 122–125
parasympathetic systems, sacral general functions, 272
parasympathetic vasodilator neurons
skin, 106
paravertebral ganglia (Figure 1.1), 12
Pavlov, Ivan (1849–1936)
conditioned autonomic reflex, 365
pelvic ganglia (Figure 1.1), 13
peripheral autonomic nervous system, in submammalian vertebrates
reptile (Figure 1.5), 30
teleost (Figure 1.5), 30
elasmobranch (Figure 1.5), 30
peristalsis, 145–148
colon (Figure 5.9), 148
small intestine (Figure 5.9), 148
piloerection
emotional arousal, 132
pilomotor neurons
activity, cat, 104
plethysmography, 131
postganglionic sympathetic neurons
sympathetic, 12–13
transmitter substances (Table 7.1), 200–202
postganglionic sympathetic
electrophysiological properties (Table 6.1), 181–184
long-afterhyperpolarizing (LAH) neurons (Table 6.1), 181–184
phasic neurons (Table 6.1), 181–184
tonic neurons (Table 6.1), 181–184
postsynaptic dorsal column pathway.
Porfour du Petit, Francois (1664–1741)
Hormone syndrome, 30
pre- and postganglionic sympathetic neurons
identification (Figure 3.4), 81
preganglionic neurons
classes
cervical sympathetic trunk
(4.5), 120–121
lumbar splanchnic nerves
(4.5), 120–121
lumbar sympathetic trunk
(4.5), 120–121
sacral parasympathetic, 240–241
sympathetic, 14–15
preganglionic neurons, cranial parasympathetic
(Table 8.1), 241–244

© in this web service Cambridge University Press & Assessment

www.cambridge.org
preganglionic neurons, dorsal motor nucleus of the vagus (DMNX) gastrointestinal tract (Figure 8.10), 241–244 preganglionic neurons, sympathetic associated interneurons (Figure 8.9), 238–242 intermediate zone, spinal cord (Figure 8.2), 235 morphology and location, 234–237 topographic organization (Figures 8.3–8.6), 235–240 segmental functional distribution (Figure 8.8), 241 premotor neurons, autonomic definition, 249–250 parasympathetic (Figure 8.17, Table 8.3), 253 patterns of central autonomic neurons related to distinguished targets (Tabs. 8.2, 8.3), 253–255 sympathetic (Figure 8.15, Table 8.2), 250–255 premotor neurons, sympathetic putative transmitters (Figure 8.16), 255 prevertebral ganglia afferent sympathetic peptidergic input, 187 integration of spinal and peripheral synaptic inputs (Figure 6.11), 185 prevertebral ganglia (Figure 1.1), 13 primary interoceptive cortex dorsal posterior insula, 64 functional organization, 67 quiescence see defense reactions raphe nuclei, caudal cutaneous vasoconstrictor system (Figure 10.17), 321–322 lipomotor neurons (adipose tissue, Figure 10.18), 322–324 reflex patterns in autonomic neurons functional labels, 71 reflex vasodilation in skin noxious stimulation, humans (Figure 4.10), 99 reflexes in autonomic neurons functional markers, 77–78 reproductive organs, regulation of emission and ejaculation, 281–283 erection reflex (Figure 9.11), 280–282 spinal mechanisms (Fig. 9.12), 278–283 urethro-genital reflex (coitus reflex, Figure 9.13), 281–283 respiratory network, ponto-medullary, 324–327 respiratory oscillations activity in sympathetic nerves (Figure 21b), 328 respiratory rhythmicity activity of sympathetic neurons (Figures 10.22, 10.23), 330–333 activity of sympathetic neurons, humans, 334–336 activity of sympathetic neurons, species differences, 333 species rhythmicity, sympathetic neurons peripheral reflex components (Figures 10.22b, 10.23a), 330–333 sympatho-skeletal neuromuscular apparatus gastrointestinal motility (Figure 5.12), 153 rostral ventrolateral medulla oblongata (RVLM) C1 (adrenergic) neurons projecting to the spinal cord (Figure 10.4, Box 10.2), 302–304 spontaneous activity, 307–309 sympathetic cardiovascular premotor nucleus (Figure 10.8), 301–307 sympathetic premotor neurons (Figure 10.7), 301–306 synaptic inputs (Figure 10.8), 306 salivary glands sympathetic supply, 113 secretomotor reflexes enteric nervous system (Figure 5.13), 154–155 segmental and suprasegmental sympathetic reflexes electrical stimulation of afferents, elicited by (Figure 9.2), 265 Sherrington, Sir Charles Scott (1857–1952) interception, exteroception, proprioception, 34–35 skeletal muscle effort (exercise) cortically induced cardiovascular responses (Figures 11.3, 11.4), 367–368 skin potential sudomotor neurons, 132 slow waves and motility patterns mechanisms (Figures 5.4, 5.5), 143–145 specificity theory neural encoding of visceral events (Figure 2.8), 53 spinal autonomic circuits interneurons (Figure 8.9), 263–264 synaptic transmission and transmitters, 262–263 spinal autonomic reflex pathways building blocks of central integration (Figure 9.1), 261–262 integration of spinal and supraspinal circuits (Figure 9.15), 286–287 sympathetic systems, 264–272 synaptic transmission and transmitters, 262–263 spinal cord as integrative autonomic organ, 285–287 spinal cord transection changes in spinal autonomic systems (Figure 9.14), 284–285 spinal autonomic reflexes see Subchapter 9.2.3 spinal reflexes, sympathetic after spinal cord transection, 265 coordination of reflexes (Figure 9.4), 269–271 intestino-intestinal reflexes, 269–271 motility-regulating neurons (Figure 9.5), 269–271 organ/tissue-specific reflexes, 269–271 pelvic viscera, stimulation of (Figure 9.3), 271, 272 physiological stimulation of afferent, elicited by (Figure 9.9, Table 9.1), 267–272 reno-renal reflexes, 269–271 spinal visceral afferent neurons, 47–48 sacral, 48 thoracolumbar, 47–48 spinal visceral afferents functional characteristics, 50–52 spino-thalamo-cortical systems exteroception, interception (Figure 2.13), 63 spleen sympathetic control, 117–120 spontaneous activity sympathetic premotor neurons, 307–309 spontaneous activity in sympathetic neurons after transection of the spinal cord, 267–269
stellate ganglion (Figures 1.1, 1.2), 12
strong and weak synapses
autonomic ganglia (Box 6.2), 174–176
submammalian vertebrates
peripheral autonomic nervous system (Figure 1.5, Table 1.5), 25–30
submucosal plexus (Meissner’s plexus) enteric nervous system (Figure 5.1), 134
sudomotor neurons
electrodermal activity, 103
reflex pattern, animal, 100–103
reflexes, humans, 103
skin potential, hairless skin, 100–101
vibration reflex, 102–103
sudomotor neurons and cutaneous vasoconstrictor neurons
integration (Figure 4.12), 102
superior cervical ganglion (Figures 1.1, 1.2), 12
intracellular measurements in vivo, 176–179
preganglionic, postganglionic neurons and body size, 170–172
supersensitivity of autonomic effector cells
reaction to denervation or decentralization, 133
sympathetic ganglia
little brains, 167
proportions of electrophysiologically characterized neurons (Figure 6.9), 182
relay function (Figure 6.3), 176–179
sympathetic neurons
location of (Table 1.1), 16
sympathetic neurons in vivo
discharge rates (Table 6.2), 185
sympathetic non-vascular neurons
depth somatic structures, 166
functional classification (Table 4.3), 101
pelvic organs, functional characteristics, 109–110
pelvic viscera and colon, 109–112
sympathetic premotor neurons
functionally identified (Figure 10.19), 326
sympathetic trunk (sympathetic chain) (Figures 1.2, 1.3), 12
sympathico-adrenal system Cannon, 115
syncope, neurally mediated, 377
syncretium of effector cells passive electrical properties, 203, 225
synovia, sympathetic innervation plasma extravasation, 223
thalamocortical system spinotalamic inputs (Figures 2.13, 2.14), 62
vagal afferent input (Figures 2.14, 2.15b), 64–67
The Wisdom of the Body revisited, synopsis autonomic nervous system and behavior, 391
integrative autonomic responses and forebrain, 391–393
tonic immobility autonomic responses in (Table 11.1), 377–378
transmitter substances autonomic neurons (Table 7.1), 202
transneuronal labeling, 76
Traube–Hering waves cardiorespiratory coupling, early studies, 329
urinary bladder and hindgut, interactive regulation of role of spinal circuits (Figure 9.10), 278–279
urinary bladder, micturition reflexes spinal circuits (Figures 9.7, 9.8), 276
supraspinal control (Figure 9.8), 275–276
vagal afferent neurons
abdominal organs, 49–50
body protection (Figure 2.5), 42–46
illness/sickness responses (Figure 2.5), 42
reflex modulation of inflammation, 42
thoracic visceral organs, 49–50
vasodilator neurons
defense reaction, 106–109
hypothalamus (Figure 4.14), 106–109
skeletal muscle, animals, 106–109
skeletal muscle, humans, 108
skin, cats, 104
skin, humans, 105–106
thermoregulation, 105–106
ventrolateral medulla oblongata (VLM), 296–301
cardiovascular cell column, 298–301
functional anatomy (Figures 10.2, 10.3), 297
location of cardiovascular neurons (Figure 10.4), 301
location of nuclei (Box 10.1), 299
ventral respiratory column, 298–301
venular plasma extravasation in inflammation, 133
vigilance reaction autonomic responses in (Table 11.1), 378
visceral afferent neurons
autonomic nervous system, 38–39
general properties (Table 2.1), 41
organ regulation, reflexes, sensations, 52–56
silent mechanoinsensitive, 52
spinal, vagal (Figures 2.1, 2.2), 35–37
vagal afferent neurons, 41–46
visceral nociception and pain, 48–52
visceral nociception
peripheral mechanisms, 50–52
visceral primary afferent neurons as interface between visceral organs and brain, 40
visceral vasoconstrictor neurons
reflex pattern, animal, 92–93
white ramus (Figures 1.2, 1.3), 12
working-heart-brainstem preparation (WHBP), 76