NK Cell-Derived Extracellular Vesicle Delivery Through Transdermal Microneedles
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**Introduction**

- **Microneedles (MN)** have already been proven effective at delivering various biomolecules to patients.
  - This includes being able to deliver EVs despite their extreme conditions that make them difficult to maintain their longevity outside the body.
  - They also portray some benefits including being easier to self-administer and being minimally invasive.

- **Extracellular Vesicles (EVs)** are vesicles that are released by cells that usually deliver proteins, metabolites, and nucleic acids to cells, but they also have therapeutic potential.

**Objective & Impact of Professor's Research**

Dr. Chung’s lab focuses on developing targeted nanoparticles for therapeutic delivery. The lab specifically works with NK-EVs, which are endogenous therapeutic nanoparticles that have inherent honing properties. The lab strives to further improve NK-EV delivery through microneedles. The outcome will allow for a more efficient way to deliver treatment of diseased tumors.

**Methods & Results**

![Microneedle Characterization](image)

![Microneedle Synthesis](image)

**Methods & Results**

- **Hyaluronic Acid (HA)** is a polyanionic gel-like polymer that can be found in the skin: it is shown to maintain protein stability, has low immunogenicity, and is FDA approved for dermal fillers.
- **Trehalose (Tre)** is a disaccharide sugar found in mushrooms and shrimp: it has bioprotective effects, low immunogenicity, and is used as a stabilizer in the food industry.

**Results:**

![Microneedle Protein Stability](image)

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**Citations**

