Index

A
a-amino-3-hydroxy-5-methylisoxazole-4-propionic acid (AMPA), 29–30, 30f
Ambion, 78
amphetamine. See also methamphetamine; methylenedioxymethamphetamine abuse of, 42
animal studies, 38
animal studies, mechanism of action, 40
blocking the effect of, 39–40
causes of death related to, 43
central effect, 37
conditioned response studies, 38–39
dopamine (DA), d-amphetamine structures, 34f
dopamine (DA), glutamate interactions and, 43, 44f
dopamine (DA) system effect, 36
first synthesis, 5, 33
5-HT transporter (SERT) interaction, 35–36
human studies, 38
indirectly acting sympathomimetics, 34
mechanism of action, 34–36, 35f
monoamine oxidase (MAO) and, 34
Parkinson’s patients, L-DOPA and, 39
peripheral effect, 38
pharmacokinetics, 44
psychomotor stimulant, 36–37
psychosis, 42–43
stereotypical behavior development and, 39
student popularity, 38
tolerance, dependence, 43
transporter models, 35, 35f
weight loss and, 5
amphetamine, clinical use
appetite suppressant, 40–41
attention deficit hyperactivity disorder (ADHD), 41
depression, 46
narcolepsy treatment, 41
anxiolytic drugs, classes, 81f

B
barbiturates. See also benzodiazepines
acute poisoning, treatment, 87–88
addiction treatment, 88
cardiovascular, respiratory systems effect, 90–91
chronic use, events timeline, 86
CNS distribution, 89, 89t
GABA\(_4\) receptor, 86–87
general structure, 78f
mechanism of action, 86
pharmacodynamics of sedation and, 89–90
physical dependence in elderly, 88–89
pregnant or nursing female use, 89
site of action, 89t
tolerance, dependence, 85–86
bath salts
3,4 methylene-dioxypyrovalerone (MDPV) structure, 171, 171f
addiction to, 170–172
CNS, peripheral nervous system effects, 171
drug overdose signs, symptoms, 172–173
route of administration, 171
withdrawal symptoms, 173f
behavioral therapies, 186–187
benzodiazepines
absorption rate, 84
cardiovascular, respiratory systems effect, 90–91
categories, 76
Clinical uses, 90
CNS distribution, 89, 89t
dose–response curve and, 78, 79f
\(\gamma\)-aminobutyric (GABA) and, 79–80, 80f
half-life, 84–85, 85f
Index

benzodiazepines (Continued)
interaction at regulatory site, 87f
mechanism of action, 79–81
paradoxical effect, 81
pharmacodynamics of sedation and, 89–90
pharmacokinetics, 84–85
pharmacological effects, 81t
physical dependence, 81, 81t
physical dependence in elderly, 88–89
pregnant or nursing female use, 89
sedative hypnotic, 77–78
site of action, 89f
tolerance, dependence, 85–86
withdrawal from, 81–84
benzodiazepines, withdrawal symptoms
conditions altering duration, intensity, 82
elimination, factors influencing, 83–84
exposure duration and, 82–83
long-term outcomes, 83–84
withdrawal response, factors influencing, 83
benzoylcegonine (BE), methylecgonine ester (MEE) metabolites, 69–70
Biosynthesis of DA and NE, 16–18

C
caffeine, nicotine, alcohol, 8
cocaine, 66–667, 67f
benzoylcegonine (BE) and methylecgonine ester (MEE) metabolites, 69–70
chronic use, toxic effects, 68
cNS effects, 67

crack cocaine, 69
dopamine transporter (DAT) protein
dblockade, 66–667, 67f
effects vs. methamphetamine, 48f
historical use, 5, 65
mechanism of action, 66–67, 67f
metabolism, 69–70
peripheral nervous system effects, 68
pharmacokinetics, 69
physical dependence, withdrawal, 68–69
serotonin (5-HT) and, 66
structural formula, 56f
tolerance, 69–70
cocaine, neurobiology of relapse
cocaine use, seeking, 70
cross reinstatement and, 72
dopamine (DA) receptors and, 71
drug priming, 70–71
glutamate and reinstatement, 72–73
mesocorticolimbic DA system and, 71
neurotransmitters involved, 71
reinstatement models, 70–73
stress-induced reinstatement, 71
codeine, 128
cognitive behavioral therapy, 187
combination therapies, 185
CNS stimulants, categories, 37
Cross-tolerance, 72

D
Dale, Sir Henry, 15
delta-9-tetrahydrocannabinol (THC). See marijuana
dependence, 9–10
dependence-producing drugs, common attributes, 10–11
detoxification programs, 185
dihydroxyphenylalanine (DOPA) decarboxylase, 17–18, 17f
dopamine (DA)
biosynthesis of, 16–18, 17f
cocaine, neurobiology of relapse, 71
da transporter (DAT), 20
depletion,
methylenedioxymethamphetamine (MDMA), 57
drug-receptor interaction and, 20, 21f
GHB and, 107–108
glutamic acid (GLU) interaction, 31, 31f,
43, 44f
impulse flow, γ hydroxybutyrate (GHB), 107–108
metabolism, 19f, 20
receptor subtypes, 21–22, 22f
receptors activation, 8
release, regulation of release, 19–20, 19f
storage, 19f, 20
synthesis regulation, 18–19
system effect, amphetamine, 36
Uptake I, 19
dopamine transporter (DAT) protein, 20
cocaine abuse and, 66–667, 67f
dopamine-β-hydroxylase (DBH), 18
drug addiction, defined, 9
drug, substance abuse. See also substance dependency, treatment
defined, 9, 183
dependence-producing drugs, common attributes, 10–11
Index 191

history, unauthorized use, 1–2
reward pathways, 10
reward pathways and, 10
society’s attitude towards, 8
drug-receptor interaction, 20, 21

E
ergot, 5–6, 6f, 138. See also LSD, 138
excitatory amino acid receptors. See also glutamic acid
a-aminoo-3-hydroxy-5-methylisoxazole-4-propionic acid (AMPA), 29–30, 30f
kainic acid (KA), 30, 30f
N-methyl-D-aspartate (NMDA), 29–31, 30f, 31f
subtypes, 29–30

F
Falck–Hillarp fluorescent histochemical method, 16
flashbacks, 144

G
γ-aminobutyric acid (GABA), 26
benzodiazepines and, 79–80, 80f
GABA_A receptor, 28, 28f, 80
GABA_B receptor, 28–29, 80
GHB and, 107
released, 27, 27f
storage, 27
structure, 80f
synthesis, 27
γ-hydroxybutyrate (GHB)
abuse potential, 111
alcohol withdrawal, heroin addiction treatment, 109–110
chemical structure, 106f
dopamine (DA), impulse flow and, 107–108
effects on CNS, 106–107
GABA receptors and, 107
mechanisms of action, 105–107
overdose symptoms, 111
pharmacokinetics, 111
synthesis, metabolism, 105–106, 106f
therapeutic uses, narcolepsy treatment, 108–109

H
Halcion, 75
hallucinogens. See also lysergic acid diethylamide; mescaline
classes of, 142
ergot, 5–6, 6f, 138
hallucination, defined, 139
hallucination persisting perception disorder (HPPD), 143–144
historical use, 5–6, 137
symptoms, 137–138
hemp, 7, 153. See also marijuana
heroin. See opium, morphine, heroin
Hoffmann, Albert
synthesis of LSD, 6, 137–139
5-HT. See serotonin
5-hydroxytryptamine, See Serotonin, 22–26

I
inhalants
addiction to, 168–169
age of first use of, 169
effects on CNS, 168–169
lethal effects, 169
mechanism of action, 170
nitrites, 170
nonmedical nitrite use, 170
types, categories, 167–168, 168f

K
kainic acid (KA), 30, 30f
Khat
active ingredient, 175
historical use, 175
long-term effects, 175
structural formula, 175f
tolerance, physical dependence to, 176

L
librium, 77
lysergic acid diethylamide (LSD)
behavioral models, mechanism of action, 140
candy flipping, MDMA, 146–147, 146f, 147f
CNS effects of, 142–143
flashbacks, hallucination persisting perception disorder (HPPD), 143–144
hallucinogenic effects of, 58–59
5-HT receptor neurons, 140–141, 141f
long-term effects of, 143–144
mechanism of action, 139–141, 141f
lysergic acid diethylamide (LSD) 
(Continued)
mood alterations and, 143
Passie Hypothesis and, 140–141
peripheral nervous system effects of, 142, 142
pharmacokinetics, 145
physiological side effects of, 142, 142
t
psychosis, 143
routes of administration, 144–145
structure, 138f
synesthesia and, 143
synthesis, 6, 138–139
toxicity, tolerance, 144–145
M
marijuana
antimotivational syndrome, 158–159
CB1 receptor antagonist, CNS effects, 158
CB1 receptors, neuroanatomical distribution, 156
chronic, long-term use effects, 158, 159f, 161
endocrine changes, 159
historical use, 6–7, 153–154
leaf, 7f
medicinal uses, 6–7
response to abruptly stopping, 160–161
synthesis, biosynthetic pathway, 154–155
THC, clinical uses, 157–158
THC, mechanism of action, 155–156
THC, peripheral and CNS effects, 156–157, 157f
THC route of administration, absorption, 159–160
THC, structural formula, 154–155, 155f
tolerance; addiction, physical dependence, 160
U.S. consumption, 154
Matrix Model, 187
mephedrone (MCAT)
effects, 174
routes of administration, 174
side effects, 174–175
structural formula, 173, 174f
mesocorticollimbic dopamine (DA) system
cocaine, neurobiology of relapse, 71
t
methamphetamine
abuse, 47, 48f
adrenergic action, 46
central, peripheral effects, 45
clinical study, Japan, 47–49
clinical uses, 45–46
common, trade names, 45
depression and, 46
effects vs. cocaine, 48f
metabolism, 50
Parkinson’s disease and, 46
potential therapeutic uses, 47
short-term effect, 49
structure of, 44, 44f
tolerance, dependence, 49–50
methylleconineester (MEE), 69–70
3,4 methylenedioxypyrovalerone (MDPV)
structure, 171, 171f
methylenedioxymethamphetamine
(MDMA)
acute effects, 56
acute withdrawal effects, 52f
adolescent abuse, ecstasy, 50–51
aggregation toxicity and, 57–58
candy flipping, LSD, 146–147, 146f, 147f
clinical use, 50
CNS effects, 51–52, 52f
dopamine (DA) release, depletion and, 57
first synthesis, 50
hallucinogenic effects of, 58–59
mechanism of action, 51
neuropsychiatric effects, cognitive impairment and, 52
neurotoxicity, 52–53
pharmacokinetics in humans, 60
reinstatement of drug-seeking behavior and, 59–60
serotonin (5-HT) effects of, 54–56, 54f
serotonin (5-HT) syndrome, 58
short-term vs. long-term effects, 53f
structural formula, 50f
tryptophan hydroxylase inhibition by, 56–57
monoamine oxidase (MAO)
amphetamine and, 34
morphine. See opium, morphine, heroin
Mrs. Winslow’s Soothing Syrup, 4, 119, 120f
N
National Institute on Drug Abuse, effective treatment principles, 184
National Survey on Drug Use and Health (2003), 4
neurotransmission, biochemistry
adrenergic transmission, 15
historical overview, 15–16
norepinephrine (NE), 15–16
Nitrites
amyl nitrite, 170
mechanism of action, 170
non-medical use, 170
N-methyl-D-aspartate (NMDA) receptors, 29–31, 30f, 31f
norepinephrine (NE), 15–16. See also dopamine (DA)
biosynthesis of, 16–17, 17f
O
opium. See also morphine, heroin addiction to opiates, 117–118
affluent drug users, 4
antagonists, 130
central neurons effects, 126
CNS effects, 123–124
codine, 128
cognitive behavior-based treatment models, 132
common use of, 4
economics, Opium Wars, 3
endogenous morphine, 124–126
endorphin precursor molecules, 125–126
G-protein coupled receptors (GPCRs), 121, 122f, 126–127
heroin addiction, 127
heroin consumption effects, 127
heroin synthesis, 127
history, 2–4, 118–120
hypodermic needle invention, use, 3, 119
immunotherapy and, 131–132
mechanism of action, 4, 120–121, 121f
morphine antagonists, naloxone, 130, 130f
morphine naltrexone, 130–131, 130f
nineteenth century use, 4
opioid receptors, 121–122, 121f, 122f, 122f, 126
opioid receptor distribution, 122, 122f
opioid receptors, associated functional effects, 122, 123f
opioid tolerance, 129
μ-opioid receptors, 121–123, 122f, 126
oxycodone, 128
OxyContin, 128–129
treatment, 131–132
pain management and, 117, 132
pharmacokinetics, 129
physical dependence, withdrawal syndrome, 129–132
prescription drugs, 127–129
receptor subtypes interaction, 121f
seventeenth century opium, 3, 118, 120
Soldier’s Disease, 3, 119
structural formula, 118
sympathetic nervous system effects, 124
thebaine (paramorphine), 128
tolerance and withdrawal, 129
Vietnam War addicts and, 4
Winslow’s Soothing Syrup, 4, 119, 120f

Opium Wars, 3
outpatient treatment, 186
oxycodone, 128
OxyContin, 128–129

P
peyote. See mescaline
pharmacologic interventions, 186
phencyclidine (PCP), ketamine addiction, illicit use, 101–102
advantages, side effects, 96
clinical uses, 98, 100–101
CNS effects, 97, 98f
distribution, elimination, 102
duration of action, 102–103
effect on performance, 101–102
effects at different dosages, 97, 98f
glutamate hypothesis of schizophrenia and, 99–100, 99f
illicit use, 95–96
mechanism of action, 96
metabolism, 102
neuropharmacology, 97–98, 98f
NMDA receptor and, 96
open channel blockers, 96
peripheral nervous system effects, 97, 98f
pharmacokinetics, 102–103
routes of administration, 100
schizophrenic patient, PCP user, 100
structural formula, 97f
withdrawal, 101
phenylethanolamine-N-methyltransferase, 18
physical withdrawal syndrome, 9
pleasure-seeking effect, 8
positive reinforcement, defined, 9
psychological dependence, defined, 9
Pure Food and Drug Act, 4, 119

R
residential treatment, 185–186

S
salvia (salvia divinorum)
medicinal use, 177
routes of administration, 177
salvinorin A, effects, 177–178
salvinorin A, structural formula, 176f
traditional use, 176
serotonin (5-HT)
biosynthesis of, 22–23, 23f, 24f
blood vessels and, 55
CNS transmission and, 55
cocaine abuse and, 66
family of receptors, 54–55, 54f
gastrointestinal (GI) tract and, 55
metabolism of, 24
methylenedioxymethamphetamine (MDMA) and, 54–56, 54f, 58
nerve ending and, 55
platelet aggregation and, 55
receptors, transduction pathways effects, 25f
serotonergic neuron, schematic diagram, 24f
structures rich in, 54–55
Soldier’s Disease, 3, 119
spice drugs, synthetic cannabinoids. See also marijuana
CNS effect, 161–162
mechanism of action, 161

T
thebaine (paramorphine), 128
tolerance, defined, 9
treatment effectiveness, 187
treatment settings, 185
12-Step Facilitation Therapy, 187
tyrosine hydroxylase, 16–17, 17f

V
vin Mariani, 5
addicts, 4

W
Wren, Christopher
hypodermic needle, 3