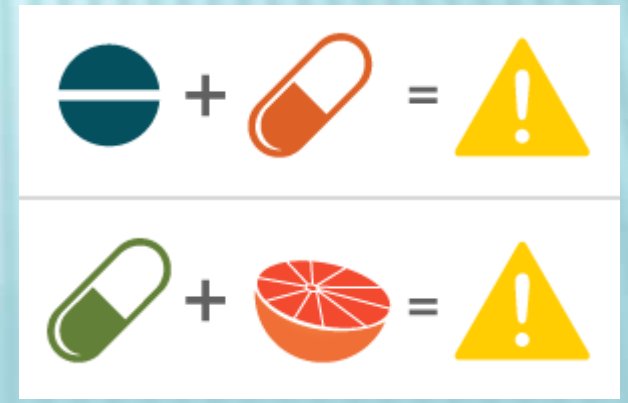
DRUG INTERACTIONS

DEFINITION

It may be defined as an alteration in the effect of drug by prior administration or concurrent administration of another drug. It includes interactions with food and interactions due to diseased state.



TYPES OF DRUG INTERACTIONS

- Pharmacokinetic
- Pharmacodynamic

PHARMACOKINETIC DRUG INTERACTIONS

When one drug alters or affects the absorption, distribution, metabolism or excretion of another drug with resultant change in plasma concentration of another drug, it is called pharmacokinetic drug interaction.

PHARMACOKINETIC DRUG INTERACTIONS

ALTERATIONS IN GIT ABSORPTION

- Alteration in pH e.g. antacid + acidic drug inhibits absorption
- Complexation/Chelation e.g. Tetracyclines + metal ions
- Inhibition of GI enzymes e.g. Phenytoin and oral contraceptives cause folic acid deficiency
- Change in GI motility e.g. Metoclopramide stimulates motility of GIT and reduces absorption of digoxin

DISTRIBUTION ALTERATION

- Displacement from receptor binding sites.
- Examples Tolbutamide + Salicylate, phenylbutazone → Hypoglycaemia
- Warfarin + Salicylate, clofibrate → Haemorrhage

METABOLISM ALTERATION

- Enzyme induction

Drug	Inducing agent	Result
Warfarin	Barbiturate, glutethimide	Decreased anti-coagulant effect
Tolbutamide	Alcohol, Rifampicin	Decreased hypoglycaemia

- Inhibition of enzyme

Drug	Inhibiting agent	Result
Warfarin	Allopurinol, nortriptyline	Haemorrhage
Benzodiazepines	Cimetidine	Increased sedative effect

EXCRETION ALTERATION

- Increase in renal excretion due to change in urinary pH e.g. Antacid like sodium bicarbonate and acidic drug like salicylates or barbiturates
- Interference with urinary excretion e.g. Probenecid and penicillin for tubular transport.

PHARMACODYNAMIC DRUG INTERACTIONS

- Drugs having opposite pharmacological actions e.g. Thiazides + tolbutamide ⟶ hypoglycaemic action of tolbutamide counteracted
- Drugs having similar pharmacological actions e.g. Alcohol + barbiturates ⟶ Increased sedative effect
- Alteration of electrolyte effect e.g. Digitalis + Thiazides ⟶ Digitalis toxicity
- Drug interaction at receptor site:
  - Drugs acting on same receptor e.g. morphine and nalorphine
  - Drugs acting on different receptor of same target organ e g. Adrenaline (activates adenylcyclase) and theopylline (inhibits phosphodiesterase) causes relaxation of bronchial muscles

DRUG-FOOD INTERACTIONS

FOOD AFFECTS THE ABSORPTION OF DRUGS; THIS MAY BE ATTRIBUTED TO DILUTION OF DRUGS, COMPLEXATION WITH DRUGS AND ALTERATION IN GASTRIC EMPTYING TIME.

EFFECT ON FOODS ON DRUGS:

- Reduction in absorption with food e.g. Aspirin, isoniazid, ampicillin, levodopa
- Increase in absorption e.g. nitrofurantoin, lithium citrate, propranolol, carbamazepine
- Unchanged absorption e.g. nitrazepam, glibenclamide, metronidazole
- Monoamine oxidase inhibitors with cheese, chocolate, yeast extract, liver, alcoholic beverages cause severe hypertension


Thank You