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PHA 324 ASSIGNMENT

CLASSIFICATION OF ANTI-MALARIAL DRUGS AND THEIR MECHANISM OF ACTION.

1. 4-Aminoquinolines

- Chloroquine
- Amodiaquine
- Hydroxychloroquine

Mechanism of action

Inhibits hemozoin formation is not known, but chloroquine can bind heme and this binding may prevent the heme from being incorporated into the hemozoin crystal.

2. 8-Aminoquinolines

- Primaquine
- Pamaquine
- Pentaquine

Mechanism of action

The mode of action of primaquine, an 8-aminoquinoline, is not understood but two potential mechanisms have been described. The 8-aminoquinolines inhibit the function of DNA in a way distinct from that associated with the 4-aminoquinolines.

Primaquine appears also to act via a quinoline-quinone metabolite to inhibit the function of ubiquinone or coenzyme Q, blocking cellular energy production.

3. 4-Quinoline methanols

- Quinine
- Quinidine
- Mefloquine

Mechanism of action

They interfere with hemoglobin digestion in the blood stages of the malaria parasite's life cycle.

4. Phenanthrene methanol

- Halofantrine

Mechanism of action

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.

5. Artemisinin derivatives

- Artemisinin
- Artemeter
- Artesunate
- Arteether

Mechanism of action

Artemisinin itself is a prodrug of the biologically active dihydroartemisinin. This metabolite undergoes cleavage of its endoperoxide ring inside the erythrocytes. As the drug molecules come in contact with the haem (associated with the haemoglobin of the red blood cells), the iron(II) oxide breaks the endoperoxide ring. This process produces free radicals that in turn damage susceptible proteins, resulting in the death of the parasite.

6. Antimetabolites

- Proguanil
- Pyrimethamine
- Atovaquone
- Dapsone

Mechanism of action

Antimetabolites interfere with the synthesis of the DNA constituents

Proguanil and Pyrimethamine inhibits plasmodium dihydrofolate reductase

7. Antibiotics

- Tetracycline
- Doxycycline

- Minocycline

Mechanism of action

Inhibit the synthesis of cell proteins through binding to the 50S or 30S subunit of the ribosomal unit preventing binding of tRNA to the mRNA-ribosome complex

8. Diaminopyridines

- Pyrimethamine

Mechanism of action

Pyrimethamine inhibits the dihydrofolate reductase of plasmodia and thereby blocks the biosynthesis of purines and pyrimidines, which are essential for DNA synthesis and cell multiplication. This leads to failure of nuclear division at the time of schizont formation in erythrocytes and liver.