

Transdermal drug-delivery system

Transdermal drug delivery is not a new concept. Iontophoresis and ultrasound are two traditional techniques used for transdermal drug delivery. Both techniques, however, carry their limitations. A new transdermal drug-delivery concept, Transdermal Therapy, developed as a result of previous research in the areas of microdermabrasion and electroporation, aims to overcome these shortcomings.

Historical background

Microdermabrasion uses a high-pressure flow of crystals to superficially ablate the skin. The technique is used to treat certain skin conditions and scars. Microdermabrasion is also utilised for enhancing the absorption of drugs into the skin and for preparing the skin for further medical applications. The effectiveness of the medications and the interaction between the different active substances that are used with microdermabrasion have been investigated for many years. As a direct result of this research, 'Dermoelectroporation', an alternative transdermal drug-

delivery technique, was discovered. Dermoelectroporation causes an increase in the permeability of the epidermis and allows active substances, including macromolecules, to penetrate into the superficial layers of the skin. Dermoelectroporation has no effect on the active substance being inserted. Once dermoelectroporation was combined with microdermabrasion, a new transdermal drug-delivery concept was established: Transdermal Therapy.

Classic iontophoresis and ultrasound

Traditional iontophoresis for transdermal drug delivery is based on the principle of Coulomb's Law: "Like electrical charges repel each other." The electrotherapeutic technique uses a galvanic current to 'push' a drug (active substance) into the patient's skin. The active substance (negative or positive) is applied over the electrode that has the same polarity (cathode or anode). The ions will migrate into the skin as a result of the repulsion of the similar electrical charges. However, the electrolysis reaction at the site of the electrode causes a degradation of the molecule being inserted. Furthermore, the substances are mainly absorbed at intracellular level, with poor delivery of macromolecules. Since the galvanic current increases the skin's temperature and may produce a burning feeling, it is generally accepted that iontophoresis may be uncomfortable for the patient.

With ultrasound, the drug is absorbed into the skin through the vibratory movements of the cells caused by the ultrasonic waves. Absorption of the substances is limited to the intra-cellular spaces. Ultrasound techniques are unable to deliver big molecular sizes and heavy substances.

Transdermal Therapy

The Transderm Ionto system is a powered drug-delivery system that has been approved for the local administration of ionic drug solutions into the body for medical purposes and can be used as an alternative to injections. Both positive and negative ions of drugs can be accurately delivered.

Imaging System

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