

# Transdermal Drug Delivery Systems: An Optimum Therapeutic Delivery System Outcomes

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## DESCRIPTION

Transdermal drug delivery systems (TDDS) are one of the advanced forms of drug delivery systems that are of the optimum therapeutic outcomes that are noticed. These dosage forms are in use since long time but they came into existence in recent times with the demand on one side and with respect to best drug delivery on the other side. These TDDS generally undergo the drug distribution through the permeation or through the percutaneous absorption, i.e., the drug starts penetrating right from the outer layer of the skin and penetrates into the deeper layers and then move within the blood stream and drug starts its action. Through this, the toxic effects can be minimized and many unwanted drug release at the non-targeted areas such as non-targets tissues or organs can be minimized. Certain drugs are not suitable to the gastrointestinal tract and the drug delivery through the skin can reduce the drug sensitivity or the gastrointestinal tract sensitivity. The drug delivery is having many advantages than that of the disadvantages.

The TDDS can avoid the first pass metabolism and thereby the different variables that are associated with the GI tract, gastric emptying issues etc. These can minimize the prolonged drug release and such the toxic effects can be minimized. The direct access for the targeted tissue or organ is applicable, such that instant relief is seen in case of the pain management TDDS. The ease of dose is limited, as no huge concentrations are required. It provides an alternative drug dosage form whenever the oral drug delivery systems cannot be formulated. Although, there are many advantages seen or noticed in these dosage forms, there are certain limitations in order to formulate into the dosage form such as; the molecular weight less than 450-500Da is necessary for the drug to diffuse across the sub-

cutaneous layers of the skin.

There are certain factors that affect the transdermal penetration of the molecules. Some factors are; physicochemical properties of the penetrant molecules, drug molecules, pathological conditions of the skin. The physicochemical properties of the penetrant molecules include the partition coefficient of the penetrant, pH condition, release characteristics etc. In terms of physicochemical properties of the drug molecules, the factors included are like composition of the drug delivery system, enhancement of the transdermal permeation etc. In terms of the pathological condition of the skin, the reservoir of effect of the horny layer plays the major role. Also, the lipid film, skin hydration capacity, skin's temperature, injury to skin etc.

These TDDS can be prepared by means of the four main components such as; polymer matrix, the drug, permeation enhancers and other excipients for the consistency. The polymer matrix are of different forms which can be obtained from the natural source so called as natural polymers (waxes, zein etc), synthetic polymers (silicon rubber), synthetic polymers (polyvinyl alcohol). Drugs are chosen based on the physicochemical and biological properties. The permeation enhancers are generally used for the drug to permeate into the skin and the penetrants used are based on solvents and surfactants. The other excipients includes the adhesives, backing membrane etc.

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