

Epicutaneous Permeation Through Skin and its Application

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Opinion Article

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ABOUT THE STUDY

The term epicutaneous refers to the route of topical drug administration by which the drug, poison, fluid, or other substance is taken into the body via direct skin application. The three major routes of administration include: topical, in which the effect is local; enteral, in which the effect is non-local; and parenteral, in which the effect is systemic. Epicutaneous medications range from lotions, creams and ointments to powders, patches, and tinctures. Other topical medications may be inhaled or applied to surfaces of tissues other than skin. Topical medications taken in excess can result in adverse skin reactions such as itching, inflammation and redness; however, if consumed properly can yield the desired outcome.

The skin acts as a barrier separating the internal body structures from the external environment, maintaining a slightly acidic pH as to prevent against pathogens and other foreign invaders. There are several layers of skin: the outer layer called the epidermis, followed with the dermis, followed with an innermost layer of fatty tissues. The two principal routes of drug administration through the skin.

Transepidermal absorption

This process outlines diffusion of substances across the stratum corneum. Diffusion can occur via the intercellular lipoidal route or through a microscopic route designed for polar compounds and ions. Because the epidermis structure is extremely compact leaving little intercellular space, permeation calls for the crossing of cell membranes. Yet the greatest struggle lies in penetration through the dermis, where diffusion occurs through the interlocking channels of the substance.

Research and Reviews: Drug Delivery

Transfollicular (shunt pathway) absorption

Sebaceous and eccrine glands operate as the skin's appendages and channels of drug absorption by acting as shunts that bypass the stratum corneum. The overall mechanism progresses through partitioning and diffusion through the sebum, the driving force being a concentration gradient.

Allergy testing

Antigen extracts are applied to the skin as puncture skin tests. This method measures the reactivity of the skin to the injected material. This can be carried out through the scratch test, prick test, or intradermal test.

Local Anesthesia: Local anesthesia provides immediate relief to the region of application by numbing the sensation and causing a loss of nociception. These drugs can be classified either as aminoamide or aminoester and are given as an injection, spray, or ointment. These are often used for dental or dermal purposes.

Transdermal patches overlap under the parenteral category but some can fall under the epicutaneous category as well. They serve a wide array of purposes:

Prevention of motion sickness

Scopolamine was the first transdermal patch to be approved by the FDA, in 1979.

- Birth control
- Hormone replacement therapy: To alleviate symptoms of menopause.
- Cessation of tobacco smoking
- Allergy tests

Arthritis pain

These drugs exist mainly as creams that work to immediately and temporarily mitigate the sensations of arthritis in the hand. They come in a few forms:

- Counterirritants
- Salicylates
- Capsaicin

Wounds/Rashes

Skin conditions can be treated with the usage of creams, lotions, gels, ointments, or in some cases steroids.