Development of Targeted Nanoparticle Platforms

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Problem:

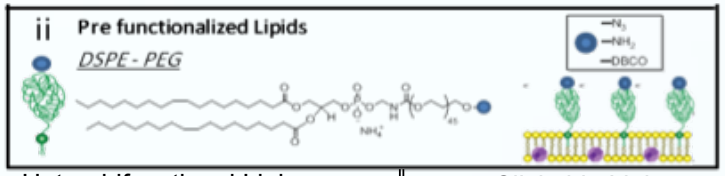
Active targeting of nanoparticles offers the opportunity for avoidance of toxic chemotherapeutic side effects and promotes internalization and retention in tumor cells.

Goal:

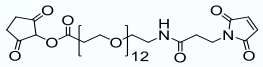
Functionalize the surface of the protocell with anti-HER2 affibodies and CD 47 peptides to increase active targeting specificity and decrease immunogenicity.

Method:

Pre-functionalized lipids are incorporated into the lipid composition prior to the protocell formation. Targeting ligands are attached using specific crosslinkers. *In vitro* studies of internalization were performed.

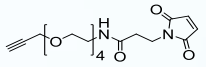


Heterobifunctional Linker



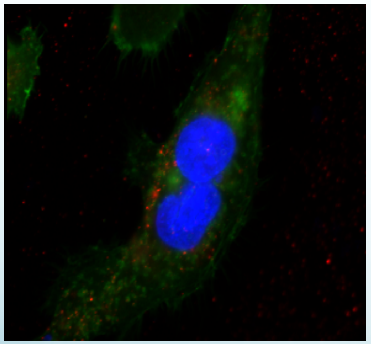
SM PEG 12

Clickable Linker

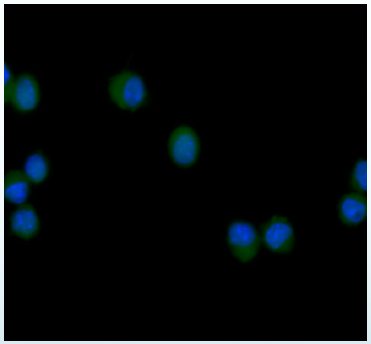


Propargyl- PEG- malemide

Results:



Protocell incubation in adenocarcinoma SKOV3 cells

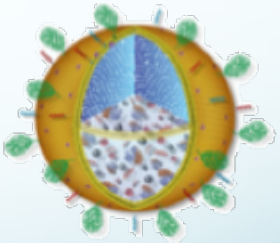


Protocell incubation in mouse macrophage RAW 264.7 cells

Results show no uptake by macrophage cells but insufficient internalization in cancerous cells.

Future Studies:

- Vary Anti HER2 / CD 47 concentrations to optimize internalization
- Perform in vivo experiments



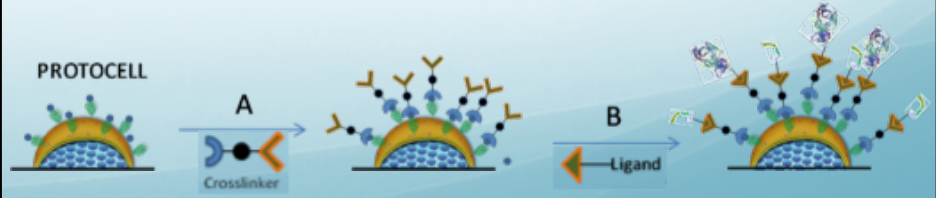


Image borrowed from: Ashley, C. E. et al. The targeted delivery of multicomponent cargos to cancer cells by nanoporous particle-supported lipid bilayers. *Nature* **2011** 10 (5), 389-397.