

New materials for drug delivery and surgery
A philosophical perspective

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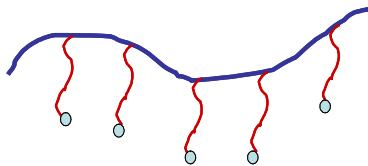
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Implantable material development

an interdependent field

■ Medicine

- Identifying unmet needs
- Defining the surgical/disease constraints
- Evaluating efficacy/biocompatibility

■ Engineering

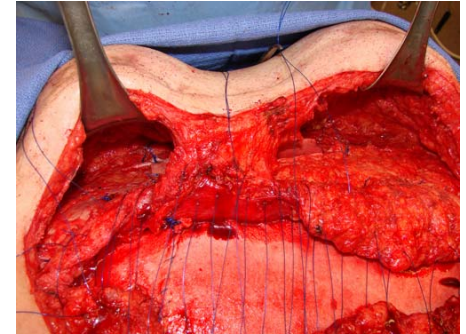
- Application of design criteria to the problem
- Determining design criteria of the problem

■ Basic sciences (chemistry/physics/biology)

- Mechanistic, fundamental understanding of systems

One example

biomaterials for seroma prevention



■ Medicine

- Seroma is a problem
- 25% occurrence in some procedures
- Potential for infection, necrosis, permanent cyst formation

■ Engineering

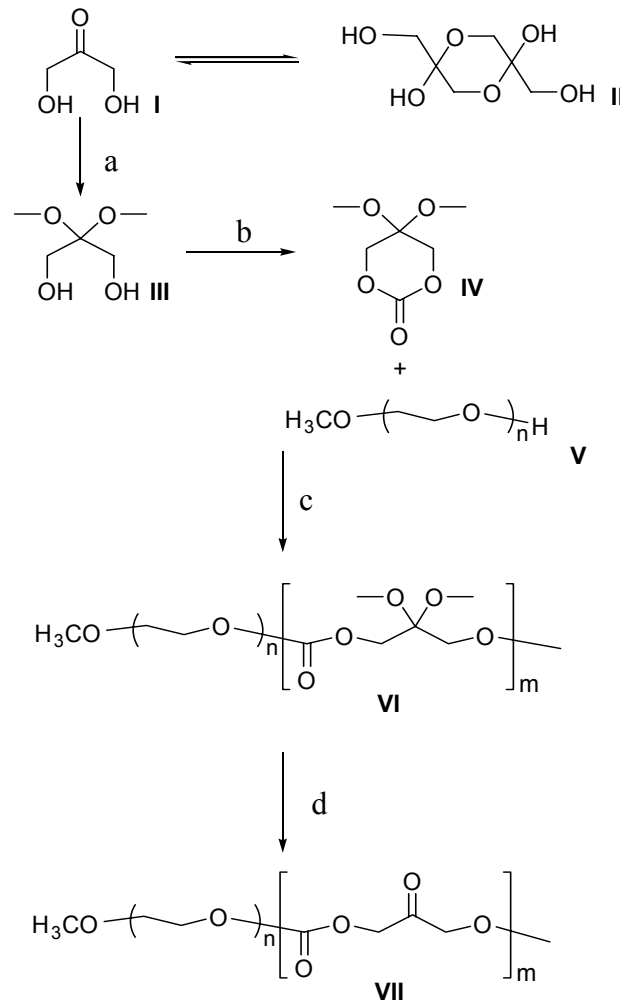
- Design of new biodegradable bioadhesive

■ Basic sciences (chemistry/physics/biology)

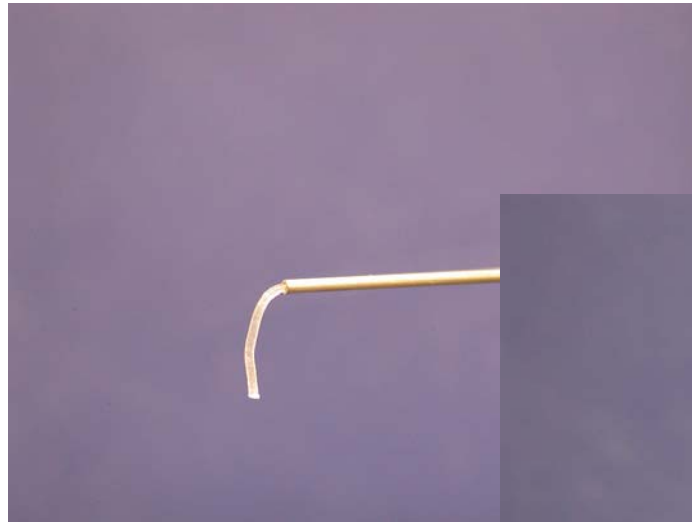
- Synthesis of bioadhesive
- Quantifying physicochemical characteristics
- Correlating material structure to anti-seroma efficacy

A new biomaterial: PEG-pDHA

Synthesis and characterization



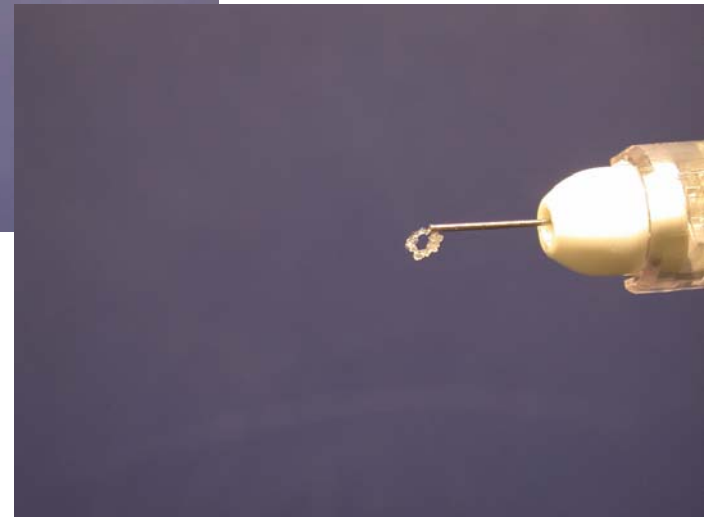
PEG-pDHA injection characteristics



20 gauge



21 gauge



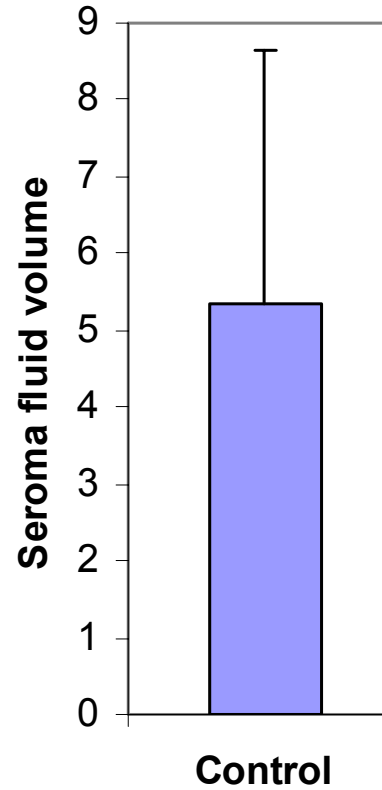
26 gauge

PEG-pDHA

anti-seroma efficacy



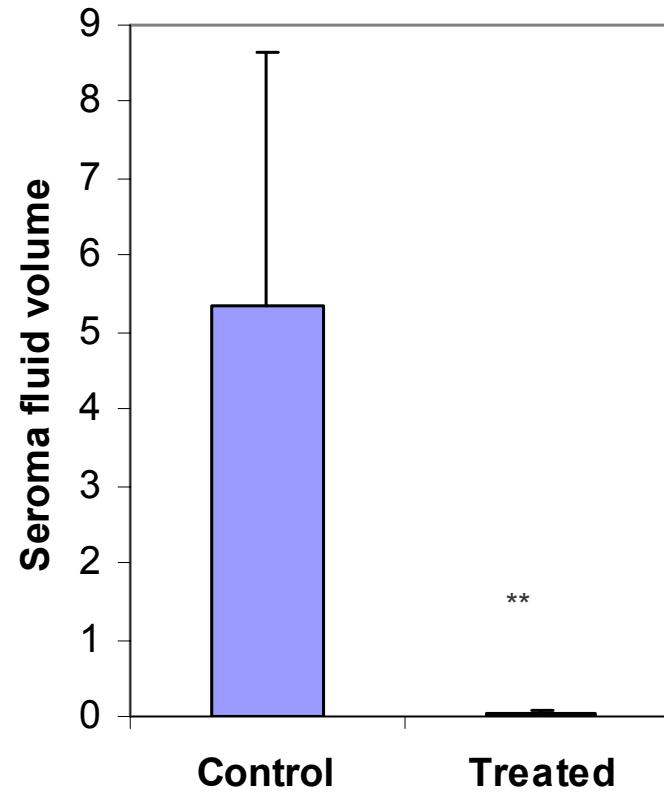
Rat model of mastectomy



PEG-pDHA *anti-seroma efficacy*



Rat model of mastectomy



Implantable material development

other opportunities?????????

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