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ASSIGNMENT

A drug used in the treatment of urinary tract infection causes brown colouration of urine. Explain in full detail the pharmacology of the drug under the following headings:

1. Name of drug
2. Antibacterial activity
3. Mechanism of action
4. Pharmacokinetics
5. Adverse effect

ANSWERS

1. Name of drug: Nitrofurantoin
2. Antibacterial activity: The antibacterial activity is higher in an acidic urine. Sensitive bacteria reduce the drug to an active agent inhibits various enzymes and damages DNA. Nitrofurantoin is bacteriostatic for most susceptible micro-organisms at concentration of 32ug/ml or less and is bactericidal at cocentrations of 100ug/ml and more. It has a narrow antibacterial spectrum, frequent bacterial resistance and toxicity. It is active against many strains of Escherichia coli and enterococci. However, most species of proteus and pseudompnas and many species of Enterobacter and Klebsiella are resistant.
3. Mechanism of action: nitrofurantoin damages DNA since its reduced form is highly reactive. It is rapidly reduced in bacterial cells by flavoproteins (nitrofuran reductase) to multiple reactive intermediates that attack ribosomal proteins, DNA, respiration, pyruvate metabolism and other micromolecules within the bacterial cell, thereby inhibiting protein synthesis.
4. Pharmacokinetics: It is absorbed rapidly and completely from the gastrointestinal tract. Antibacterial concentrations are not achieved in plasma following ingestion of recommended doses because the drug is rapidly eliminated. It also colours the urine brown. It is not used for pregnant women, individuals with impaired renal function, children younger than one month of age. It is not recommended for the treatment of pyelonephritis or prostatis.
5. Adverse effect: It can give gastrointestinal disturbances which include nausea, vomiting and diarrhea. Another effect is Acute pneumonitis. It can also give neurological problems like headache, nystagmus and polyneuropathies and demyelination may occur. Another side effect can also be hemolytic anemia.