**MLT 2nd**

**Course Title: General Pharmacology I**

**Student Name: Abdul Hameed**

**Student ID: 16021**

**Note:**

**Attempt all questions**

**Each question carry equal marks**

**Pay attention to every point of question**

**Give to the point answers**

**Extra detail may leads to marks deduction**

1. What does drug interactions mean and enumerate its various types.

**Drug Interaction:**

The drugs interaction is the unwanted reaction of two or more drugs, or a drug and supplements, beverage and food etc. it may sometime or mostly causes harmful effects. These effects may be permanents or temporary. In some causes drug interaction is necessary for body and it create a substance which cover or control the disease completely. When a patient take a drug for certain disease or condition and it can be cause a drugs interaction.

**Example:**

If a patient having high blood pressure and he can take nasal decongestant, so may it can cause unwanted or unpleasant reaction.

**Types of drug interaction:**

There are different types of drug interaction:

1. Drug-drug interaction: It is the reaction of two or more drugs which is given in combination to control the disease without creating any harmful effect.
2. Drug-food interaction: It is the reaction of drug and food or beverage, food poising is the best example of that type. the food and drug create a bond which is non beneficial for the body.
3. Drug-condition interaction: A reaction occurs when taking a drug while having certain condition. For example the use of drug during high blood pressure.

Mostly there are two types of drug interaction in ordinary condition.

1. Pharmacokinetics drugs Interaction.
2. Pharmacodynamics drugs Interaction.
3. Write down a detail note on pharmacodynamic drug interaction.

**Pharmacodynamic drug interaction:**

Pharmacodynamics is the term which is the combination of two words “pharma” which means related to drugs and “dynamics” means in motion or in the site where the specific drugs creates its effect. So the pharmacodynamic describes the relationship between the drug concentration at its site of action, typically a receptor or the site which required the drug it may be sensory organ, and the corresponding effect of a drug. Administration of a combination of drugs may result in an alteration of this dose–response relationship.

 Pharmacodynamics is ‘what the drug does to the body’. These interactions occur between drugs with additive or opposing effects. The brain is the organ most commonly compromised by pharmacodynamic interactions and it send signal to the specific point.

 Pharmacodynamic drug interaction is actually desired because the dynamic or motion of the drug is necessary to reach the point where it is needed.

There are two types of pharmacodynamic interaction.

* Direct pharmacodynamic interaction
* Indirect pharmacodynamic interaction
* **Direct pharmacodynamic interaction:**

Direct pharmacodynamic interaction is that in which a drugs having similar or opposing pharmacological effects are used concurrently or similar motion. There are three consequences of direct interaction

* Antagonistism.
* Addition or summation.
* Synergism or potentiation.
* **Antagonistism:**

When the interacting drug having different or against each other this phenomenon is known as antagonism. The interacting drug have opposing action.

* **Addition or summation:**

The interacting drug have similar action and resultant effect is the some of individual drug responses. Each one add or increase the effect of other. These work in pair form.

* **Synergism or potentiation:**

It is an enhancement of action of one drug by another.

* **Indirect pharmacodynamic interaction:**

In which both the object and the precipitant drugs have unrelated effects. But the latter in same way alerts the effects but latter in some way alerts the effects of the former.

1.
2. Differentiate between hypoglycemic and hyperglycemic agents with examples.

**Hypoglycemic agents:**

 Hypoglycemics are that agents which reduce the blood glucose level in diabetic patients and also give to any other persons for the reduction of blood glucose level.

**Examples:**

* Biguanides : Metformin
* Sulfonylureas: glimepiride, gluburide, tolbutamide, glibencalmide, glipizide.
* Meglitinides : nateginide, repaglinide
* Thiazolidinediones: pioglitazone, rosiglitazone
* Alpha-glucosidase inhibitors: acarbose, miglitol.

**Hyperglycemic agents:**

Any drugs that increases the level of glucose in the blood

**Examples:**

* D50W
* Glucagon
1. What is emesis and antiemetic drugs, give examples

**Emesis Drugs:**

An agent use for cause vomiting, it is usually use in emergency situation such as after ingestion of toxins they may act directly on the gastrointestinal tract, bring about emesis through local irritant effects,

**Example:**

Apomorphine

**Antiemetic Drugs:**

The drugs which is used for the treatment of vomiting and nausea is known as antiemetic drugs. It is normally used to treat motion sickness and the side effects of opioid analogesics,

**Example:**

* Dimenhydrinate
* Diphenhdramine
* Meclizine
* Promethazine
1. What kind of drugs are used for cough and sputum, give examples

**Drugs for cough and sputum:**

 Guaifenesin is one of the drug which is belong to a class of drugs known as expectorants. It is use for the treatment of cough, works by thinning and loosening mucus which block the air path so it thin and remove mucus from the airways, clearing congestion, and making breathing easier. Dextromethorphan belongs to a class of drugs known as cough suppressants. It acts on a part of the brain (cough center) to reduce the urge to cough

**Example:**

Codeine, pholcodeine, noscapine, dextromethorphan

Q3.

1. Enumerate different targets for antibiotics

**Targets of antibiotics:**

* Topoisomerase II (DNA gyrase). Topoisomerase
* Tetrahydrofolic acid synthesis inhibitors
* DNA-dependent RNA polymerase
* Penicillin-binding proteins
* Peptidoglycan units
* Cell membrane
* 30S ribosome
* 50S ribosome
1. Explain viral replication process in detail

**Viral Replication:**

 Viral replication is a very complicated process, because viruses never reproduce by division, they are replicated by a process in which all components of virus are produced separately and are assembled into intact virus. For replication of virus host in necessary, host may be a bacteria, plant or an animal, viral replication are done that following six stages

* **Attachment :**

Viral proteins on the capsid or phospholipid envelope interact with specific receptors on the host cellular surface. This specificity determines the host range (tropism) of a virus.

* **Penetration:**

  The process of attachment to a specific receptor can induce conformational changes in viral capsid proteins, or the lipid envelope, that results in the fusion of viral and cellular membranes. Some DNA viruses can also enter the host cell through receptor-mediated endocytosis.

* **Uncoating:**

   The viral capsid is removed and degraded by viral enzymes or host enzymes releasing the viral genomic nucleic acid.

**Replication:**

After the viral genome has been uncoated, transcription or translation of the viral genome is initiated. It is this stage of viral replication that differs greatly between DNA and RNA viruses and viruses with opposite nucleic acid polarity. This process culminates in the de novo synthesis of viral proteins and genome.

**Assembly:**

After de novo synthesis of viral genome and proteins, which can be post-transcriptionally modified, viral proteins are packaged with newly replicated viral genome into new virions that are ready for release from the host cell. This process can also be referred to as maturation.

**Virion release:**

There are two methods of viral release: lysis or budding. Lysis results in the death of an infected host cell, these types of viruses are referred to as cytolytic. An example is variola major also known as smallpox. Enveloped viruses, such as influenza A virus, are typically released from the host cell by budding. It is this process that results in the acquisition of the viral phospholipid envelope. These types of virus do not usually kill the infected cell and are termed cytopathic viruses.

After version release some viral proteins remain within the host’s cell membrane, which acts as potential targets for circulating antibodies. Residual viral proteins that remain within the cytoplasm of the host cell can be processed and presented at the cell surface on MHC class-I molecules, where they are recognized by T cells.

Q4.

1. Classify antihypertensive drugs with example

**Classify antihypertensive drugs:**

 Blood pressure are also known as antihypertensives. There are many classes of antihypertensive drugs:

* Diuretics.
* Vasodilators.
* Beta-blockers.
* Peripheral adrenergic inhibitors.
* ACE inhibitors.
* Central agonists.
* Angiotensin II receptor blockers.
* Combined alpha and beta-blockers.
* Calcium channel blockers.
* Alpha-2 Receptor agonists.
* Alpha blockers.
1. What are the causes and drug therapy of various kinds of angina pectoris

Angina pectoris is the medical term for chest pain or discomfort due to coronary heart disease. There are 4 types.

**1. Angina pectoris:-**

 It occurs when the heart muscle does not get as much blood as it needs. This usually happens because one or more of the heart’s arteries is narrowed or blocked, also ischemia.

**Drug therapy for angina pectoris**:-

 The vasodilator drugs used as anti-anginal agents are of two:

* Those which act rapidly to relieve paroxysmal attacks of angina pectoris.
* Drugs with a slower onset and longer duration of action which are intended to prevent attacks of acute pain.

**2. Unstable angina**:-

 Coronary artery disease due to atherosclerosis is the most common cause of unstable angina. Atherosclerosis is the buildup of fatty material called plaque, along the walls of the arteries.

**Medication:**

1. One of the first treatments your doctor may recommend is a blood thinner, such as aspirin, heparin, or clopidogrel.

2. Surgery. If you have a blockage or severe narrowing in an artery, your doctor may recommend more invasive procedures.

3. Lifestyle changes.

Variant (prinzmetal) angina:-

 The pain from variant angina is caused by a spasm in the coronary arteries which supply blood to the heart muscle.

Q5.

1. Differentiate between general and local anesthetics, explain various stages of general anesthesia

**General Anesthesia:**

 The anesthesia is necessary during operation at earlier time when there is no concept of anesthesia so the drugs which create hallucination affect was forbidden and there was no medical use of them. During mid-1800s, surgeries was producing pain because patient was not given the drug which cause sedative affect, dental procedures typically were undertaken without the aid of effective anesthetic agents. Chemical methods available at the time included intoxication with ethanol, hashish , or opium, whereas physical methods included packing a limb in ice, creating ischemic conditions with tourniquets, inducing unconsciousness by a blow to the head, or the most common technique, employing strong-armed assistants to hold down the helpless patient during the entire painful surgical procedure. Additionally, at this time, many practicing physicians had been erroneously taught that pain was a requirement for effective healing.

 **Stages of general anesthesia:**

* Analgesia
* Delirium
* Surgical Anesthesia
* Respiratory Paralysis

**Local anesthesia:**

 Local anesthetic agents are drugs that, it is used for the specific areas of the body, when given either topically or administered directly into a localized area, produce a state of local anesthesia by reversibly blocking nerve conductances that transmit the sensations of pain from this localized area to the brain. Unlike the anesthesia produced by general anesthetics, the anesthesia produced by local anesthetics is without loss of consciousness or impairment of vital central cardiorespiratory functions. Local anesthetics block nerve conductance by binding to selective sites on the Na+ channels in the excitable membranes, thereby reducing Na+ passage (i.e., conductance) through the pores and, thus, interfere with the generation of action potentials. Although local anesthetics decrease the excitability of nerve membranes, they do not affect the neuron’s resting potential. Local anesthetics, as compare to analgesic compounds, do not interact with the pain receptors or inhibit the release or the biosynthesis of pain mediators and reduce the pain during surgeries and to create a comfortable condition during that moment.

1. Write down the mechanism of action of narcotic and non-narcotic analgesics

 **Narcotics Analgesic:**

 Opioid drugs, typified by morphine, produce their pharmacological actions, including analgesia, by acting on receptors located on neuronal cell membranes. The presynaptic action of opioid to inhibit neurotransmitter release is considered to be their major effect in the nervous system.

**Non-Narcotic Analgesics:-**

 Non-opioid analgesic can be classified due to their chemical characteristics as acid (NSAIDs = non-steroidal anti-inflammatory drugs such as ASA, ibuprofen, diclofenac, naproxen) and non-acid (paracetamol, metamizole).

The common mechanism of action of these substances is their effect on prostaglandins synthesis.