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**DEPARTMENT: NURSING SCIENCE**

**COURSE CODE: PHA 324**

ASSIGNMENT

**QUESTIONS**

CLASSIFY THE ANTIMALARIAL AGENTS AND STATE THE MECHANISM OF ACTION OF EACH CLASS OF DRUG LISTED

**ANSWERS**

**1. Quinine**

**2. Chloroquine**

**3.Amodiaquine**

**4. Pyrimethamine**

**5. Proguanil**

**6. Sulfonamides**

**7. Mefloquine**

**8.Atovaquone**

**9. Primaquine**

**10. Artemisinin**

**11. Halofantrine**

**12. Doxycycline**

**13. Clindamycin**

***MECHANISM OF ACTION OF THE CLASSES OF DRUGS LISTED ABOVE***

* **QUININE: The mechanism of action is interference with the parasite's ability to digest haemoglobin. Quinine and quinidine also inhibit the spontaneous formation of beta-haematin (haemozoin or malaria pigment) which is a toxic product of the digestion of haemoglobin by parasites.**
* **CHLOROQUINE: The major action of chloroquine is to inhibit the formation of hemozoin (Hz) from the heme released by the digestion of haemoglobin (Hb). The free heme then lyses membranes and leads to parasite death. Chloroquine resistance is due to a decreased accumulation of chloroquine in the food vacuole.**
* **AMODIAQUINE: The mechanism of plasmodicidal action of amodiaquine is not completely certain. Like other quinoline derivatives, it is thought to inhibit heme polymerase activity. This results in accumulation of free heme, which is toxic to the parasites.**
* **PYRIMETHAMINE: Pyrimethamine interferes with the regeneration of tetrahydrofolic acid from dihydrofolate by competitively inhibiting the enzyme dihydrofolate reductase. Tetrahydrofolic acid is essential for DNA and RNA synthesis in many species, including protozoa.**
* **PROGUANIL: Proguanil is a prophylactic antimalarial drug, which works by stopping the malaria parasite, Plasmodium falciparum and Plasmodium vivax, from reproducing once it is in the red blood cells. It does this by inhibiting the enzyme, dihydrofolate reductase, which is involved in the reproduction of the parasite.**
* **SULFONAMIDES: Sulfonamides. Mode of action: Inhibition of other metabolic processes. Sulfonamides interfere with folic acid synthesis by preventing addition of para-aminobenzoic acid (PABA) into the folic acid molecule through competing for the enzyme dihydropteroate synthetase.**
* **MEFLOQUINE: Mefloquine is an antimalarial agent which acts as a blood schizonticide. Its exact mechanism of action is not known. Activity In Vitro and In Vivo: Mefloquine is active against the erythrocytic stages of Plasmodium species.**
* **ATOVAQUONE: Atovaquone selectively inhibits the malarial cytochrome bc1 complex in the parasitic electron transport chain, collapsing the mitochondrial membrane potential.**
* **PRIMAQUINE: Primaquine’s mechanism of action is not well understood. It may be acting by generating reactive oxygen species or by interfering with the electron transport in the parasite. Also, although its mechanism of action is unclear, primaquine may bind to and alter the properties of protozoal DNA.**
* **ARTEMISININ: Artemisinin is first activated by intraparasitic heme-iron which catalyzes the cleavage of this endoperoxide. A resulting free radical intermediate may then kill the parasite by alkylating and poisoning one or more essential malarial protein(s).**
* **HALOFANTRINE: The mechanism of action of Halofantrine may be similar to that of chloroquine, quinine, and mefloquine; by forming toxic complexes with ferritoporphyrin IX that damage the membrane of the parasite.**
* **DOXYCYCLINE: Doxycycline inhibits bacterial protein synthesis by binding to the 30S ribosomal subunit. Doxycycline has bacteriostatic activity against a broad range of Gram-positive and Gram-negative bacteria.**
* **CLINDAMYCIN: Clindamycin has a primarily bacteriostatic effect. At higher concentrations, it may be bactericidal. It is a bacterial protein synthesis inhibitor by inhibiting ribosomal translocation, in a similar way to macrolides.**