

MESOPORATION - a new addition to mesotherapy and no-needle drug delivery

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Mesoporation is a complex process that allows introduction of mesotherapy and any other drugs into the tissue at depths equivalent to the mesotherapy injections. The delivery time required is between 10 - 20 minutes, depending on the size of treated area. For example, face and neck treatment would take 15 minutes and cellulite, treatment about 30 minutes.

The depth of penetration ranges from very superficial 2-3 mm up to a few centimeters.

Mesoporation is a new, no-needle treatment, stemming from iontophoresis. It delivers 99% of the prepared mesotherapy formulation at the depth of 1 centimeter and approximately 65% at the depth of 6 centimeters. In contrast, traditional iontophoresis delivers only about 10% of the product at the depth of 1 cm.

Mesoporation is a novel and unique method developed

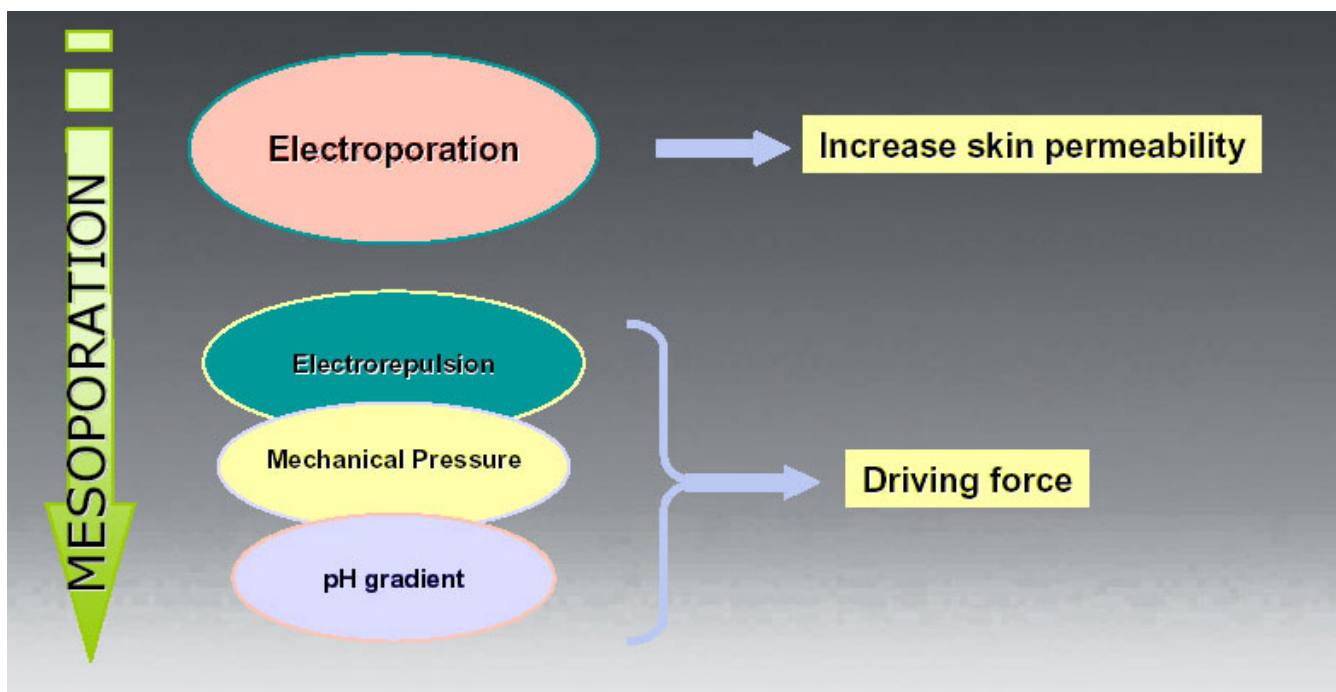
exclusively for mesotherapy treatment and it is based on 4 modalities:

1. Electroporation.
2. Electro repulsion
3. Mechanical pressure
4. PH gradient

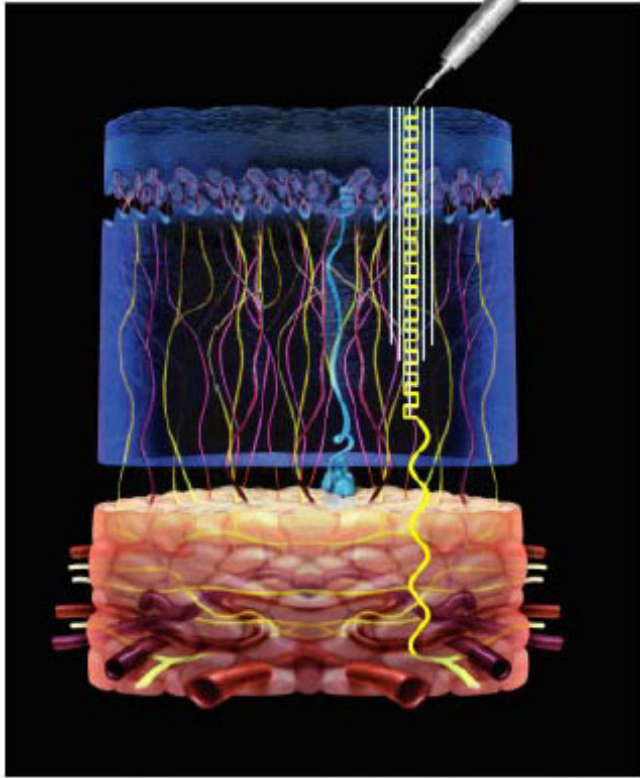
Electroporation

Electroporation is a process of a cellular membrane reorganization in response to electrical impulses delivered by an active electrode. The impulse creates temporary, watery channels - mesopores- in the cellular membrane. The drug molecules can then penetrate the tissue through these channels.

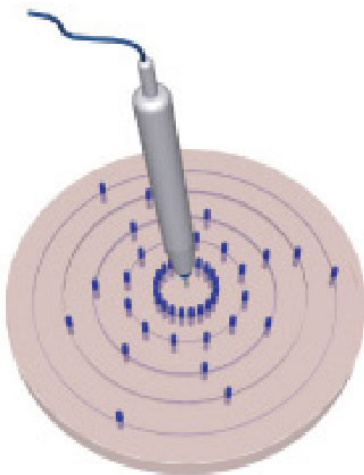
The process is possible due to the specific action on the fatty acids, which are an integral part of the epidermis and any other tissue.



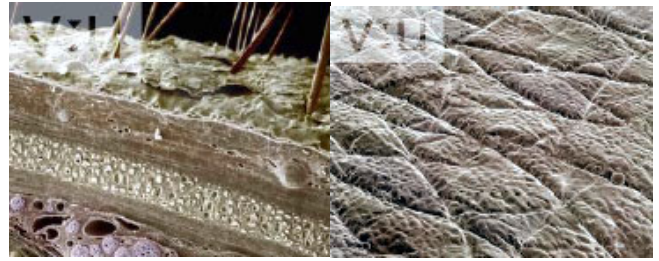
Mesoporation diagram



Channels through the stratum corneum (yellow)



When a positively charged electrode touches the skin, a number of (blue) channels - mesopores- are created.

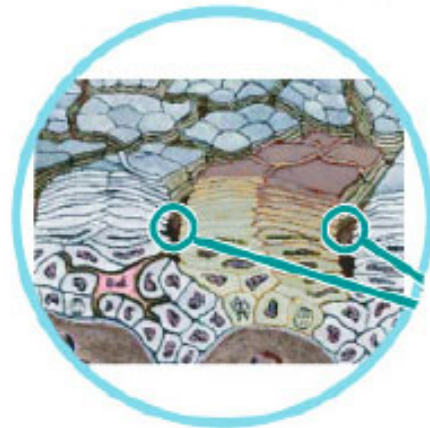


Epidermis and dermis

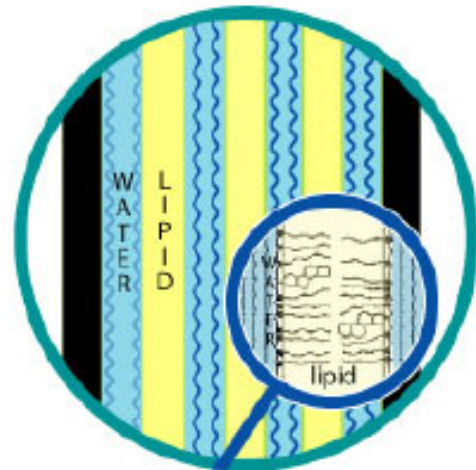
Stratum corneum

Epidermis contains multiple layers of lipids.

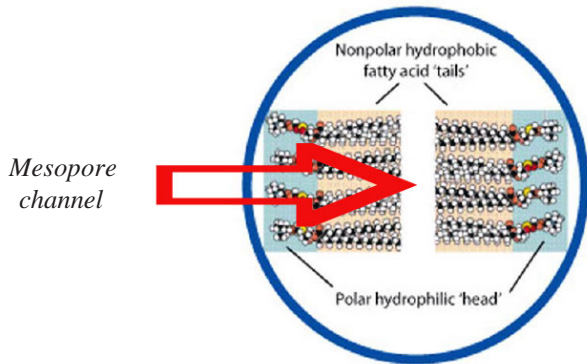
Under specific electric impulse the lipid layer can be rearranged and new aqueous pathways can be formed through the stratum corneum. The process affects non-polar fatty acid tails.



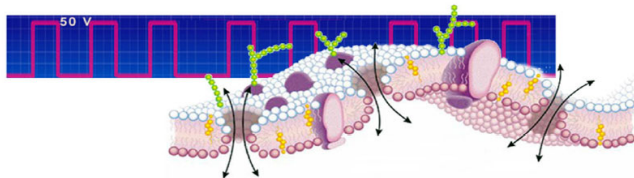
Epidermis lipids



Epidermis closeup

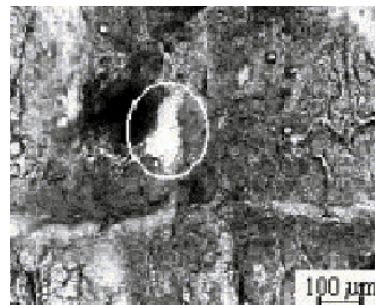


Rearranging the non-polar fatty acid tails leads to creation of temporary channels - mesopores.



Once those pathways are created the door to skin and body is open.

These channels are used for water and non-water soluble substances to be delivered through the skin barrier and deep into the tissue. We call them mesopores.



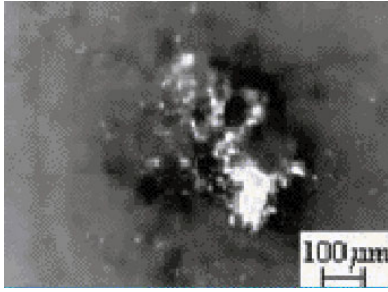
Mesopore seen through an electronic microscope.

Mesopores last from 15 - 20 seconds up to a several minutes. Mesopores range in size from 40 - 250 microns.

Electrorepulsion

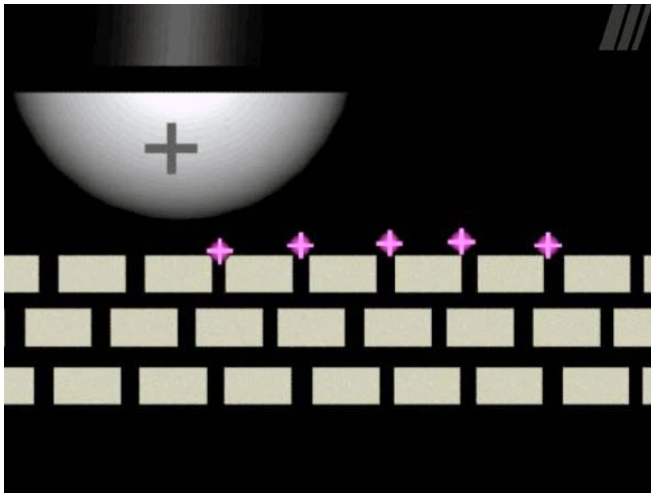
The positively charged drug is repulsed by positively charged electrode into the tissue through the mesopores. Most of the mesotherapy drugs are positively charged.

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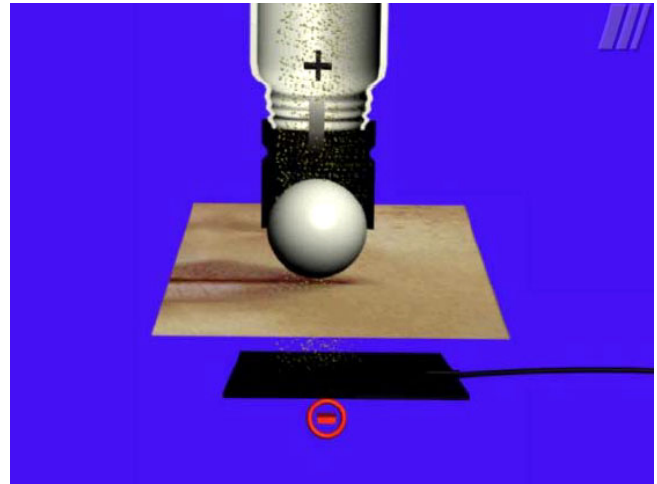
Mesopore seen through an electronic microscope.

In case of negatively charged drug the polarity of electrodes can be reversed. The electrode acts also as a dispenser (dispenser electrode) of the delivered solutions.



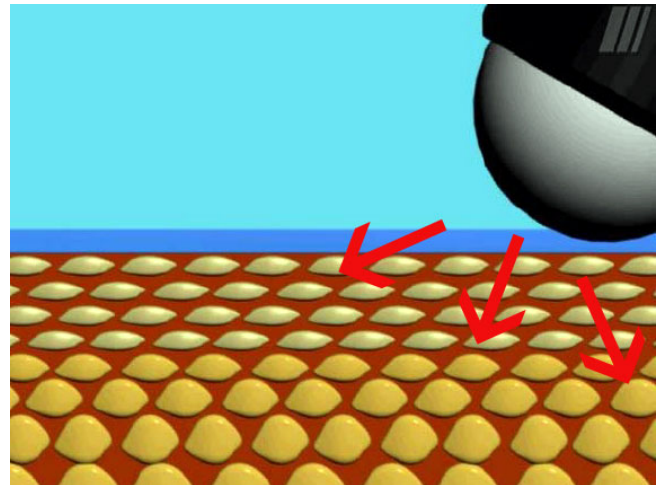
The product has a positive charge, the current coming into the dispenser electrode has a positive charge and when they meet the product is repulsed through the mesopores. Because of the nature of the mesopores, both ions and molecules are diffused into the skin.

Additional driving force is a negatively charged grounding electrode placed in opposite geometry from the treatment area.



Mechanical pressure

It relates to the mechanical pressure applied to the skin by a performing treatment person. The mechanical pressure is exerted through the product delivering electrode. The pressure pushes the drugs through the mesopores and into the tissue.



The combination of electroporation, electrorepulsion, and mechanical pressure allows to deliver a large amount of substances.



PH gradient

It refers to electro osmosis and pH gradients. The isoelectric point of the skin is -4. Under physiological conditions, with the surface of skin buffered at or near 7.4, the electro osmosis favors positively charged molecules.

Drugs' negative polarity is not a problem. Prior to mesoporation, all of the mesotherapy or any other drugs or substances require to be mixed with the special carriers in order to be delivered. Those carriers are an integral part of the mesoporation technology and act as the vehicle carrying drugs through the stratum corneum.

Mesoporation device is an important milestone in no-needle drug delivery.

It can be used for rejuvenation, wrinkles, fat deposits, love handles, cellulites, second chin, bleaching, acne and other skin problems, stimulation of collagen and elastin, tissue lifts and any other treatment involving topical or injectable drugs. That kind of medical platform can be used for a follow up skin treatment after the face lift or any other cosmetic surgery. Mesoporation allows for effective delivery of any drug or any formulation depending on the desired effect. *It complements lasers,*

dermabrasion, VelasMOOTH, needle mesotherapy and any other treatment.

Drugs delivered by the mesoporation cause no irritation and no tissue reaction (unless there is an allergy to any formulation component).

Mesoporation is a process developed by Microlab Biomedical, an Italian Bioengineering Company. Its product called "Mesoderm" has recently received FDA approval and as a class III device will be available in the USA starting July 2007. It can only be purchased by licensed physicians.

"Mesoderm" is a trademark of Microlab Bioengineering Company. For more information call 1-800 -706-7786.

