

# Enteral Routes.....Cont

## Rectal Route:

- **50% Bypasses portal circulation (Drug avoids destruction by the liver enzymes)**
- **Good absorption**
- **Prevents drug destruction by low pH of the stomach and intestinal enzymes**
- **Good for drugs that might induce vomiting if given orally**
- **May be used for unconscious patients or if the patient is vomiting (commonly used to administer antiemetics)**

# Parenteral Routes

- **Used for drugs poorly absorbed from the GIT**
- **Used for drugs unstable in the GIT**
- **Used for treatment of unconscious patients**
- **Used in circumstances that require rapid onset of action**
- **Only sterile solutions can be injected**

# Parenteral Routes...Cont

## **Intravenous Route (IV):**

- **The most common parenteral route**
- **Used for drugs not absorbed orally**
- **Avoids first-pass effect**
- **Permits rapid onset of effect**
- **May be used for irritant drugs**
- **May be used inject large volumes like iv fluids**
- **May be used to administer drugs over a long period of time**

# Parenteral Routes...Cont

## Disadvantages of the IV Route:

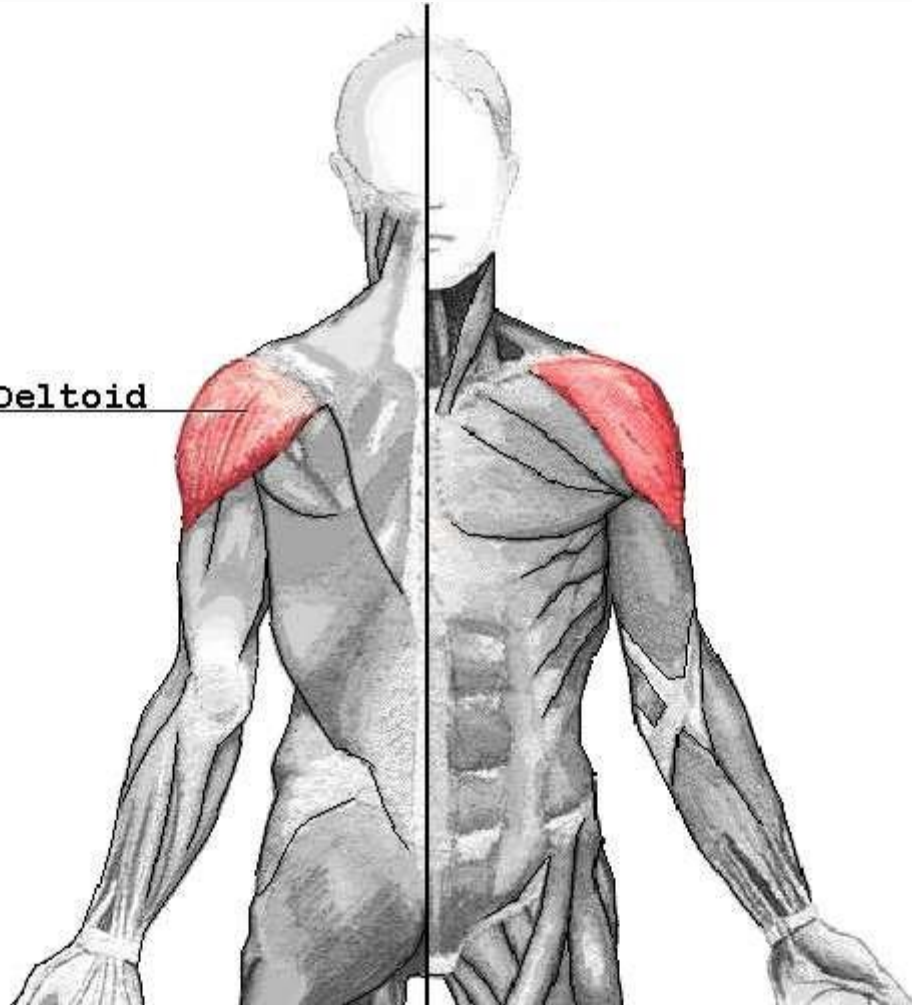
- **Only used for sterile solutions**
- **Difficult to control an administered dose**
- **Possibility of bacterial contamination**
- **Possibility of hemolysis**
- **Possibility of adverse reactions by too rapid delivery of high drug concentrations**

# Parenteral Routes...Cont

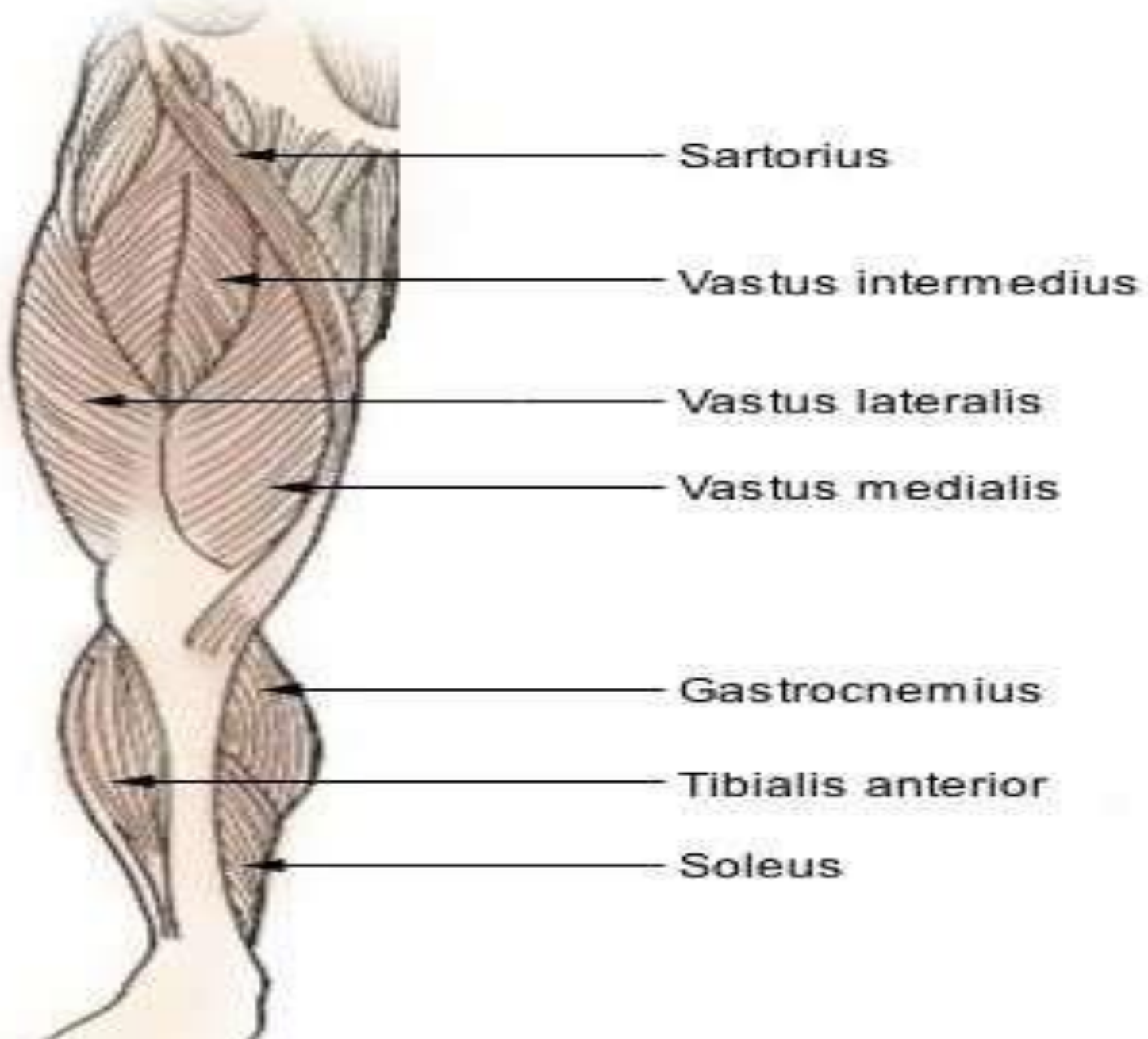
## **Intramuscular Route (IM) :**

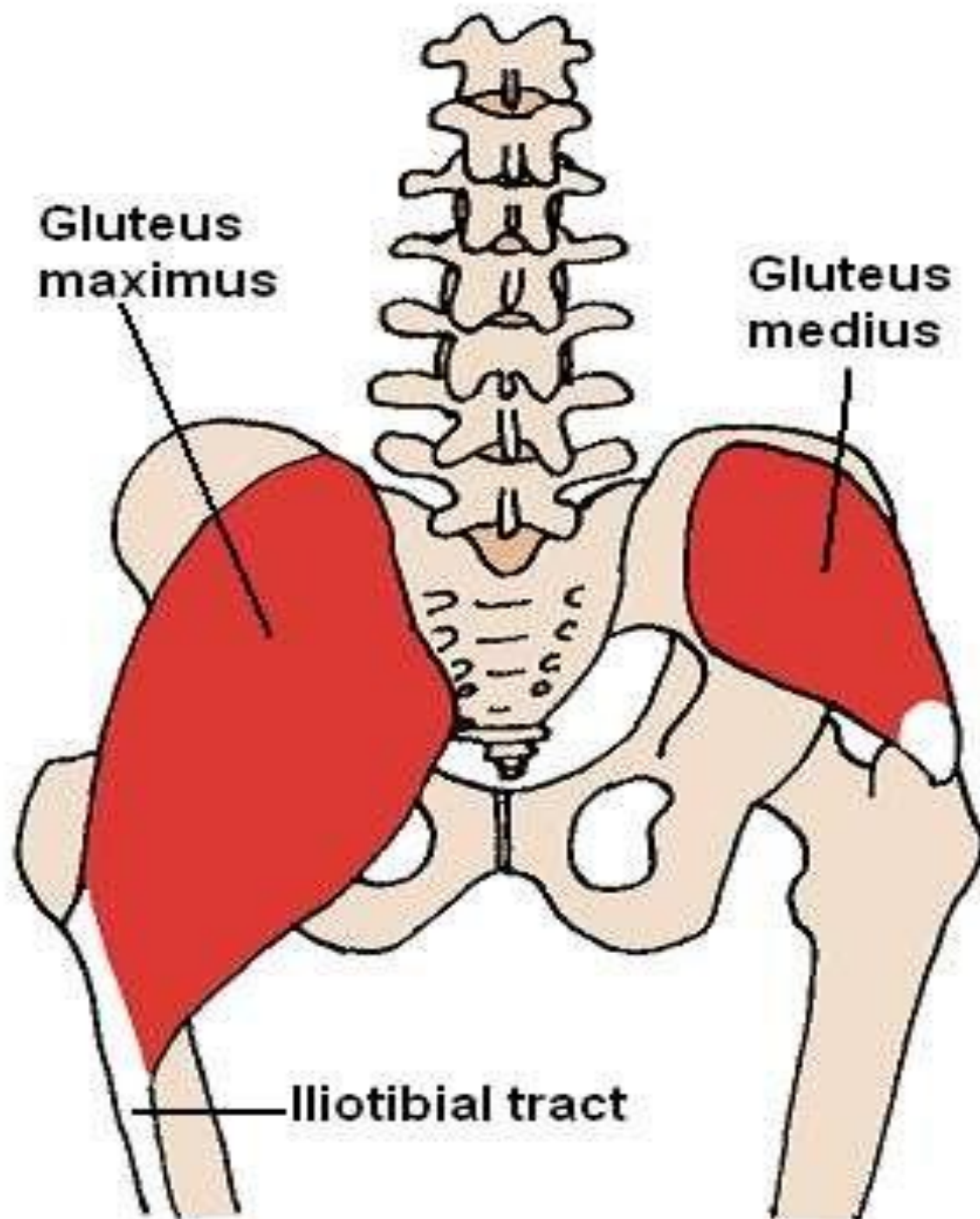
- **Aqueous solutions are injected IM**
- **Used for depot preparations (oily preparations, or special nonaqueous vehicles such as ethylene glycol).**
- **Irritant drugs may be given IM.**
- **Deltoid, vastus lateralis and gluteus maximus muscles are commonly used**

**Deltoid**



# Muscles of the Lower Extremity







# Parenteral Routes...Cont

## Subcutaneous Route (SC) :

- **Only used for drug not irritating to tissues.**
- **May be used for:**
  - **depot drugs (implants; silastic capsules containing the contraceptive levonorgestrel)**
  - **or sustain release drugs**
- **Absorption may be controlled through co-administration of a vasoconstrictor (Epinephrine)**

# Parenteral Routes...Cont

## **Intraarterial (IA):**

**Occasionally used when a drug effect is intended to be localized in a particular organ or tissue (treatment of liver cancer; diagnostic agents)**

# Parenteral Routes...Cont

## Intrathecal:

**Used for injection of certain drugs directly in the cerebrospinal fluid (CSF) when rapid and localized effect is intended in the meninges or the cerebrospinal axis:**

- **methotrexate in acute leukemia**
- **treatment of brain tumor**
- **spinal anesthesia**
- **acute CNS infections**

# Other Routes of Drug Administration

## Inhalation:

- Provides rapid delivery of drugs over the large surface area of the mucous membranes of the respiratory tract and pulmonary epithelium
- For Drugs which are gases (general anesthetics), or as aerosols.
- Convenient for patients with respiratory complaints such as asthma.
- Rapid onset of effect (as the IV)

# Other Routes of Drug Administration

## **Intranasal:**

- **Drugs taken by sniffing**
- **Desmopressin for the treatment of diabetes insipidus (banned in USA in 2007, pills are the alternative)**
- **Salmon calcitonin for treatment of osteoporosis**

# Other Routes of Drug Administration

## Topical application:

### 1. Mucous membranes:

- Drugs are applied on the mucous membranes of the conjunctiva, nasopharynx, oropharynx, vagina, urethra, urinary bladder to produce **a local effect**
- Good absorption to sites of action

# Other Routes of Drug Administration

## Topical application:

### 2. Skin:

- Drugs applied directly on the skin.
- Used when a local effect is desired.
- *Absorption through the skin can be enhanced by preparing the drug in a cream or as an oily preparation.*
- May be used for sustain release preparations (dermal patches) to achieve systemic effects.

### 3. Eye:

- Used for ophthalmic drugs to produce local effects on the eye

Table 1-1

## Some Characteristics of Common Routes of Drug Administration\*

ROUTE	ABSORPTION PATTERN	SPECIAL UTILITY	LIMITATION AND PRECAUTIONS
Intravenous	Absorption circumvented Potentially immediate effects	Valuable for emergency use Permits titration of dosage Usually required for high-molecular-weight protein and peptide drugs Suitable for large volumes and for irritating substances, when diluted	Increased risk of adverse effects Must inject solutions <i>slowly</i> , as a rule Not suitable for oily solutions or insoluble substances
Subcutaneous	Prompt, from aqueous solution Slow and sustained, from repository preparations	Suitable for some insoluble suspensions and for implantation of solid pellets	Not suitable for large volumes Possible pain or necrosis from irritating substances
Intramuscular	Prompt, from aqueous solution Slow and sustained, from repository preparations	Suitable for moderate volumes, oily vehicles, and some irritating substances	Precluded during anticoagulant medication May interfere with interpretation of certain diagnostic tests ( <i>e.g.</i> , creatine kinase)
Oral ingestion	Variable; depends upon many factors ( <i>see text</i> )	Most convenient and economical; usually more safe	Requires patient cooperation Availability potentially erratic and incomplete for drugs that are poorly soluble, slowly absorbed, unstable, or extensively metabolized by the liver and/or gut

\*See text for more complete discussion and for other routes.



