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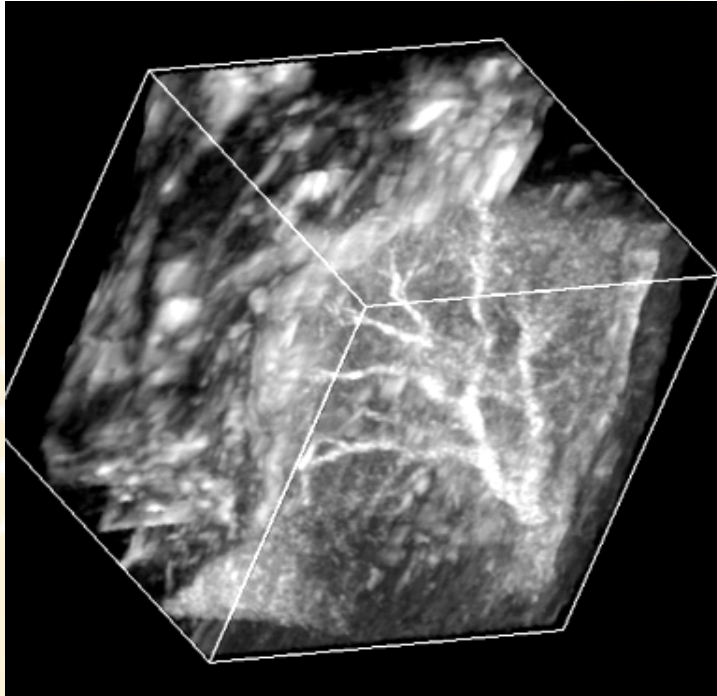
Microencapsulation Research

Drexel University
Philadelphia, PA

www.biomed.drexel.edu



Ultrasound Contrast Agents



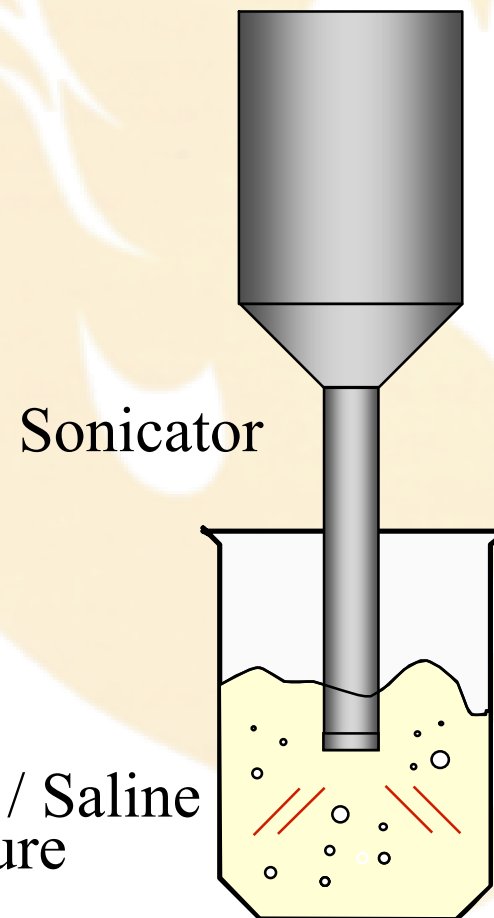
3-D image of rabbit kidney with contrast injected IV. Note excellent vessel definition.

- Our current agent is excellent for harmonic US imaging
- Brings imaging from the tissue (organ) to the vessel level
- Imaging is still on the macro scale
- Intend to visualize at the receptor (nano) level and deliver drug



Current Agent Preparation

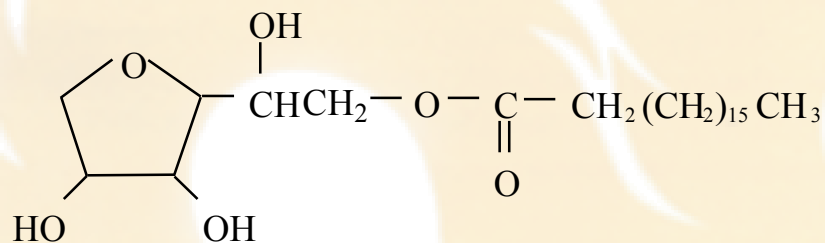
- Mixed Surfactant / Saline Solution
- Purge with perfluorocarbon gas (PFC)
- Sonicate for three minutes
- Bubbles formed through cavitation
- Separate from unused surfactant by gravity
- Wash with buffer, store under PFC.
- US Patent #5,352,436





Components for Surfactant-Stabilized ST68

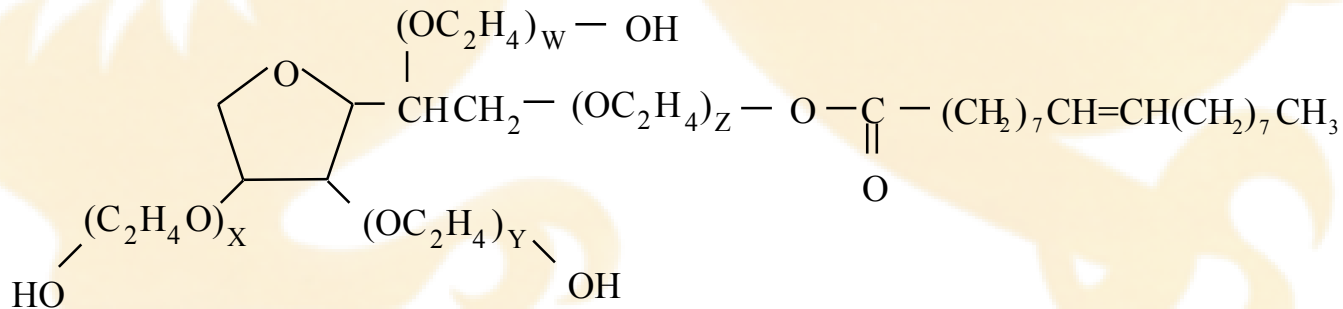
Span 60



Hydrophilic Head Group

Hydrophobic Tail

Tween 80



$$W + X + Y + Z = 22$$

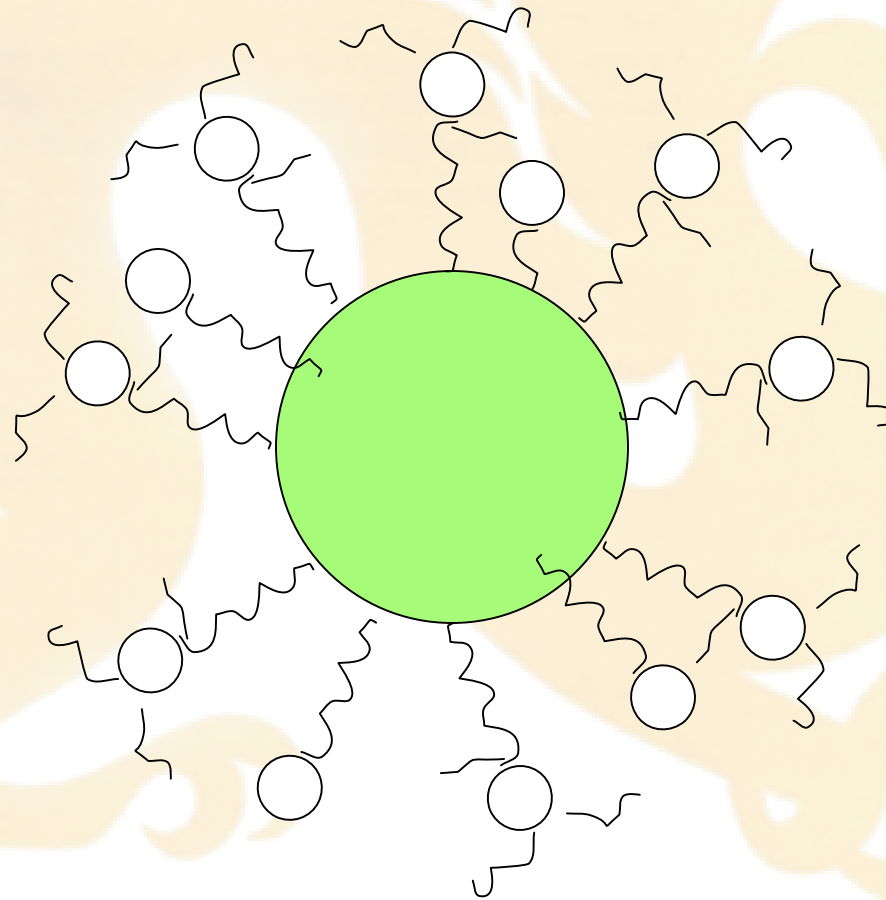


Visualization of the Agent

 PFC gas bubble

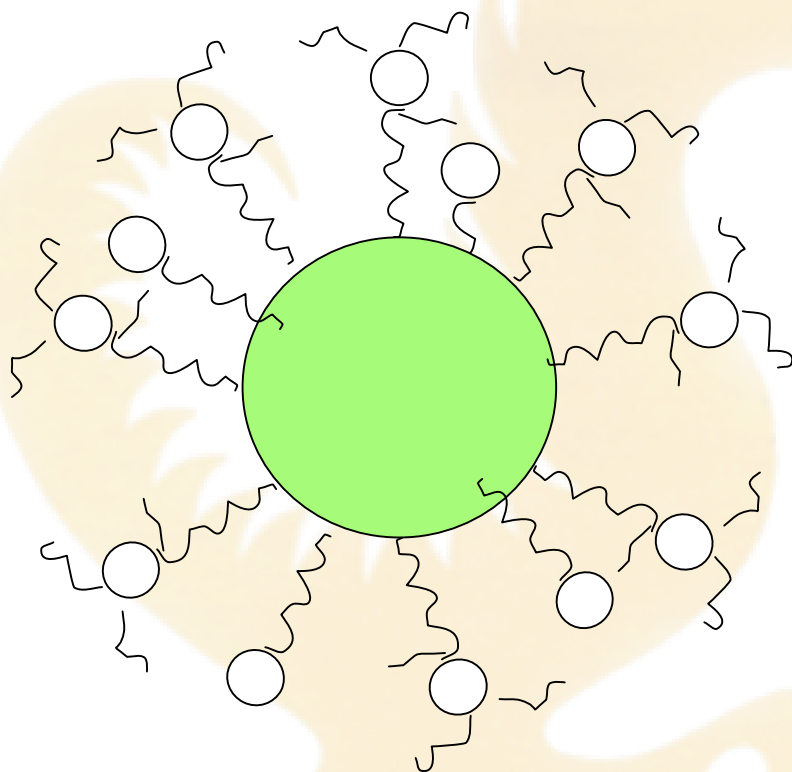
 Tweent80

 Span 60



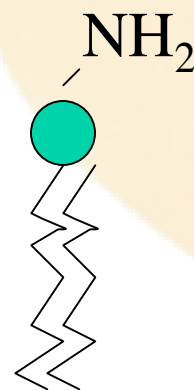


Proposed Agent Down at the Nanoscale



Y

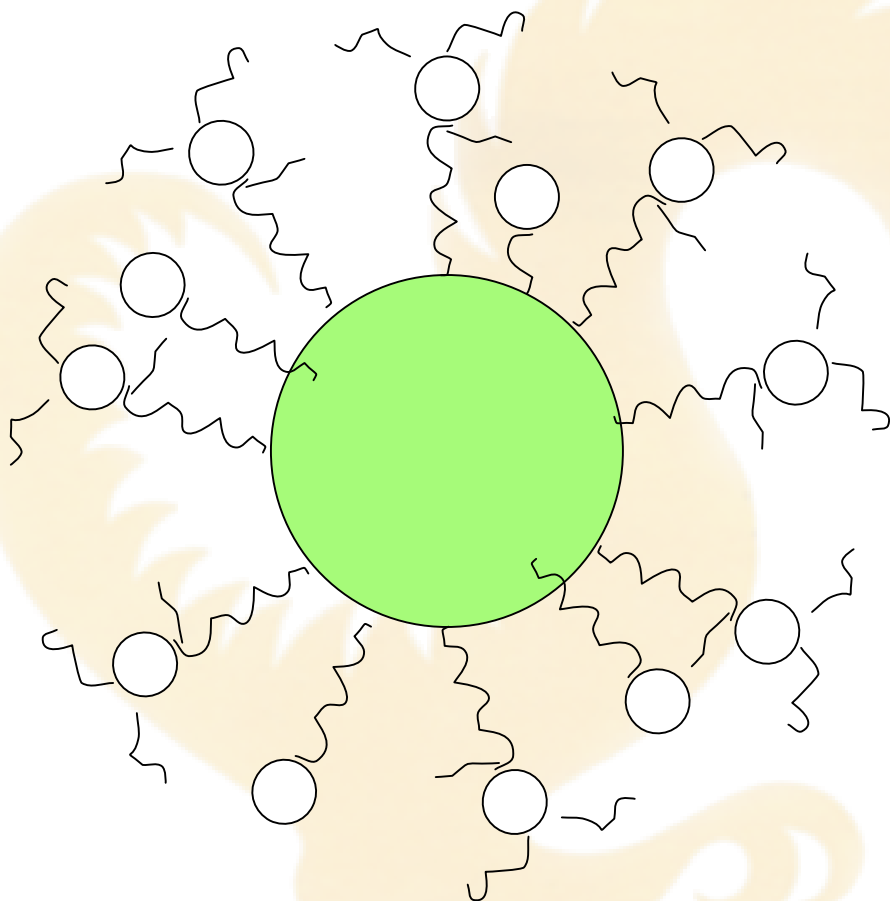
Targeting moiety
e.g., antibody



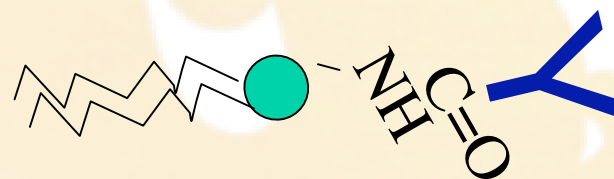
Phosphatidyl
Ethanolamine
(PE)



Forming Agent at the Nanoscale



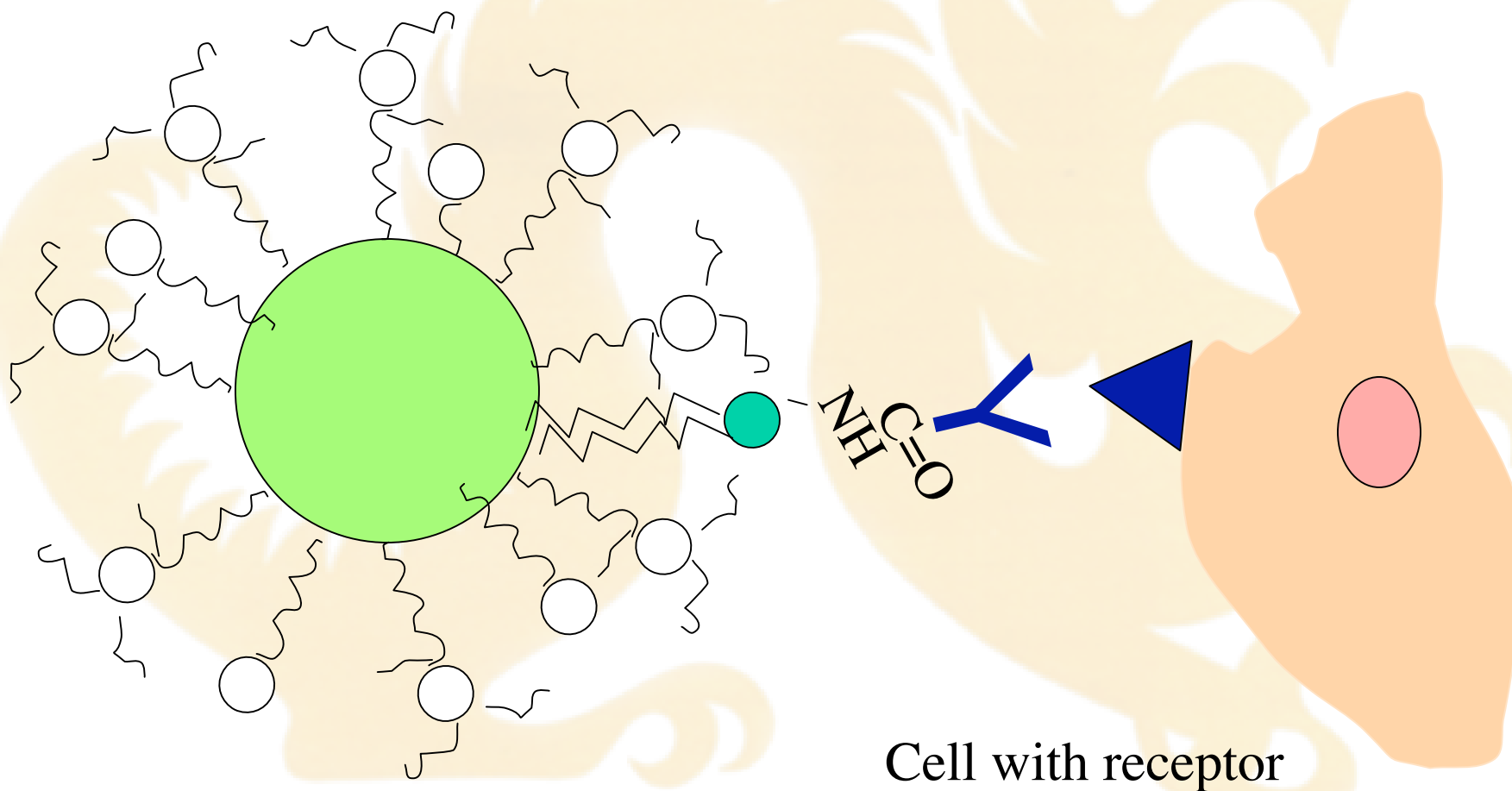
Link targeting moiety to PE



Insert into bilayer of agent

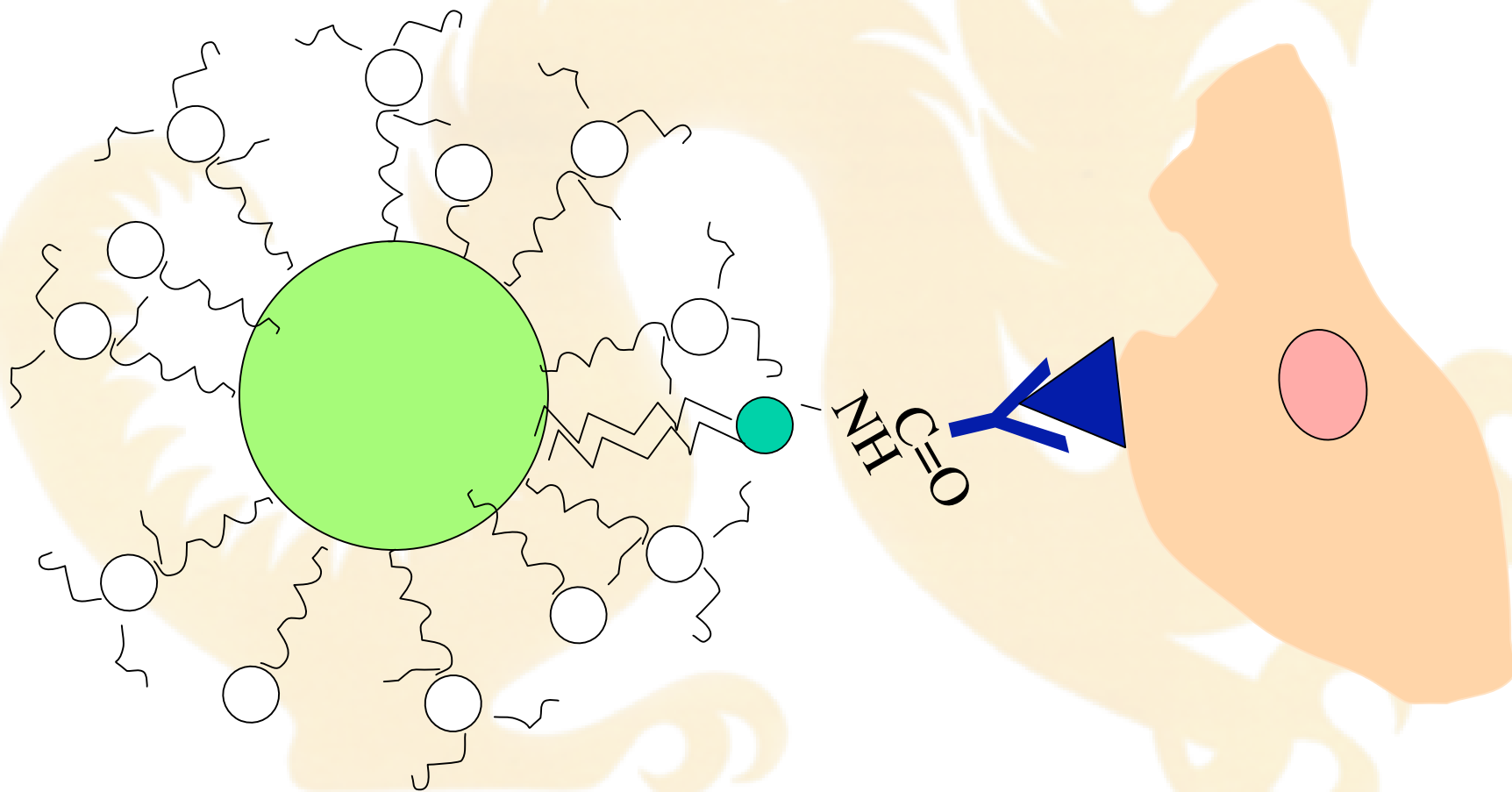


Agent Targeted at the Nanoscale



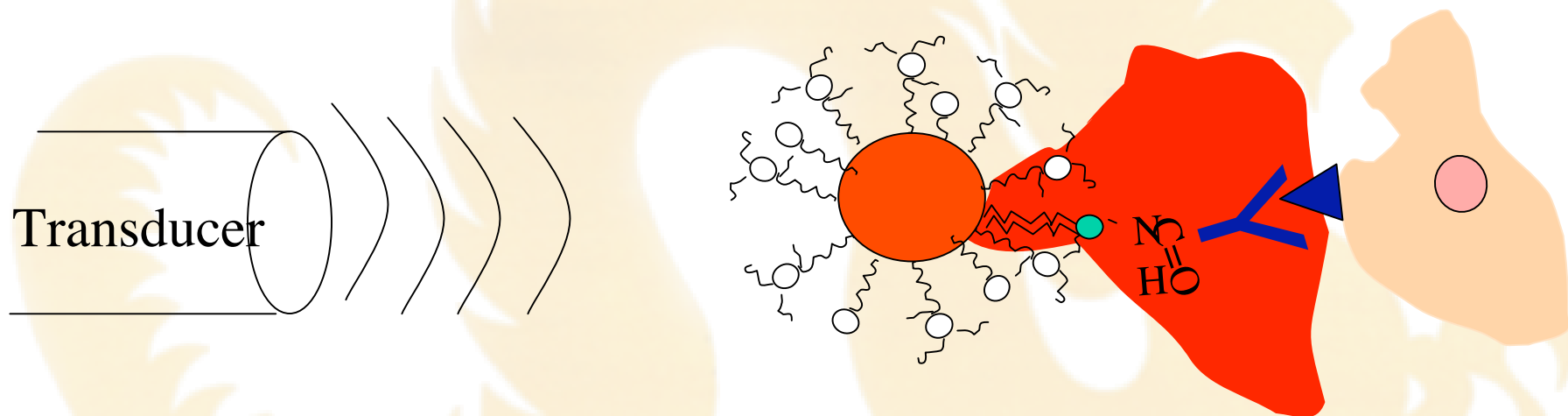


Agent Targeted at the Nanoscale





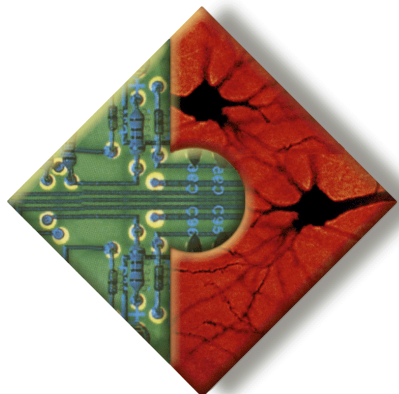
Drug Delivery at the Nanoscale



With some of the agent filled with drug (red) in the place of PFC gas, we intend to use the ultrasound to both image, and trigger targeted drug delivery directly to the cell



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