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Transdermal Drug Delivery System

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ABSTRACT

Transdermal drug delivery has made an important contribution to medical practice, but it has not yet fully reached its potential as an alternative to oral delivery and hypodermic injections. The advantages of the drug delivery route over other types of delivery system such as oral, topical, intravenous, intramuscular, etc.that the episode can provide a controlled release of the drug to the patient, usually through a perforated membrane.storage space or body temperature dissolves small layers of wood embedded in adhesives.First-generation transdermal delivery systems have continued their continued growth in clinical use in the delivery of low-dose, lipophilic, low-dose drugs. Transdermal drug delivery is the latest technology that promises a better future than the ability to reduce the use of needles for various drugs but the cost factor is an important factor to consider as developing countries like INDIA have the second highest population, but due to high rates.

TDDS keyword costs: Transdermal Drug Delivery, Skin Maturity, Membrane Limited Systems, Controlled Adhesive diffusion system.

INTRODUCTION

Transdermal drug delivery systems are topically administered medicaments in the form of patches that deliver drugs for systemic effects at a predetermined and controlled rate [1].A transdermal drug delivery device, which may be of an active or a passive design, is a device which provides an alternative route for administering medication. These devices allow for pharmaceuticals to be delivered across the skin barrier [3]. In theory, transdermal patches work very simply. A drug is applied in a relatively high dosage to the inside of a patch, which is worn on the skin for an extended period of time. Through a diffusion process, the drug enters the bloodstream directly through the skin.Since, there is high concentration on the patch and low concentration in the blood, the drug will keep diffusing into the blood for a long period of time, maintaining the constant concentration of drug in the blood flow [2].

Basic Components of TDDS:

- Polymer matrix / Drug reservoir
- Drug
- Permeation enhancers
- Pressure sensitive adhesive (PSA)
- Backing laminates
- Release liner
- Other excipients like plasticizers and solvent

Types of TDDS

1**.** Reservoir system
2. Matrix system
3. Microresevior system

Advantages

a) It can prevent the absorption of intestinal drugs covered by intestinal pH, enzymatic activity and drug interactions with food, beverage and other oral drugs [4].
b) It can replace medication when the method is not suitable such as vomiting and diarrhea [4] .
c) To avoid the effect of passing egTransdermal Nitroglycerin.
d) The patch also allows for regular fishing rather than peaks and valleys at the level of oral contraceptives [5].

e) Long-term treatment with a single program, prompt medication notification in the event of an emergency, and the ability to quickly eliminate drug side effects through pesticides [5].

Disadvantages

a) Some patients develop contact dermatitis in the area of use of one or more parts of the system, making it necessary to eliminate [4] .
b) Only strong drugs are suitable for transdermal patch due to natural barriers to drug penetration into the skin.eg scopolamine transdermal patch placed behind the ear, is not loose.
c) Long-term adherence is difficult.

ANATOMY AND PHYSIOLOGY OF SKIN

The skin has evolved into a very effective barrier, preventing dehydration and xenobiotics.It enables us to withstand many environmental challenges.The reasons for this are many and can be easily summarized for the purposes of this chapter.Almost all compounds.ceramides, fatty acids free, cholesterol, as well as cholesterol sulphate.Their most important factor is that they are organized into organized bilayer arrays.The main distribution of stratum across the stratum The corneum appears intercellular. [6] .Enthering to the epithelial borders is a slow process due to the effect of blockade structures.The skin, especially the stratum corneum, has a barrier to drug entry due to its high density (1.4 g / cm2in in dry state) its current flow down. 15 to 20%.Transdermal bioavailability.So, in recent years, more research has been done on the area of intervention development [7].Limits include low penetration rates, volume fluctuations and intermediate volume [8].

Human skin comprises of three distinct but mutually dependent tissues

a) The stratified, a vascular, cellular epidermis
b) Underlying dermis of connective tissues
c) Hypodermis

Percutaneous absorption

Before topical application is applied locally or systematically, it must pass through the stratum corneum.Percutaneous absorption is defined as the penetration of various layers into the skin and the penetration of the skin into systemic circulation [10]. Percutaneous absorption of drug molecules is very important in the transdermal drug delivery system because the drug must be taken in sufficient doses and doses to achieve and maintain uniform, systemic, therapeutic throughout use. Usually when a drug molecule passes through the stratum corneal barrier, transitions to deeper layers of the skin and systemic absorption occur more quickly and easily [9].

Releasing the therapeutic agent from the application applied to the skin surface and its transfer to the circulatory system is a multi-step process that involves

- Internal dispersion and release from construction
- Separated from the outer part of the skin, the stratum corneum (SC)
- Distribution by SC, mainly in the form of lipidic intercellular.

Distribution from SC to active fluid epidermis, distribution of active epidermis and upper dermis, enlargement of papillary dermis (capillary system) and microcirculation [12].

Routes of drug penetration through skin

In the process of percutaneous permeation, the drug molecule may pass through the epidermis itself or may be distributed through shunts, especially those supplied by widely distributed hair follicles and eccrine glands. In the early stages of menopause, drug cells may penetrate the skin near the hair follicles or sweat ducts and be absorbed through the follicular epithelium and oily glands. When a stable condition is reached in the spread of the stratum corneum it becomes the main route for transdermal entry [10].

In any molecule applied to the skin, two main mechanisms of skin penetration can be described:

- Transepidermal route
- Transfollicular Route
- Skin prevention activities

The upper layer of the skin is the most important function in maintaining the prevention function. Here the cells are higher and closer together, preventing germs from entering and storing the fluid that is stored in the skin. components [12].Lipids are secreted by cells from the base layer of the skin upwards.These lipid molecules combine to form a solid network of connections, which actually act as mud between wall bricks.

PRINCIPLES OF TRANSDERMAL PERMEATION

The foreskin was considered an impenetrable barrier, but it was later discovered that the skin had been used as a precautionary measure. capillary network.The various steps involved in the transport of the drug from the compound to the circulatory system are as follows [3]

1.The distribution of the drug from the peripheral membrane to the stratum corneum.
2.Sorption by stratum corneum and penetration by active epidermis.
3.The insertion of the drug through the capillary network on the dermal papillary layer.
4.Impact on the target organ.

Kinetics of Transdermal Permeation

Knowledge of the kinetics of skin permeation is essential for the successful development of transdermal treatment systems.Transal transdermal permeation involves the following steps:

1.Sorption by stratum corneum.
2.Drug infiltration through the epidermis.
3.Take medicine using a capillary network in the dermal papillary layer.This access is only possible if the drug has certain physiochemical areas.The level of skin penetration is provided by

dQ ------ = Ps (Cd - Cr) dt

When I -Cd and Cr focus on the penetration of the skin in the donor area, the stratum corneum area and the receptor portion of the body respectively. Pss are not all coefficient of skin tissue penetration into the donor. The input coefficient is given to the relationship:

$$Ps = \frac{Dss\ Ks}{hs}$$

Where Ks is the differential coefficient of partition partition interface partitioning of the incoming molecule from solution or system to the stratum corneum, Dss is the obvious difference in the constant distribution of the incoming molecule by thickening of the skin tissue and hs. total firmness of skin tissues.As Ks, Dsss and hs are permanent under the given conditions the pereability Ps permeability Ps of indoor skin can be considered permanent.From equation (1) it is clear that a continuous level of drug penetration can only be achieved if Cd>> Cri .e .The drug concentration in the area of stratum corneum Cd is similar and much larger than the drug concentration in Cr.The equation becomes:

dQ ------- = Ps Cd dt

Skin penetration rate remains the same as long as the size of the Cd remains the same throughout the skin process. In order to keep the CD unchanged the drug should be extracted from the device at a rate of Rr consistently or greater than the absorption rate of the skin at a level equal to or greater than the melting of the drug balance in the stratum corneum Cs. namely Cd >> Cs. Therefore a higher level of skin penetration is obtained and given the equation:

$$(dQ / dt)\ m = PsCs$$

From the image above it can be seen that the high level of skin penetration depends on the skin coefficient Ps and the corresponding melting point in the stratum corneum Cs. Skin penetration is therefore seen in stratum corneum limited [14].

CONCLUSION

Transdermal drug delivery is by no means an old technology, and technology is no longer just a sticker. Due to the latest technological advances and the introduction of the drug into the action area without cracking the skin membrane the transdermal route has become a widely accepted drug management route. It promises to eliminate needles for drug management in the future.

REFERENCES

1. Chien, YW, Novel drug delivery systems, Drugs and the Pharmaceutical Sciences,Vol.50, Marcel Dekker, New York, NY;1992;797
2. Transdermal drug delivery system/introduction
3.Ansel.H.C, Loyd.A.V, Popovich.N.G, Pharmaceutical dosage forms and drug delivery systems, Seventh edition, Lippincott Williams and Willkinspublication.
4. Mahato RA. Pharmaceutical dosage forms & drug delivery'' Published by CRS press, Taylor & Froncrs Group, 6000 Broken Sound Parkway, Sute

300, Boca Raton, 2002, 196-197

5.Brahmankar.D.M, Jaiswal.S.B, Biopharmaceutics and pharmacokinetics A Teatise. Vallabh Prakashan, Delhi1995, 335-371.

6. Hadgraft J. Skin, the final frontier. Int J Pharm. 2001; 224(1–2):1–18.

7. Joseph R, Robinson, Vincent HL. Controlled drug delivery fundamentals and applications. Revised and Expanded: Lee. Marcel Dekker, Inc; 2005. p.524.

8. Moser K. Passive skin penetration enhancement and its quantification in-vitro. Eur J Pharm Biopharm. 2001; 52:103-112.

9. Mehta R. Topical and transdermal drug delivery: what a pharmacist needs to know. InetCE. 1st Ed., Arizona;2004:1-10.

10. Jain NK. Pharmaceutical product development. 1st Ed. CBS Publisher and Distributors. New Delhi. 2002:221-228.

11. Robinson JR, Lee VH. Controlled drug delivery fundamentals and applications. 2nd Ed. New York. 2005:523-536.

12. Ramteke KH, Dhole SN, Patil SV. Transdermal drug delivery system: a review. J Advanced Sci. Res. 2012;3(1):22-35.

13. Kumar D, Sharma N, Rana AC, Agarwal G, Bhat ZA. A review: transdermal drug delivery system: a tools for novel drug delivery sestem. Int. J Drug Dev. Res. 2011;3(3):70-84.

14. Jain.N.K, Controlled and novel drug delivery, first edition, CBS publishers and distributors, New Delhi.1997.