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**Matric Number: 17/MHS03/007**

**Course Name: System Pharmacology**

**Course Code: PHA 306**

**Assignment Title: Drugs Used In Urinary System Disorders**

1. **Name of drug**: Nitrofurantoin
2. **Antibacterial Activity**: **Nitrofurantoin** is effective against many gram-positive and gram-negative organisms. **Nitrofurantoin** is **bactericidal** against most common urinary tract pathogens, including Escherichia coli, Enterococci, Klebsiella, Staphylococcus saprophyticus, and Enterobacter. Its spectrum of susceptibility also includes *Shigella*, *Salmonella*, *Citrobacter*, *Neisseria*, *Bacteroides*, group B streptococcus, *Staphylococcus aureus*, and *Staphylococcus epidermidis*.
3. **Mechanism of Action**: Nitrofurantoin’s mechanism action remains poorly understood since its discovery in the 1940’s. Nitrofurantoin uses several mechanisms to achieve an antimicrobial effect. Nitrofurantoin is taken up by bacterial intracellular nitroreductases to produce the active form of the drug via reduction of the nitro group. Intermediate metabolites that result from this reduction then bind to bacterial ribosomes and inhibit bacterial enzymes involved in the synthesis of DNA, RNA, cell wall protein synthesis, and other metabolic enzymes.
4. **Pharmacokinetics**: Nitrofurantoin is well absorbed in the gastrointestinal tract with most absorption occurring in the proximal small bowel. Studies have shown that therapeutic urinary concentrations of the drug are increased if nitrofurantoin is taken with food.
5. **Adverse Effects**: Nitrofurantoin is a relatively safe drug compared to alternatives.
* The most common reported side effects include nausea, vomiting, loss of appetite, and diarrhea which usually develops within the first week of therapy.
* The most well known severe reaction is pulmonary toxicity.
* Other rare adverse effects include hepatic reactions such as cholestatic jaundice, hepatitis, and hepatic necrosis.
* Peripheral neuropathy is another known rare adverse effect, and is mostly associated with prolonged use in patients with poor renal function.