Purposes of drug administration

- cure of diseases
  - specific infections eg antibiotics
  - chemotherapy in cancer or leukaemia

- alleviate symptoms eg diuretics to reduce oedema, antipyrine to reduce fever

- replace deficiencies: restoration of normal function by the replacement of an endogenous deficiency eg insulin, L-dopa
Route of administration
Bioavailability

- Can be estimated
- Ratio of AUC of other route compared to AUC_{IV}
- Bioavailability = \frac{\text{AUC}_{\text{oral}}}{\text{AUC}_{IV}}
First pass effect

Blood from the gut passes through the portal system to the liver.
If the metabolic or excretory capacity of the liver for the drug is large, bioavailability will be substantially reduced (the so-called first-pass effect).

Other anatomical, physiological, and pathological factors can influence bioavailability, and the choice of the route of drug administration must be based on an understanding of these conditions.
Drug Absorption
Incomplete absorption following oral drug administration is common:

For example -- only 70% of a digoxin dose reaches systemic circulation. Factors:

- poor GI tract absorption
- digoxin (Lanoxin, Lanoxicaps) --- metabolism by gastrointestinal flora
- Very hydrophilic drugs - not be well absorbed -- cannot cross cell membrane lipid component
- Excessively lipid-soluble (hydrophobic) drugs may not be soluble enough to cross hydrophilic of the cell membrane.
Plasma protein binding

- mostly to plasma albumin for acidic drugs
- basic drugs to $\alpha_1$-acid glycoprotein and lipoprotein for
- Many endogenous substances, steroids, vitamins, and metal ions are bound to globulins
- binding to other plasma proteins generally occurs to a much smaller extent
Factors affecting drug-plasma protein binding

- Number of drug binding sites on the protein
- Protein concentration
- Lipid solubility
- Weak acids are bound more extensively than weak bases
- Competing molecules
- Disease