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ASSIGNMENT

QUESTIONS;

* A drug used in the treatment of urinary tract infection causes brown coloration of urine. Explain in full detail the pharmacology of the drug under the following headings:
1. Name of the drug
2. Antibacterial activity
3. Mechanism of action
4. Pharmacokinetics
5. Adverse effect

ANSWERS;

1. Nitrofurantoin
2. Nitrofurantoin is bacteriostatic for most susceptible micro-organisms at concentration of 32ug/ml or less and bacteriocidal at concentration of 100ug/ml and more. It’s antibacterial activity is higher in an acidic urine.
3. Mechanism of action: The drug works by damaging bacterial DNA, since its reduced form is highly reactive. This is made possible by the rapid reduction of nitrofurantoin inside the bacterial cell by flavoproteins (nitrofuran reductase) to multiple reactive intermediates that attack ribosomal proteins, DNA, respiration, pyruvate metabolism and other macromolecules within the cell thereby inhibiting protein synthesis. Nitrofurantoin exerts greater effects on bacterial cells than mammalian cells because bacterial cells activate the drug more rapidly.
4. Pharmacokinetics: it is rapidly and completely absorbed from the gastrointestinal tract. It’s bioavailaility is 80%, with roughly 25% of nitrofurantoin excreted unchanged in the urine. The plasma concentration is undetectable, with peak level of 1ug/ml. This is because of a very rapid renal elimination glomerular filtration (20%) and tubular secretion resulting in a plasma half-life of only 20 minutes. Nitrofurantoin colors the urine brown. It is not use for pregnant women, patients with impaired renal function and children less than one month of age. It is also not recommended for treatment of pyelonephritis or prostatis.
5. Adverse effect:
* Gastrointestinal disturbance such as nausea, vomiting, and diarrhea.
* Acute pulmonary hypersensitivity reaction (pneumonitis).
* Neurological problems such as headache, drowsiness, dizziness, nystagmus, polyneuropathies, an demyelination.
* Hemolytic anemia.