Designed for
Perfection

EPN

Electroporation Needle System

Contents

1. What is EPN?

EPN : Electroporation Needle system

EPN is the new generation of emerging technology with combining automatic needling (Auto Microneedle Therapy System, Auto MTS) and electroporation to effectively deliver a drug. EPN permits (by Auto MTS and electroporation) to effectively deliver a drug into different tissue depths within face or scalp.

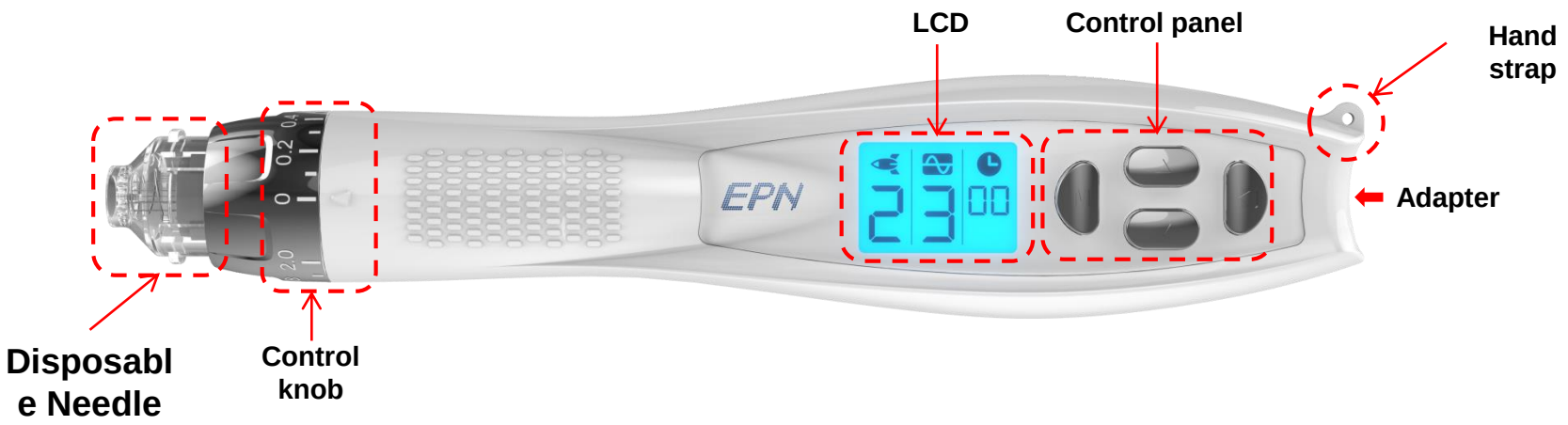
By needling on the underlying skin tissue in shorter treatment times, it achieves more effective drug delivery through electrostimulating micro-pores that provides less discomfort to the patient.

❖ **Clinical Indication**

- ➢ Hair regeneration
- ➢ Improving Surface scar & Deep scar
- ➢ Skin brightening
- ➢ Skin firming
- ➢ Pore contraction
- ➢ Improving wrinkle

1. What is EPN?

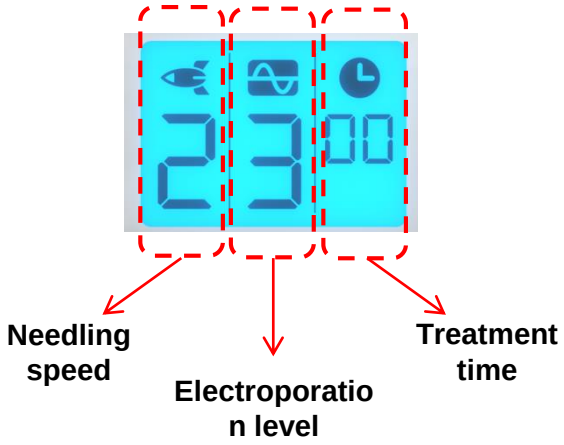
Device Description



Disposable needle

- Disposable sterilized needle
- 33 gauge 9 pin
- Electrode needle
- Adjustable control of multiple needle penetration depths, up to 2.0 mm
- Separately packaging – 24PCS/Box

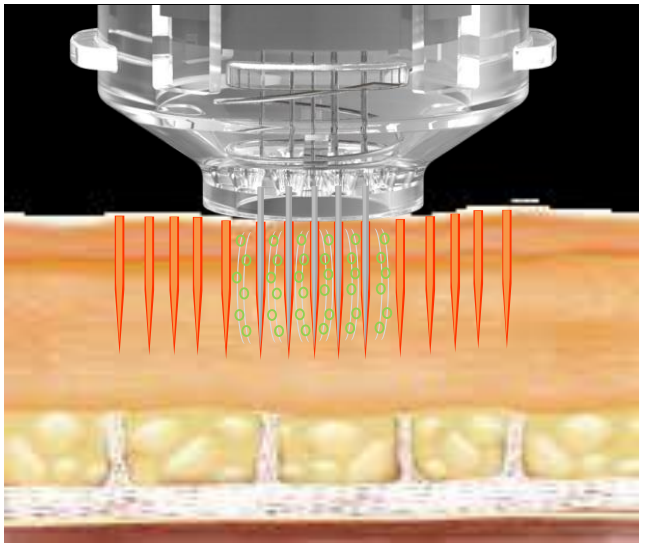
LCD display



2. EPN Principle

2.1. Automatic needling (Auto MTS)

- Induces an effective drug delivery stimulating tissue by micro-needling and drug to permeate into the tissue
- Induces a drug with the high molecular weight to permeate into the dermal layer
- Induces skin tissue on scar tissue to regenerate throughout micro-pores

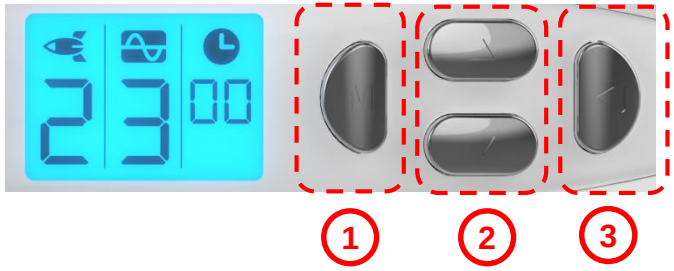


2.2. Microneedle electroporation

- Can be activated by microneedles penetrated into the dermal layer
- Makes micro-pores instantly on dermal fibroblast membranes
- Induces a drug with the high molecular weight to permeate into the fibroblasts

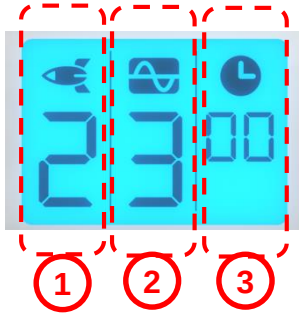
3. Mechanism of Action

Control panel



No	Description
1	Mode select button
2	Level decrease / increase button
3	Strat / Stop

LCD



No	Description
1	Needling speed display
2	Electroporation level display
3	Treatment time display

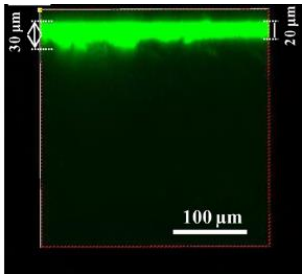
4. Device Feature & Technology

Microneedle + electroporation

❖ Synergy effects of drug penetration

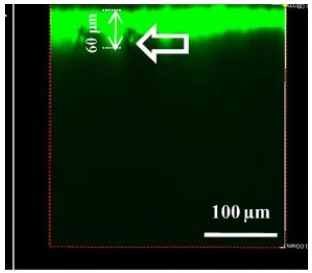
Result

(a)



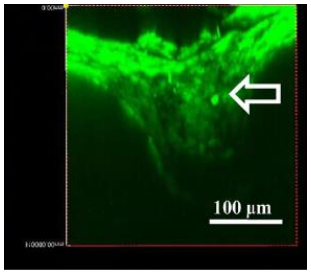
(a) Intact skin – penetration depth 30 μm

(b)



(b) Microneedle only – penetration depth 60 μm

(c)

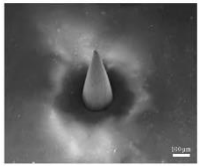


(c) IN-SKIN EP (200 V, 10 ms, 10 pulses)

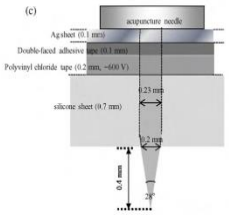
Materials and methods

- Animal: Male hairless rats (Abdomen)
- Chemical: FD-4 (Fluorescein isothiocyanate (FITC)-dextran. Molecular weight 4.3 kDa)
- Observation: Fluorescence confocal laser scanning
- Electroporation: 200V / 10ms / 10 pulse
- Microneedle

IN-SKIN EP



- Microneedle penetration depth: 0.4 mm



Reference

Yan K, Todo H, Sugibayashi K. Transdermal drug delivery by in-skin electroporation using a microneedle array. Int J Pharm. 2010 Sep 15;397(1-2):77-83.

※ Microneedle with electroporation can effectively deliver high molecular and hydrophilic drugs.

4. Device Feature & Technology

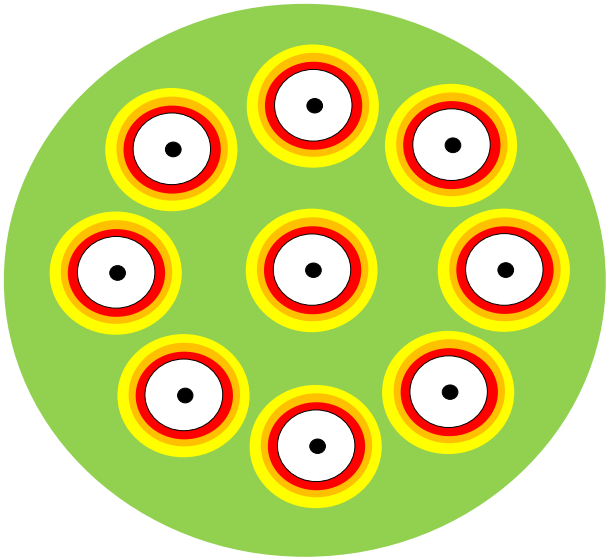
Electroporation

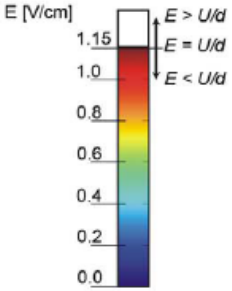
❖ Nine needle electrodes placed in a circle

➢ 8 electrodes circular placement +single electrode central placement

❖ (+), (-) Cross-placement

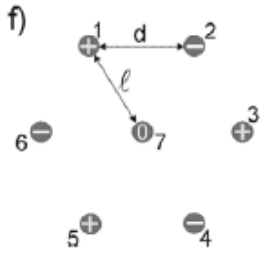
Electric field of
EPN electrodes configuration

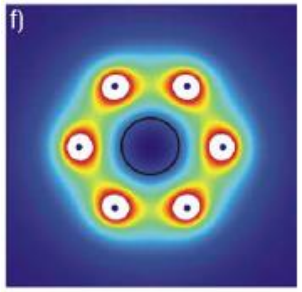




Reference

Corović S, Pavlin M, Miklavcic D. Analytical and numerical quantification and comparison of the local electric field in the tissue for different electrode configurations. Biomed Eng Online. 2007 Oct 15;6:37.





(+), (-) Cross-placement

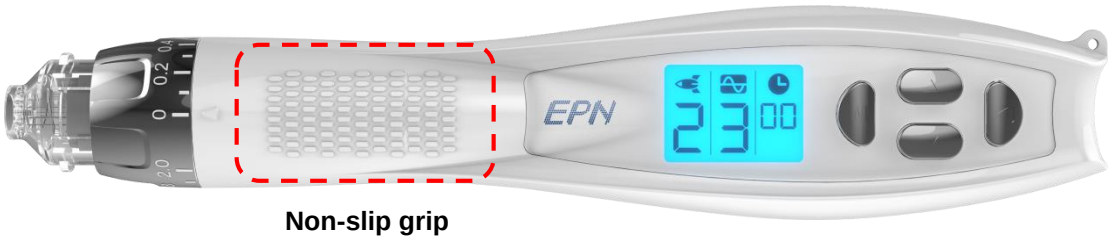
→ Constant electric field

※ EPN provide constant electric field to all the tissue between the electrodes.

4. Device Feature & Technology

Ergonomic design

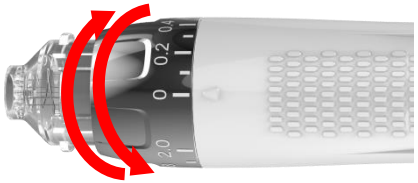
- A non-slip grip
- Operator-friendly handle as a pen type, enabling fatigue-free procedures



Non-slip grip

- Direct access to mount and dismount

Needle connection



Needle depth control

5. Efficacy report – Non-clinical report

Microneedle + electroporation

❖ Non-clinical transdermal delivery test method

Attachment of Mouse skin

Solution drop

EPN Application During 5 minute

In order to confirm drug permeation promotion by EPN, drug permeability of EPN was analysed using Transdermal diffusion system. The drug permeability of the EPN treated group and the untreated group was determined by using a diffusion cell. After attaching mouse skin to the diffusion cells, 5% Vit C solution was applied to the skin membrane, and the amount of permeated Vit C was measured after operating EPN for 5 minutes under the following conditions.

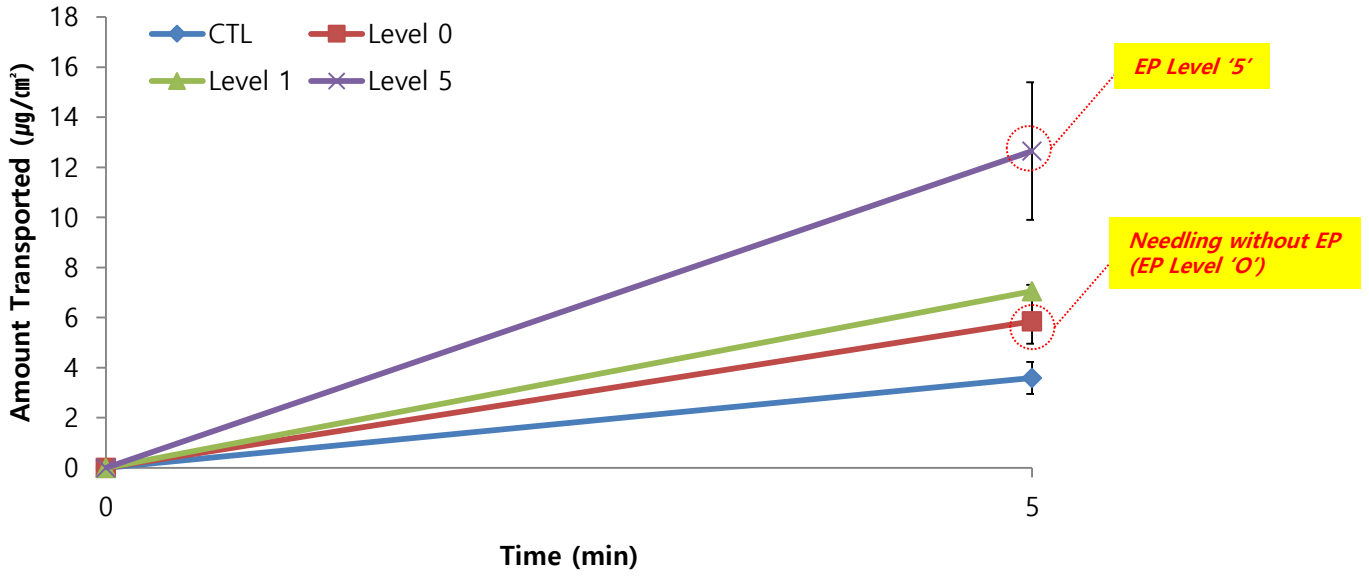
Sample	Control	Level 0	Level 1	Level 5
Needle	-	+	+	+
Electroporation	0	0	Low level	High level

Sookmyung Women's Univ. Research institute of pharmaceutical science, Oh S,
Skin permeation study of Vitamin C-2-Phosphate Mg salt using electrophoretic device(EPN), 2015. 11.

5. Efficacy report – Non-clinical report

Microneedle + electroporation

❖ Non-clinical transdermal delivery test result



Condition	untreated		Auto Needle		Needle + EP
permeability	1	<	**1.63**	<<	**3.52**

※ Microneedle with electroporation can effectively deliver high molecular and hydrophilic drugs.

Sookmyung Women's Univ. Research institute of pharmaceutical science, Oh S,
Skin permeation study of Vitamin C-2-Phosphate Mg salt using electrophoretic device(EPN), 2015. 11.

5. Efficacy report – Clinical report

Treatment region: Scalp

◆ Patient 1

Before | 3rd treatment | 9th treatment | 12th treatment

◆ Patient 2

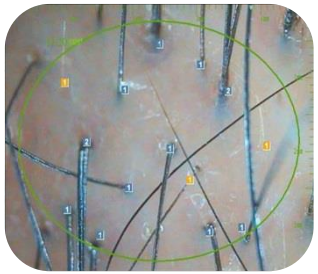
Before | 4th treatment | 10th treatment

5. Efficacy report – Clinical report

Treatment region: Scalp

◆ Patient 3

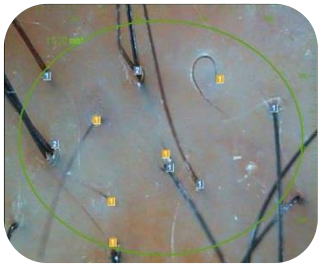
Before



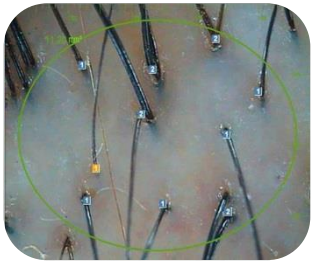
After

◆ Patient 4

Before



After



5. Efficacy report – Clinical report

Treatment region: Scalp

◆ Patient 5

Before

After

◆ Patient 6

Before

After

◆ Patient 7

Before

After

◆ Patient 8

Before

After

5. Efficacy report – Clinical report

Treatment region: Scalp

◆ Patient 9

Before

After

◆ Patient 10

Before

After

◆ Patient 11

Before

After

◆ Patient 12

Before

After

5. Efficacy report – Clinical report

Treatment region: Face

- Patient 13
  - Acne scar

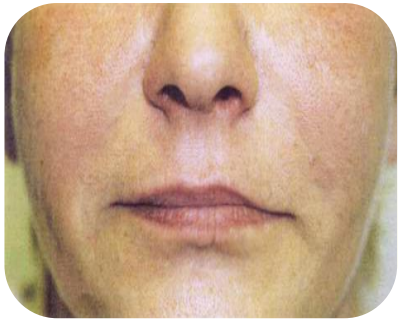
Before

After

- Patient 14
  - Nasolabial line

Before

After



Thank you

FOR FURTHER INFORMATION, PLEASE CONTACT US AT
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