475 **ROUTES OF DRUG ADMINISTRATION**

To be effective in altering behavior/how the body works, the drug molecules must first **get into the body**; and once inside the body, must then **get to the specific receptor sites**/drug target receptors (site of action).

**General factors to consider:**
- Chemical properties of the drug (e.g. pH, fat/H2O soluble)
- Proper medium to carry drug (esp. oil vs. H2O)
- Desired latency of drug onset
- Desired duration of drug effects
- User variables: age, sex, race, weight (esp. fat tissue vs. muscle)
- Specific medical conditions of user (e.g. conscious vs. unconscious, factors related to GI tract, liver, kidney; can S swallow?)
- Other: cost, pain, ease of delivery

**Drug forms & preparations:**
- **Solids** – tablets, crystals, powders, capsules, suppositories, patches
- **Liquids** – in oil, in H2O
  - Suspensions – in oily creams (injectable, ointmens)
- **Inhalants** – gases, smokes, vapors

**Drug “vehicle”** – inert substance/fluid drug is in

**Body “compartments”**
- Body is essentially a set of “walled compartments” (separated by various membranes or cell walls)
- e.g. GI tract, inside of blood vessels (bloodstream), extracellular fluids, inside/outside of BBB, fat cells
- So, once the drug enters the body, it still has to pass through various cell membranes in order to reach the targeted receptor sites
1. **Oral (non-parental route)**
   Latin abbreviation is “P.O.” (*per os*, through the mouth)
   A long drug route, drug passes through many cell membranes on its way to RSs

   **Most common route**
   Absorption of drug through walls of GI tract & into blood vessels

   **Absorption is highly variable**
   Food/no food in GI tract & what sort of food
   GI motility
   Actual composition of drug
   GI tract enzymes

   Usually a **slower absorption route**
   Advantages
   Disadvantages

   Relatively **easy route** to use

   **Drawbacks** of oral route

   “First pass effect” & liver
   blood supply to liver

   liver enzymes, biotransform = metabolize drug

   drug “metabolites”

   necessitates a larger initial drug amount

   between S variance in which/how much liver enzyme S has
2. **Injection (parental route)**
   Can avoid problems inherent in using oral route

Advantages

Disadvantages

Difference kinds of injections:
   a. **Intravenous** (I.V.)

   b. **Intramuscular** (I.M.)

   c. **Subcutaneous** (S.C. or subcu)

   d. **Intraperitoneal** (I.P.)

   e. **Intra-arterial** (I.A.)

   f. **Intrathecal** (I.T.)
      Often submeningeal

   g. **Intracranial** (I.C.)
3. **Inhalation**
   gases, vapors
   absorbed into blood vessels that serve the lungs
   fastest route

   Disadvantages

4. **Other Routes** of Administration

   **Via mucous membranes**
   - Sublingual
   - Via conjunctivum
   - Via rectum
   - Via vaginal walls
   - Via nasal mucosa

   **Topical/Transdermal Absorption**
   - Ointmens, creams, dermal patches
   - Methods to enhance skin penetration (ultrasound, electric current)
   - Case of accidental poisoning with organophosphates

   **Depot Preparations**
   - e.g. Norplant

   **Peritoneal Pumps**

   **Liposomes, Microspheres**