Pharmacodynamics – Study Guide

Know the following terms and concepts:

Pharmacodynamics
Therapeutic effects
Side-effects
What is a “dirty” drug?
Acute Toxicity vs. Chronic Toxicity
Physiological Toxicity vs. Behavioral Toxicity
Important features of Dose Response Curve:
Different effects have different DRCs,
Minimal vs Maximal Effective Dose,
Potency vs Efficacy
ED50
LD50
Therapeutic Index
Therapeutic Window
Central Nervous System (CNS)
Peripheral Nervous System (PNS)
Know the basic functions of the following brain structures:

Hindbrain
Medulla
Cerebellum
Pons

Midbrain
Reticular Activating System
Substantia Nigra
Periaqueductal Grey

Forebrain
Thalamus
Hypothalamus
Hippocampus
Amygdala
Striatum

Cerebral Cortex

Divisions of the PNS: Somatic and Autonomic.
Functions of neurons vs. glial cells.
Parts of a neuron: dendrites, cell body, axon, myelin sheath, nodes of Ranvier.
Action Potential
Resting membrane potential
What causes the resting membrane potential?
Ionic concentrations inside and outside of neurons.
Forces that drive ions across membranes: diffusion, electrostatic pressure.
Be able to describe in writing the events comprising the action potential.
Voltage-gated ion channel.
How can psychoactive drugs affect the action potential?

Synaptic Transmission
Synaptic Cleft
Presynaptic Neuron (Membrane) vs Postsynaptic Neuron (Membrane)
Neurotransmitter
Neurotransmitter Vesicle
Be able to describe in writing the events comprising synaptic transmission.
Chemically-gated ion channel.
Excitatory Post Synaptic Potential (EPSP)
Inhibitory Post Synaptic Potential (IPSP)
Spatial Summation
Frequency Coding
Ionotropic Receptors vs Metabotropic Receptors
Autoreceptors
Receptor Upregulation vs Receptor Downregulation
Neurotransmitter synthesis
Precursors to Neurotransmitters
Know how psychoactive drugs can affect the following steps of synaptic transmission:
  Precursors
  NT synthesis
  NT storage
  NT release
  NT binding
  NT reuptake
  NT degradation
Receptor Agonists vs Receptor Antagonists
  Two types of receptor agonists.
  Know the basic characteristics/functions of the following neurotransmitter systems as discussed in class:
    Glutamate
    Acetylcholine
    GABA
    Dopamine
    Norepinephrine
    Serotonin
    Endorphin
    Acetylcholine esterase
    Monoamine oxidase
Effect of botulinum toxin and nerve gas.
Families of neurotransmitters.
  Amino Acids
  Monoamines
  Catecholamine
  Indolamine
  Peptides
Know the NT important for each of these brain areas:
  Substantia Nigra
  Ventral Tegmental Area
  Nucleus Accumbens
  Locus Ceoeruleus
  Raphe Nuclei
  Basal Forebrain
  Neuromuscular Junction
Muscarinic vs Nicotinic receptors