Opinion
Volume 6:1, 2022

Journal of Formulation Science & Bioavailability

ISSN: 2577-0543 Open Access

An Overview of Transdermal Patch

Mariana Ganea*

Department of Pharmaceutical Sciences, University of Greenwich, London, UK

Introduction

A transdermal patch is a medicated adhesive patch that is applied to the skin to deliver a particular amount of medication into the bloodstream through the skin. The patch provides a controlled release of medication into the patient, usually through a porous membrane covering a reservoir of medication or through body heat melting thin layers of medication embedded in the adhesive, which is an advantage of transdermal drug delivery over other types of medication delivery (such as oral, topical, intravenous, or intramuscular). The fundamental problem of transdermal delivery systems is that the skin is a very effective barrier; as a result, this method can only deliver drugs with molecules tiny enough to enter the skin. The US Food and Drug Administration approved the first commercially accessible prescription patch in December 1979. For motion sickness, these patches delivered scopolamine [1].

Description

Researchers have developed Microneedle Transdermal Patches (MNPs), which consist of an array of micro needles that allow a more varied range of substances or molecules to be passed through the skin without having to micronize the treatment first, to overcome skin restrictions. MNPs have the advantage of regulated medicine release and easy application without the need for medical help. Advanced MNPs technology allows drug delivery to be tailored for local use, such as skin whitener. MNPs applied to facial skin. Many different types of MNPs have been designed to penetrate tissues other than skin, such as interior mouth and digestive tract tissues. This allows for more rapid and direct delivery of the molecule to the desired location [2].

Application

- The nicotine patch, which distributes nicotine in controlled dosages to aid in the cessation of tobacco smoking.
- Patches containing hormones.
- Estrogen patches are sometimes recommended to transgender women as a sort of hormone replacement treatment to alleviate menopausal symptoms (as well as post-menopausal osteoporosis).
- Testosterone CIII patches for both men and women (Androderm) and contraceptive patches (marketed as Ortho Evra or Evra) (Intrinsa).
- In rare cases, nitroglycerin patches are used instead of sublingual pills to treat angina.
- Motion sickness is commonly treated with transdermal scopolamine.
- Clonidine, an antihypertensive medication, is accessible as a transdermal patch.
- In March 2006, Emsam, a transdermal version of the MAOI selegiline, was approved as the first transdermal delivery agent for an antidepressant in the United States.ost popular transdermal patch in the United States. In 2007, Europe approved the first commercially marketed vapour patch to help people quit smoking.
- Fentanyl CII (marketed as Duragesic) and buprenorphine CIII are two opioid drugs that are frequently prescribed in patch form to provide round-the-clock pain management (marketed as BuTrans).

Types

There are five main types of transdermal patches [3]:

Single-layer drug-in-adhesive: The medication is also contained in the sticky layer of this system. The adhesive layer of this sort of patch not only serves to glue the numerous layers together, as well as the entire system to the skin, but it also serves to release the medicine. A temporary liner and a backing surround the adhesive layer. It is distinguished by the presence of the medicine within the skin-contacting glue that is applied to the epidermis.

Drug-in-adhesive multilayer: The single-layer drug-in-adhesive patch is identical to the multi-layer system; however, the multi-layer system adds another layer of drug-in-adhesive, usually separated by a membrane (but not in all cases). One layer is for immediate medication release, while the other is for controlled drug release from the reservoir. A temporary liner layer and a permanent backing are also included in this patch. Drug release is determined by membrane permeability and drug molecule diffusion.

Reservoir: The reservoir transdermal system, unlike the single-layer and multi-layer drug-in-adhesive systems, has a distinct drug layer. The drug layer is a liquid compartment divided by the adhesive layer that contains a drug solution or suspension. The drug reservoir is completely enclosed in a shallow compartment constructed of a drug-impermeable metallic plastic laminate with a rate-controlling membrane made of a polymer similar to vinyl acetate on one surface. The backing layer also supports this patch. The rate of release in this system is zero order.

Matrix: A drug layer of a semisolid matrix contains a drug solution or suspension in the matrix system. This patch's sticky layer partially covers the drug layer and surrounds it. A monolithic device is another name for it.

Patch of vapour: The adhesive layer in a vapour patch not only holds the various layers together but also releases vapour. Vapour patches are primarily used for decongestion and release essential oils for up to 6 hours. Other vapour patches on the market increase sleep quality or help smokers quit.

Advantages

- Pain free
- Can be targeted to allow direct access to the desired tissues.
- MNPs can be safely administered by the patient, reducing the need for experienced medical personnel.
- Because some medications are water insoluble, insoluble pharmaceuticals and compounds can be directly "injected" into the dermal layer using MNPs. Insoluble medicines' transdermal administration will be improved even more.
- When compared to the needle and syringe procedure, this method is safer (needlestick). There is less waste, no infection spread, and no injuries. In the United States, at least 300,000 needle stick injuries occur each year, with disposal accounting for about half of the accidents [4].

***Address for Correspondence:** Mariana Ganea, Department of Pharmaceutical Sciences, University of Greenwich, London, UK, E-mail: ganeam@gmail.com*

Received: 03 January, 2022, Manuscript No. fsb -22-64295; **Editor assigned:** 06 January, 2022, PreQC No. P-64295; **Reviewed:** 17 January, 2022, QC No. Q-64295; **Revised:** 24 January, 2022, Manuscript No. R-64295; **Published:** 31 January, 2022, DOI: 10.37421/2577-0543.22.6.120

ApplicationMNPs as vaccine delivery platform: MNPs vaccine could be used instead of direct injection. MNPs may transport bioactive compounds of various physical sizes and are capable of delivering larger molecules than transdermal patches. This means that an inactive virus or pathogen can be injected into the body without causing discomfort or skin irritation. It may also lower the expense of storing items that must be transported at a specific temperature and condition. Because MNPs are smaller and thinner than vial bottles, they can be transported in large quantities in a single trip. Medical waste such as syringes and dirty needles are also removed, minimising the risk of blood-borne illness pathogen spread in rural areas.

MNPs to reduce obesity: Obesity is currently one of the most talked-about concerns in developed countries. Researchers have tested a variety of medications to reduce obesity rates, including one known as "browning chemical." MNPs are used to target a specific group of fat tissue, demonstrating that the patch can deliver browning nano particles to a specific fat tissue group. Because MNPs are localised, the drug's negative effects can be reduced. The results demonstrate that the white fat of mice shrank over a four-week period in animal trials. Furthermore, the mice's improved metabolism suggests that the experiment employing MNPs to reduce obesity may be worth testing in the future. If the research is effective, MNPs treatment could be a fantastic option, as direct injectable obesity medicines require medical supervision. MNPs can be performed by the patient without any specific skills while they are here.

MNPs for cosmetic and skin care: MNPs can also include skin treatments such as face whitening agents and dark eye circles serum. Its localised properties help to give skin whitening to the facial area. Even a very precise area, such as dark under-eye circles. When the melanin index (a dark or black pigment present on the skin) is measured, patients treated with whitening agents coated in MNPs have a lower melanin index than those treated with whitening essence (topical). The treatment lasts eight weeks, and the results indicate that MNPs could be a promising cosmetic vector because they do not cause skin irritation and can be tailored to target specific areas of the body.

Aspects of regulation: The United States Classifies a Transdermal Patch a combination product is defined by the Food and Medication Administration as a medical device paired with a drug or biological product that the device is supposed to deliver. Any transdermal patch product must apply for and gain approval from the Food and Drug Administration before being sold in the United States, demonstrating safety and efficacy for its intended purpose.

Future Prospects

Because the majority of MNP applications are still in development, it's crucial to consider the long-term impact of drug delivery efficiency. In addition, more research is required to determine which molecules can be given via MNPs. The little plastic backing may contribute to water pollution because to its compact nature, which can be readily swept away by wind and water if not properly disposed of [5].

Conclusion

The US Food and Medication Administration classify a transdermal patch as a combination product because it combines a medical device with a drug or biological product that the device is supposed to deliver. Any transdermal patch product must apply for and gain approval from the Food and Drug Administration before being sold in the United States, demonstrating safety and efficacy for its intended purpose.

References

1. McConville, Aaron, Catherine Hegarty, and James Davis. "Mini-review: Assessing the potential impact of microneedle technologies on home healthcare applications." *Med* 5 (2018): 50.
2. Veerabadran, Nalinkanth G., Ronald R. Price, and Yuri M. Lvov. "Clay nanotubes for encapsulation and sustained release of drugs." *Nano* 2 (2007): 115-120.
3. Lee, Jeong Woo, and Mark R. Prausnitz. "Drug delivery using microneedle patches: not just for skin." *Expert Opin Drug Deliv* 15 (2018): 541-543.
4. Li, Junwei, Mingtao Zeng, Hu Shan, and Chunyi Tong. "Microneedle patches as drug and vaccine delivery platform." *Curr Med Chem* 24 (2017): 2413-2422.
5. Nachum, Zohar, Avi Shupak, and Carlos R. Gordon. "Transdermal scopolamine for prevention of motion sickness." *Clin Pharmacokinet* 45 (6): 543-566.

How to cite this article: Ganea, Mariana. “An Overview of Transdermal Patch.” J Formul Sci Bioavailab 6 (2022): 120.