Please note – this learning resource has been produced by the GUMS Academic Team. It is possible that there are some minor errors in the questions/answers, and other possible answers that are not included below. Make sure to check with other resources.

**SCENARIO 1**

**Max, a 16-year old with a severe allergy to peanuts is dared by a friend to administer his Epipen (IM adrenaline) when he is not having an anaphylactic attack.**

**1. Describe the various receptors adrenaline works on and contrast them to the cholinergic receptors.**

**2. What are the major drugs that mimic the receptors mentioned previously, specifically what agonists and antagonists can you think of?**

**2. Max began to exhibit telltale sympathetic signs. Compare and contrast the SNS and PNS systemic effects.**

**3. Why is adrenaline routinely given by IM injection instead of orally or IV?**

**4. Explain the concept of bioavailability in regards to oral vs IM vs IV administration**

**5. Describe what agonists and competitive and non-competitive antagonists are**

**SCENARIO 2**

**Mr. Roy has familial hypercholesterolemia and has been taking simvastatin, a HMG-CoA reductase inhibitor (statin), to lower his risk of CVS disease for the last 6 years. Today Mr Roy presents to his GP with coughing, fever and chest pain. The GP suspects a chest infection and prescribes clarithromycin (a macrolide antibiotic). Simvastatin is broken down via CYP450 system and clarithromycin is an inhibitor of the CYP450 pathway.**

**1. What concerns would you have by using these two medications together?**

**2. Explain (in brief terms) clearance (high and low hepatic and renal) by the liver and how this relates to this scenario.**

**3. Explain (in brief terms) the cytochrome P450 system**

**4. List 2 options for appropriate management of Mr Roy’s condition**

**SCENARIO 3:**

**Paramedics are called to a local park by a jogger who noticed a young female slumped over a bench. The paramedics find a driver's license and identify the female as Mrs Sims. She has fresh IV track marks on her arm and labored and shallow breathing at a rate of 4 breaths per minute. Mrs Sims is unresponsive to her name, and her eyes are dilated.**

**1. What is heroin?**

**2. What are the major effects of opiates?**

**3. What are some signs and symptoms of Heroin/ opioid overdose and explain why respiratory depression occurs?**

**4. What is a likely diagnosis for Mrs. Sims signs**

**The paramedics decide to administer Naloxone based on Mrs. Sims signs and symptoms**

**5. What is naloxone and how does it work? Is a single dose sufficient?**

**The paramedics decide to transport Mrs. Sims to hospital for observation and continued naloxone therapy. Whilst in hospital Mrs. Sims expresses her desire to get clean. She is referred to the ATODS (Alcohol, tabacco and other drugs service) and it is decided that as Mrs. Sims mainly uses heroin, methadone is to be initiated.**

**6. What is Methadone?**

**7. Why would this help Mrs. Sims with her addiction to heroin (also explain half-life and its relevance)**

**8. Explain the clinical definitions of tolerance, dependence and withdrawal and relate them to Mrs. Sims situation**

**ADDITIONAL QUESTIONS**

**Describe the mechanisms that remove or destroy the neurotransmitter after its release, giving examples of the various mechanisms.**

**Explain how drugs exert their effects through receptors for endogenous ligands, using heroin and naloxone as examples**

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[**https://forms.gle/Jm1kWoZ73gAV9a6V9**](https://forms.gle/Jm1kWoZ73gAV9a6V9)