

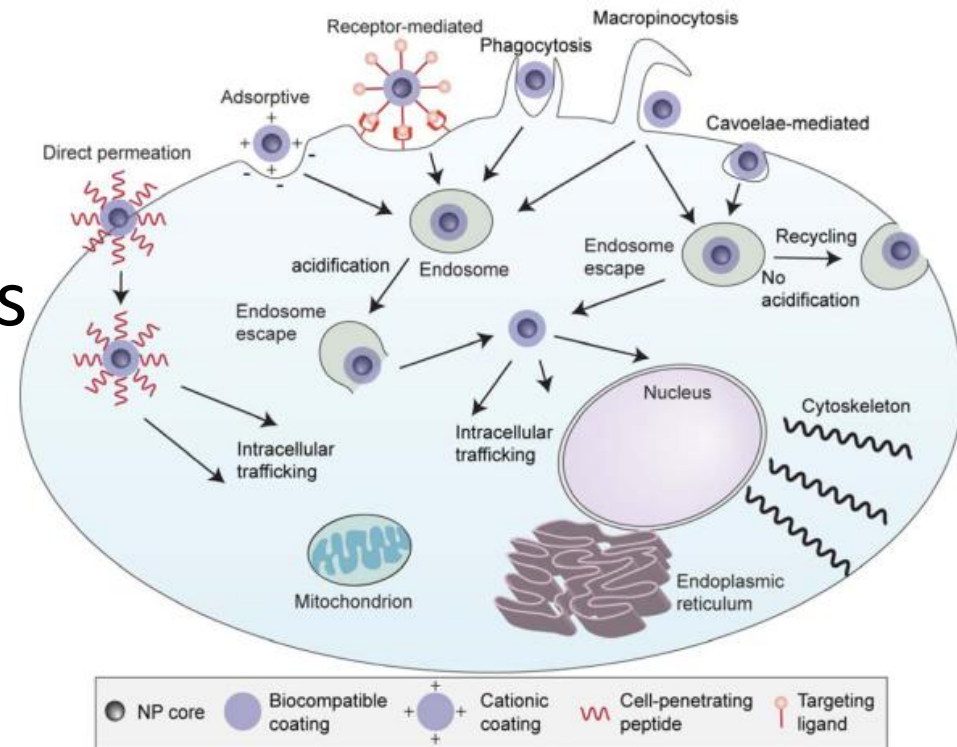
Nanoparticles for Gene Delivery

Joshua Lim



Project Overview

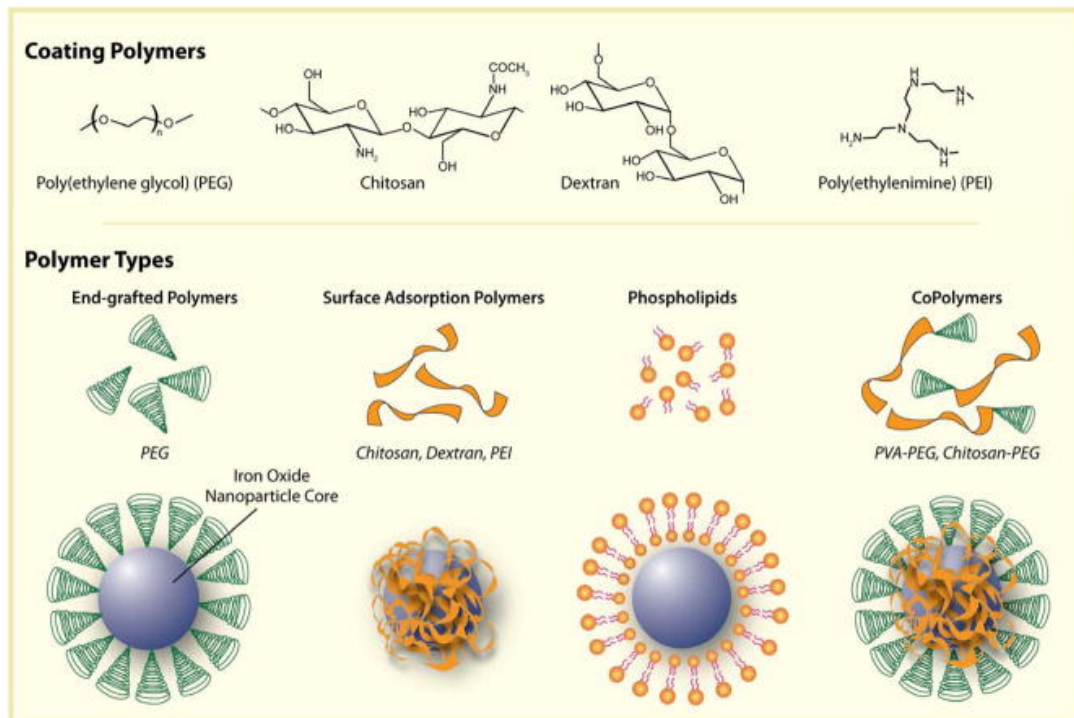
- Based on previous work with non-viral gene delivery method
- Iron oxide nanoparticles bring advantages
 - Superparamagnetic
 - Biodegradable
 - Easily tunable



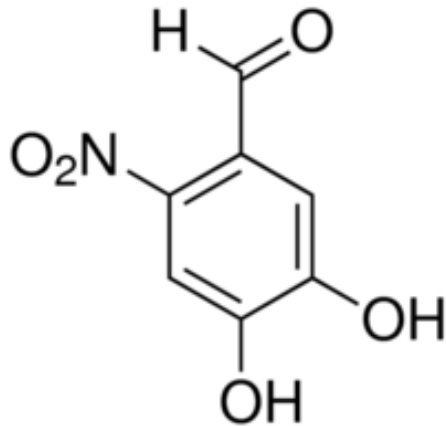
Iron Oxide Nanoparticles

Several components

- Iron oxide core
- Copolymer: Chitosan-PEG (polyethylene glycol)
- PEI for DNA binding- tried 1.2 kDa and 25 kDa PEI



NPBA-PEI



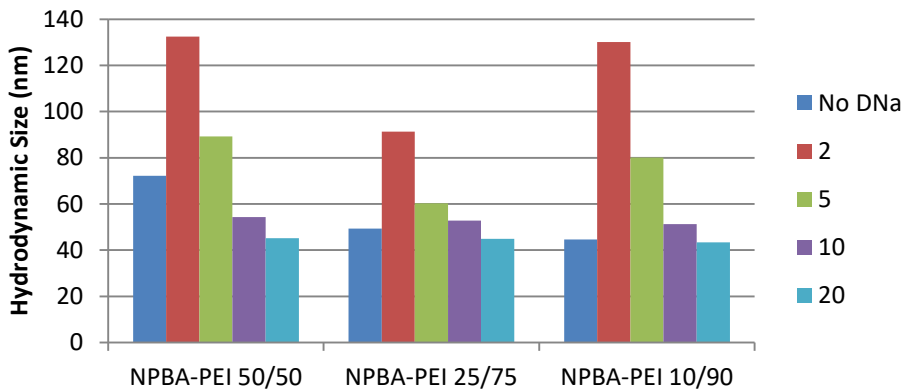
3,4-dihydroxy-6-nitrobenzaldehyde
used to modify chitosan for higher
affinity for iron oxide core

- Made batch of polymer, CPNBA-PEI, and incorporated into synthesis
- Tried different ratios of original polymer, CPBA, and new polymer, CPNBA-PEI

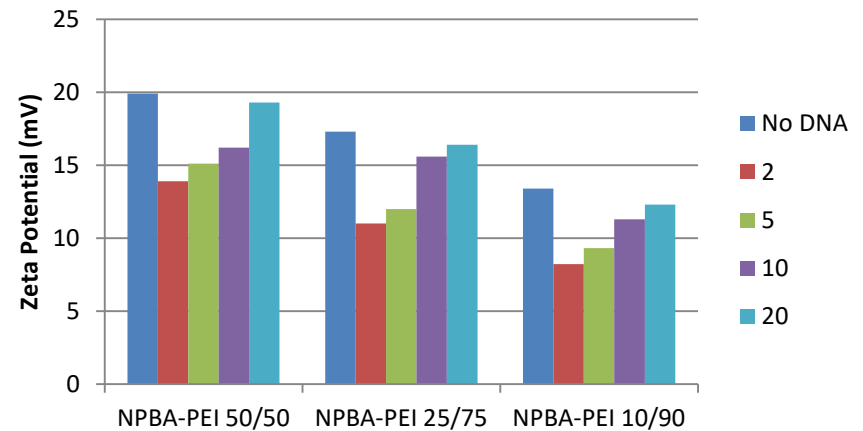
Characterization and DNA Binding

- Size and zeta potential measurements
- Bound DNA at four ratios of NP:DNA
- Red fluorescent protein DNA used

Size

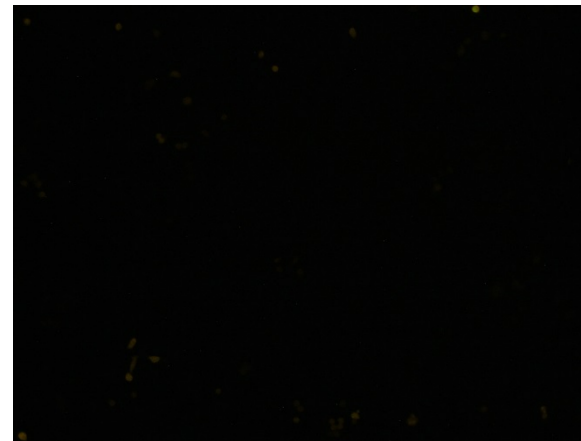
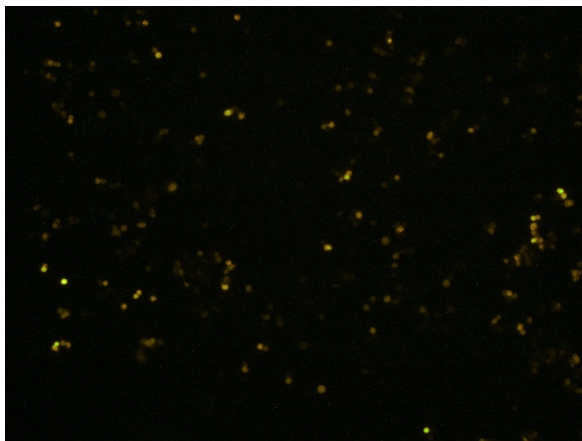
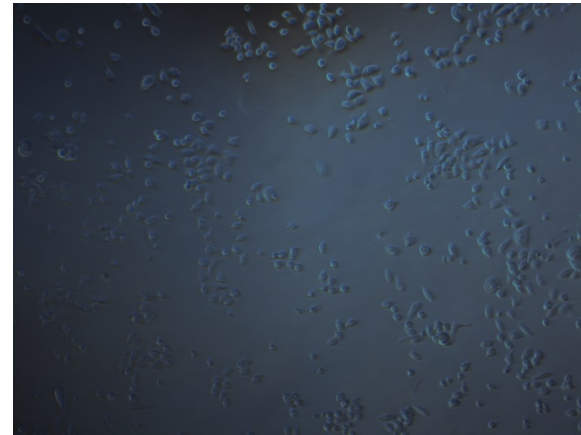
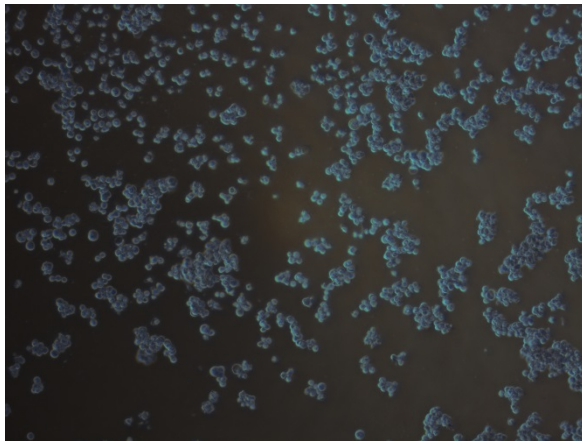


Zeta Potential



Cell Transfections

- Worked best with NPBA-PEI 50/50 on SF767 cells



50/50 10:1 NP:DNA 1 μ g DNA

Lipofectamine control

Future Work

- Measure transfection efficiency
- Try optimizing targeting ligands for enhanced uptake in specific cells
- Try combination of 1.2 kDa and 25 kDa PEI

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