




# FACTORS AFFECTING TDDS

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Factors affecting transdermal drug delivery system can be divided into three classes :

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1. Biological factors
  2. Physicochemical factors
  3. Formulation factors



## □ Biological factors

### ❖ pH of the Skin :

- The pH of the skin is usually acidic i.e., 4-6
- This pH is responsible for regulating permeability of drug.
- According to pH- penetration hypothesis, only the unionised form of drug can permeate through lipid barrier

### ❖ Skin hydration

- Hydration is most important factor increasing the permeation of skin. So use of humectant is done in transdermal delivery.



## ❖ Site of application:

- The site on which the transdermal patches are applied will affect the permeation.
- The thickness of the skin, nature of stratum corneum vary site to site which affects permeation.

## ❖ Age, Sex and Race:

## ❖ Pathological condition of the skin:

- Injuries that disrupt the continuity of the stratum corneum increases permeability due to increased vasodilatation.

## ❖ Lipid film:

- The lipid film on the skin surface acts as a protective layer to prevent the removal of moisture from the skin and helps in maintaining the barrier function of stratum corneum.



## ☐ PHYSICOCHEMICAL FACTORS

### ❖ Partition coefficient:

- The optimal partition coefficient (K) is required for good action. ( b/w 1 and 4)
- Drugs with high K are not ready to leave the lipid portion of skin. Also, drugs with low K will not be permeated.

### ❖ Molecular size and shape:

- Drugs with high molecular weight have low permeation. (<400 daltons)
- Smaller particle size have more permeability than the large particles.



## ❖ Drug concentration:

- The flux is proportional to the concentration gradient across the barrier and concentration gradient will be higher if the concentration of drug will be more across the barrier.

## ❖ Stability and half life :

- Drug should be stable when it comes in contact with the skin.
- It should have low melting point.
- Half life of drug should be less than 10 hrs.



## □ FORMULATION FACTORS

### ❖ Release characteristics:

- Solubility of drug in dosage form determines the release time.

### ❖ pH of the vehicle:

- The acidic or alkaline pH may cause irritation to skin and may affect drug release, degree of hydration of polymers, therefore the surface pH of patches was determined to optimized both drug and adhesion.

### ❖ Permeation enhancers:

- Physical permeation enhancers
- Chemical permeation enhancers



## ➤ IDEAL PROPERTIES OF TDDS

Parameters	Properties
Dose	Less than 20mg/day
Half-life	< 10 hrs
Molecular weight	<400 Dalton
Melting point	<200°C
Partition coefficient	1 to 4
Aqueous Solubility	>1mg/mL
pH of the aqueous saturated solution	5-9
Skin Reaction	Non irritating and non-sensitizing



