Gladson: Pharmacology for Rehabilitation Professionals, 2nd Edition

Chapter 02: Pharmacodynamics: Mechanism of Action

Test Bank

MULTIPLE CHOICE

1) Which of the following receptor types causes the formation of second messengers?

A. Ion channel linked receptors
B. G-protein linked receptors
C. Kinase linked receptors
D. DNA coupled receptors

ANS: B
Ion channel linked receptors directly regulate ion channel openings. Kinase linked receptors cause protein phosphorylation and DNA coupled receptors cause gene transcription, both leading to protein synthesis and cellular effects.

2) The correct sequence of the second messenger forming elements is _____.

A. drug, receptor, enzyme, G-protein, second messenger
B. drug, receptor, G-protein, enzyme, second messenger
C. drug, G-protein, receptor, enzyme, second messenger
D. drug, enzyme, receptor, G protein, second messenger

ANS: B
The drug stimulates the membrane receptor which in turn stimulates or inhibits the G-protein, which in turn stimulates or inhibits an enzyme which produces more or less second messengers. The second messenger causes then the observed cellular effects.

3) The fastest response after drug stimulation of a receptor is observed with _____.

A. ligand gated receptors
B. G-protein coupled receptors
C. kinase linked receptors
D. DNA coupled receptors

ANS: A
The response can be observed after milliseconds. The receptors listed below cause cellular effects after seconds and only after hours in the last two cases.

4) Agonists _____.

A. bind selectively to a receptor but do not change its conformation

B. can be divided into reversible and irreversible agonists
C. after chronic use can decrease the number of receptors
D. All of the above

ANS: C
They show affinity to the receptor, bind, change the receptor conformation and cause a response which can be an enhanced or decreased (e.g., increase or decrease in heart rate). They are divided into full and partial agonists; partial agonist, depending on the state of the physiological system, can act as an agonist or antagonist.

5) Antagonists _____.

A. block the receptor by changing its conformation into an unresponsive state
B. can always be displaced by an agonist
C. block endogenous compounds from stimulating the receptor
D. after chronic use can decrease the number of receptors

ANS: C
Antagonists do not change the conformation of the receptor but prevent endogenous compounds from binding and acting on the receptor. Competitive antagonists can be displaced by agonists (acting on the same site) while non-competitive antagonists cannot be (bind permanently or act on different sites). After chronic use some antagonists can increase the number of receptors (while chronic use of some agonists decreases the number of receptors).

6) If two drugs antagonize each other while acting on different receptor sites, then this antagonism is referred to as _____.

A. physiological antagonism
B. competitive antagonism
C. chemical antagonism
D. pharmacological antagonism

ANS: A
Physiological antagonism refers when two drugs cause opposite physiological responses (e.g., one drug increases and one drug decreases heart rate). Competitive antagonism refers to competition of two drugs on the same receptor (e.g., agonist and antagonist). Chemical antagonism refers to chemical binding or chemical inactivation of two drugs among each other (e.g., tetracycline binding to antacid). Pharmacological antagonism refers to a pharmacological interaction (e.g., an increased metabolism of a drug caused by another drug).

7) If the dose-response curve (increasing doses vs. physiological effects) of an agonist is plotted and then another curve is obtained when an antagonist has been added to the agonist, then the second curve is moved _____.

A. parallel to the left in case of a competitive antagonist
B. parallel to the right in case of a competitive antagonist
C. parallel to the left in case of a non-competitive antagonist
D. parallel to the right in case of a non-competitive antagonist

ANS: B
Competitive and non-competitive antagonists move the curves of agonists to the right. Competitive antagonists move the curve parallel and larger doses of the agonist can overcome the effects of the antagonist. Non-competitive antagonists move the curve non-parallel, the curve is shorter, and the actions of the agonist cannot be fully overcome.

8) Chemical groups or sites on the cell surface with which drugs combine to produce effects are _____.

A. antagonist
B. agonists
C. molecular targets (receptors)
D. placebos

ANS: C
Agonists, antagonists, and placebos are the molecules that would bind to a receptor.

9) With a dose-response curve, the Kd _____.

A. is the dose necessary to achieve Emax
B. is the dose at half the Emax
C. determines efficacy
D. is equivalent to the toxic index

ANS: B
Kd is used to determine the potency of a drug.