

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI

Pharmacology-II (PHA F341)

Comprehensive Examination (CLOSED BOOK)

Date: 07/12/2016

Duration: 80 Minutes

Weightage: 20%

Instructions: Write correct and precise answers (No Spelling Mistakes). Writing YES/No, is not sufficient to get marks, you have to justify the YES/NO. Marks will only be given to correct and well explained answer and not to partial answers.

1. A 50 year old male patient recently had a myocardial infarction and is also suffering from colorectal cancer. Doctor prescribed him to take Warfarin. Along with this, patient has to take a chemotherapy for cancer, hence his doctor prescribed Aprepitant during the chemotherapy. In this case, patient is simultaneously taking Warfarin and Aprepitant. Explain, whether prescribing warfarin along with Aprepitant is a right choice?. If YES/No, explain your answer with correct justification. Why Warfarin was prescribed? Aprepitant belongs to which class of drug and explain its mechanism of action. [1+1+1=3M]
2. A 58 year old patient was diagnosed with a colon tumor, doctor prescribed him to undergo Colectomy. After the Colectomy, patient was complaining about the constipation, hence doctor prescribed him to take Lactulose. Explain, whether lactulose is the correct medication, If, YES/No, explain your answer with correct justification.? Explain the mechanism of action of Lactulose? [1+2=3M]
3. A female pregnant patient is suffering from familial hypercholesterolemia, to her, doctor prescribed Atorvastatin. Explain, whether prescribing Atorvastatin to her is a right choice?. If YES/No, explain your answer with correct justification. Explain two **important side effects** of HMG CoA reductase inhibitors. [2+2=4M]
4. Type 2 diabetes is considered to be a life style disorder. In this context:
 - a. Explain the concept of "Pre-Diabetic Stage" with respect to Insulin Sensitivity. [1.5M]
 - b. Explain the progress of a person from a pre-diabetic stage to a chronic type 2 diabetic patient with the help of Insulin and glucose levels. [3M]
 - c. Explain in detail how the glucose causes the release of Insulin from β cells and mechanism of action of sulfonylurea? [2+1.5= 3.5M]
5. Explain the mechanism of action of Zileuton and Zafirlukast [1+1=2M]

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Answer Key

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1. **No**, it is not a right choice. Aprepitant induces this **enzyme CYP3A4** and, thus, affect responses to other agents; for example, concomitant use with warfarin can **shorten the half-life of the anticoagulant**. 1M

Aprepitant belongs to a **new family of antiemetic agents**. It targets the **neurokinin receptor** in the brain and blocks the actions of the natural substance. 1M

Warfarin is used **prophylactically**, it is used in patients with acute myocardial infarction to prevent the **recurrence of acute deep-vein thrombosis or pulmonary embolism**. 1M

2. **Yes**, lactulose is the correct choice. **Lactulose is a semisynthetic disaccharide sugar** that also acts as an osmotic laxative. 1M

It is a product that cannot be hydrolyzed by intestinal enzymes. Oral doses are degraded in the colon by **colonic bacteria into lactic, formic, and acetic acids**. This **increases osmotic pressure**, thereby **accumulating fluid, distending the colon, creating a soft stool, and causing defecation**. 2M

3. **No**, it is not a right choice. because Atorvastatin **contraindicated in pregnancy and** patients who are homozygous for familial hypercholesterolemia **lack LDL receptors** and, therefore, benefit much less from treatment with these drugs. 2M

Side effects: Liver failure and myopathy 2M

4. **a. Insulin Sensitivity:** Ability of Insulin to lower circulating glucose concentrations 1.5M

Adipose tissue, Skeletal Muscle and Liver increase glucose uptake and decreased glucose production.

4.**b** Three conditions high glucose and High insulin Levels, High glucose and normal insulin levels and High glucose and below normal Insulin levels. 3M

4.**C**. Increased blood glucose level--- Glucose is taken by B-cells---- Glucose is phosphorylated which acts as glucose sensor---- Products of glucose metabolism enters mitochondria- generation of ATP--- The rise in ATP causes block of K⁺ channels leading to depolarization & Ca⁺⁺ influx--- Exocytosis & release of Insulin 2M

- **Mechanism of action:** Stimulation of insulin release from β cells of the pancreas by **blocking the ATP sensitive K⁺ channels**, resulting in depolarization and Ca⁺⁺ influx and Reduction of serum glucagon levels 1.5M

5. Zileuton is a selective and **specific inhibitor of 5-lipoxygenase**, preventing the formation of both **LTB₄ and the cysteinyl leukotrienes**. 1M

Zafirlukast is selective, **reversible inhibitors of the cysteinyl leukotriene-1 receptor**, thereby blocking the effects of cysteinyl leukotrienes. 1M