MICROVESICLES TO NANOEMULSIONS
*design inspiration from nature*

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...what are these?

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**Microparticles:**
...a cellular dust with mission
BIOMIMICRY: design inspiration from nature

Nanoemulsion: …miniature version of microparticles

Nanoemulsions are colloidal dispersion systems composed of two immiscible liquids mixed with the help of an emulsifying agent.

Simple …yet extraordinary

Controlled Drug Release
Targeted Drug Delivery
Alter Gene Expression
Nanoemulsion: …treatment of onychomycosis

NB002: …novel cationic nanoemulsion to penetrate nail bed

Why should anesthesiologist care about nanoemulsion?
Exparel®: case in point

Substance P and NK-1 Receptors: key pain mediator

1. Substance P binds to NK-1 receptors.
2. Substance P/NK-1 receptor complex leads to endosome formation.
3. Acidic endosomes mediate signals.
4. Endosome signaling mediates nociception.

pH sensitive nanoemulsion: novel vehicle to carry aprepitant

Concentration of aprepitant in dorsal horn of spinal cord using different aprepitant formulations:
Nanoemulsion: potential role in chronic pain

- Nerve growth factor
- Transient receptor potential cation channel subfamily V member 1 (TRPV1)
- Alpha-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid receptor (AMPAR)

Chronic Pain

- Precise antibody delivery to prevent NGF
- Gene silencing with siRNA

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