Drug Loaded Spacers for LDR Prostate Brachytherapy

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Disclosure

I have the following financial relationships to disclose:

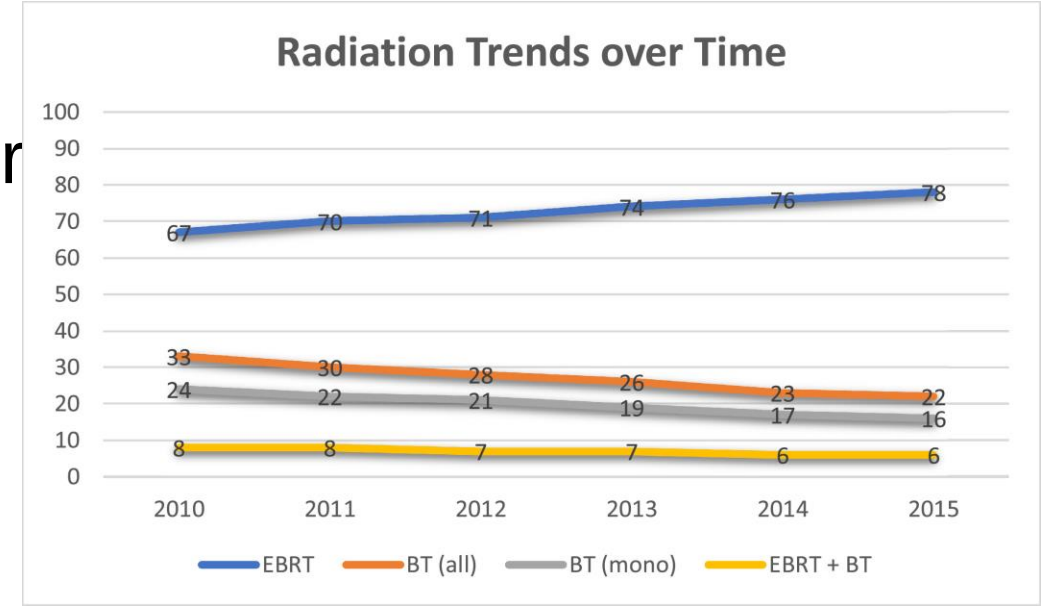
- Stockholder/Co-founder in: Capio Biosciences, Archimmune Therapeutics, Nanobarriers and Immune-X
- Research funding from Archimmune Therapeutics
- Consulting: Archimmune and Johnson and Johnson

- and -

I will not discuss off label use and/or investigational use in my presentation.

Background

- LDR brachytherapy is an effective treatment for prostate cancer
- Not sufficient as single-treatment for high risk disease
- Main toxicity is urinary retention
- Utilization has decreased due to SBRT and EBRT technology advances
- Advantages of brachytherapy: normal tissue sparing, logistics etc remain



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Background

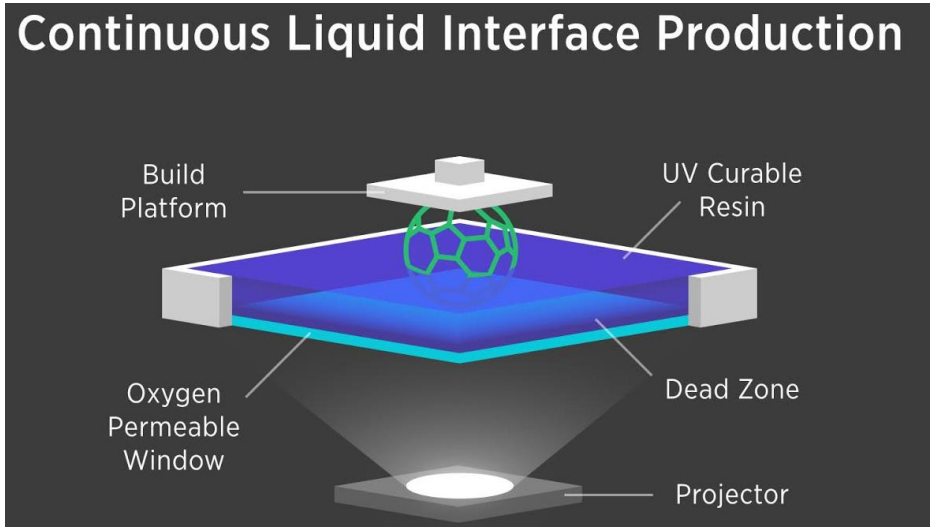
- “Systemic agents” such as ADT, enza/apalutamide, docetaxel can improve treatment outcome in PCa
- Steroids can be used to reduce swelling associated with brachytherapy
- But these systemic agents have significant toxicity/side effects
- Spacers in LDR (not to be confused with SpaceOAR) can be used for drug delivery

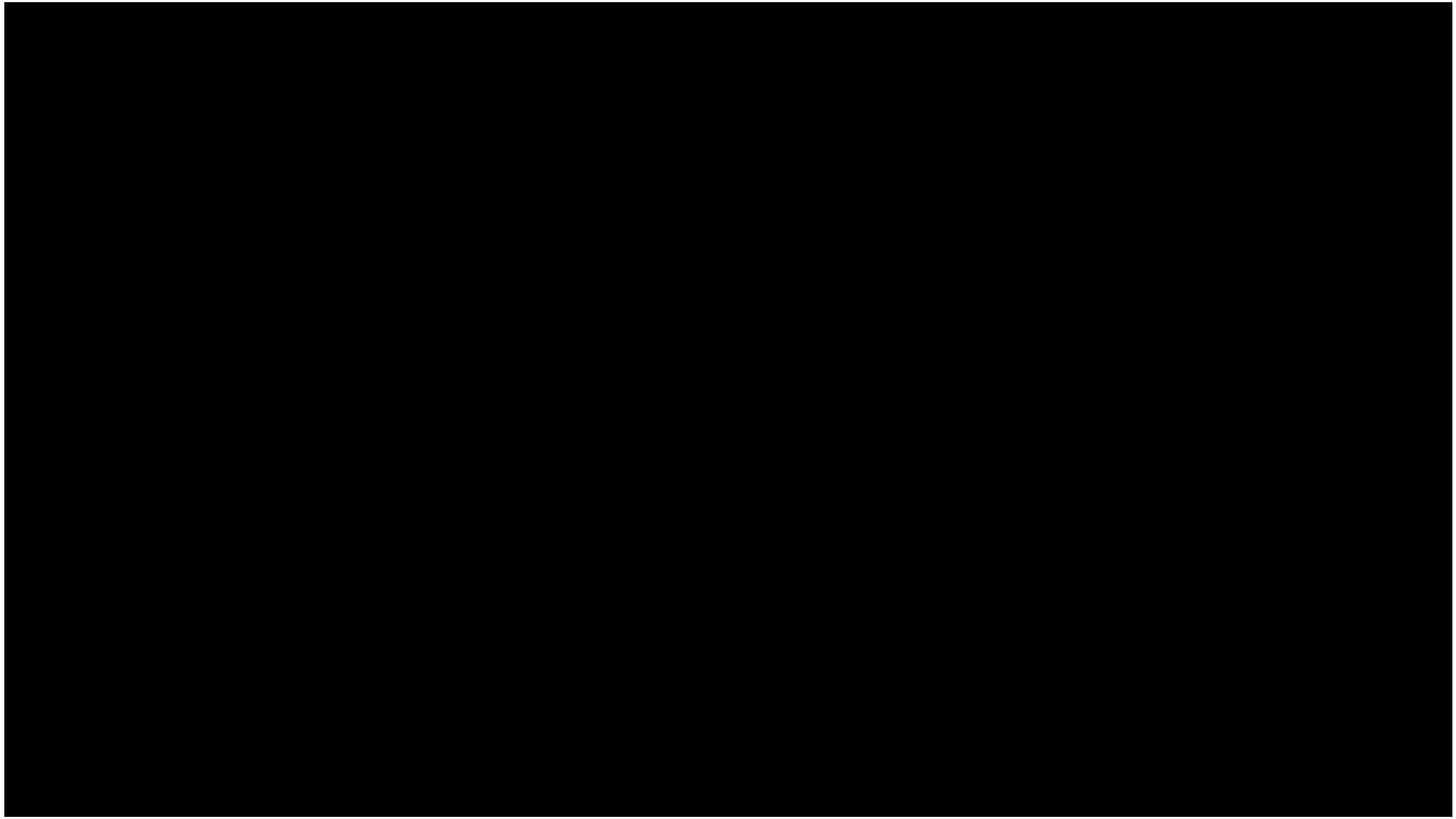
Considerations of local drug delivery

- Material: Biocompatible/biodegradable with ability to delivery multiple types of therapeutics
- Shape: Controlled release over long periods of time
- Formulation/manufacturing: easy to engineer

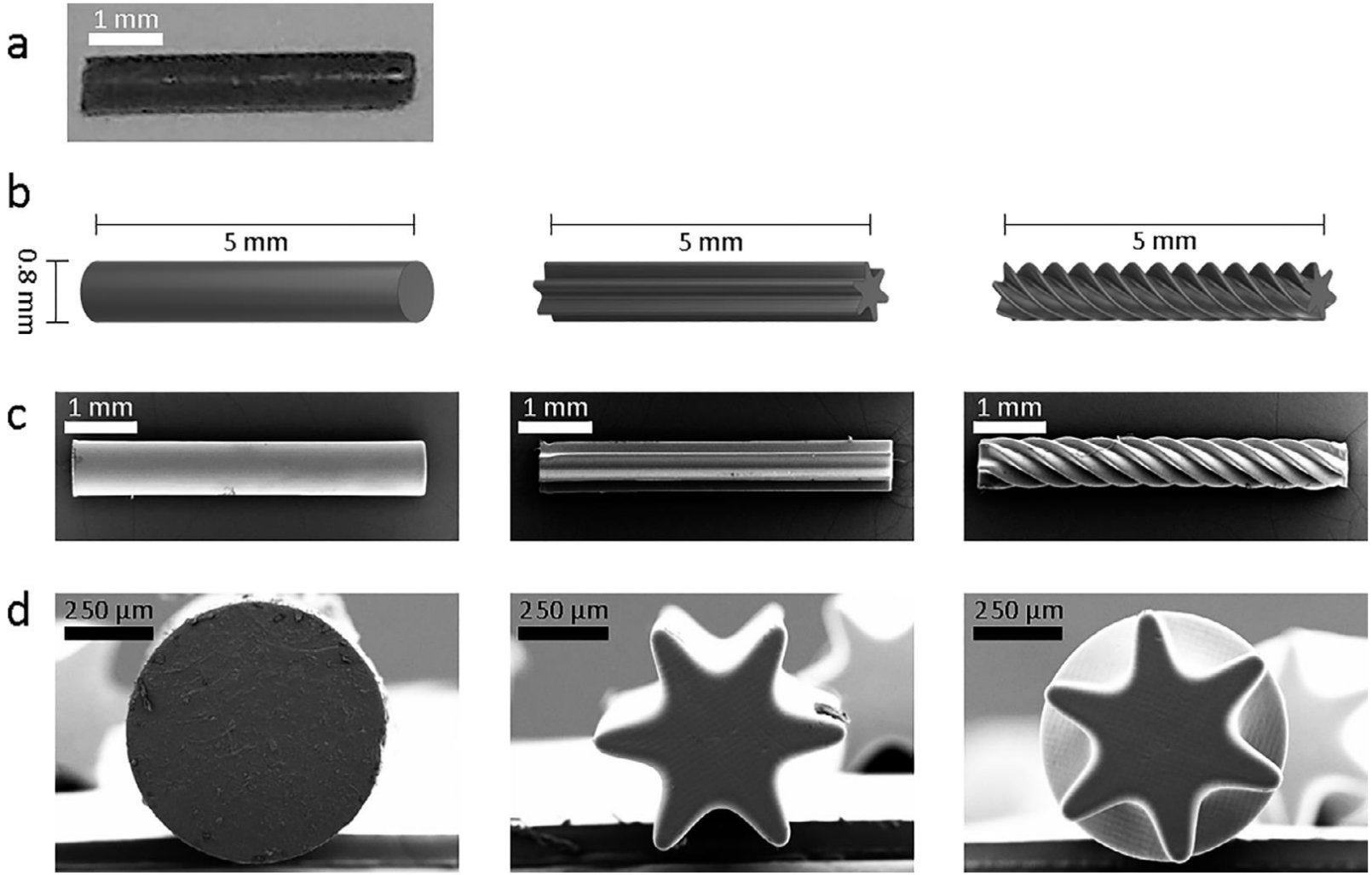
Continuous liquid interface production (CLIP) 3D Printing

- Fast
- Layerless
- High resolution





Spacer design



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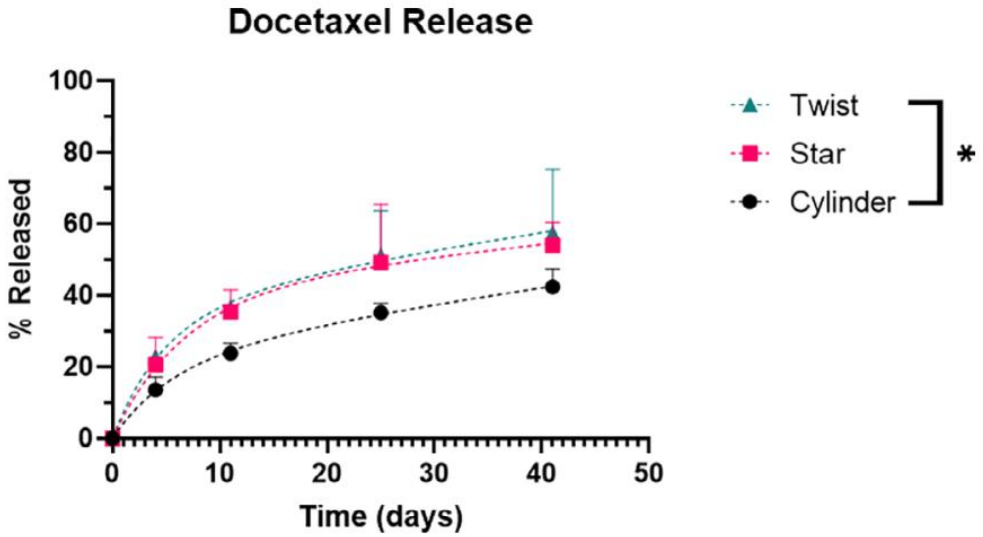
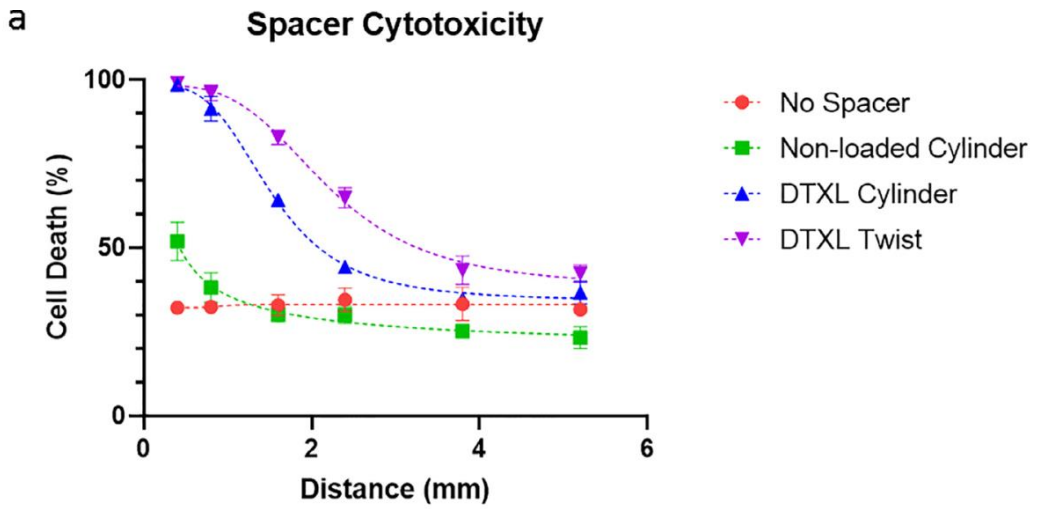
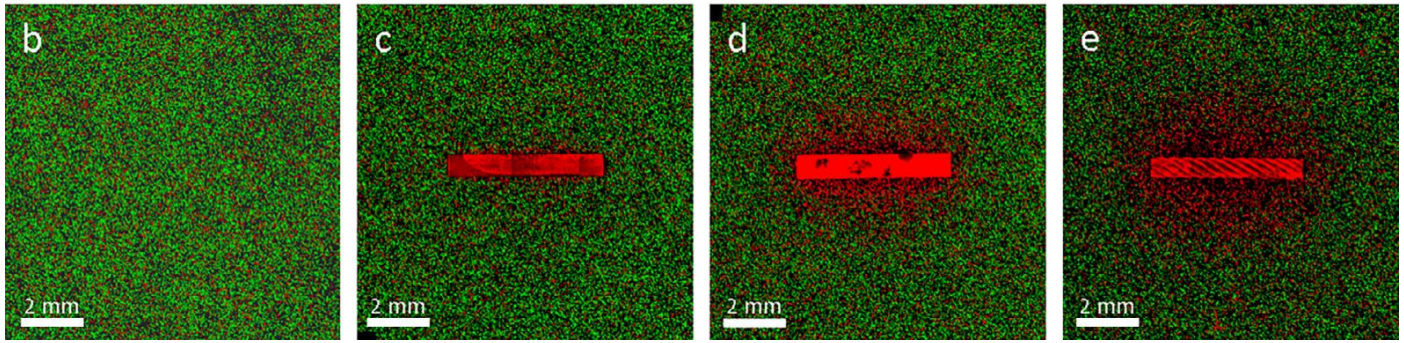
Drug release and diffusion







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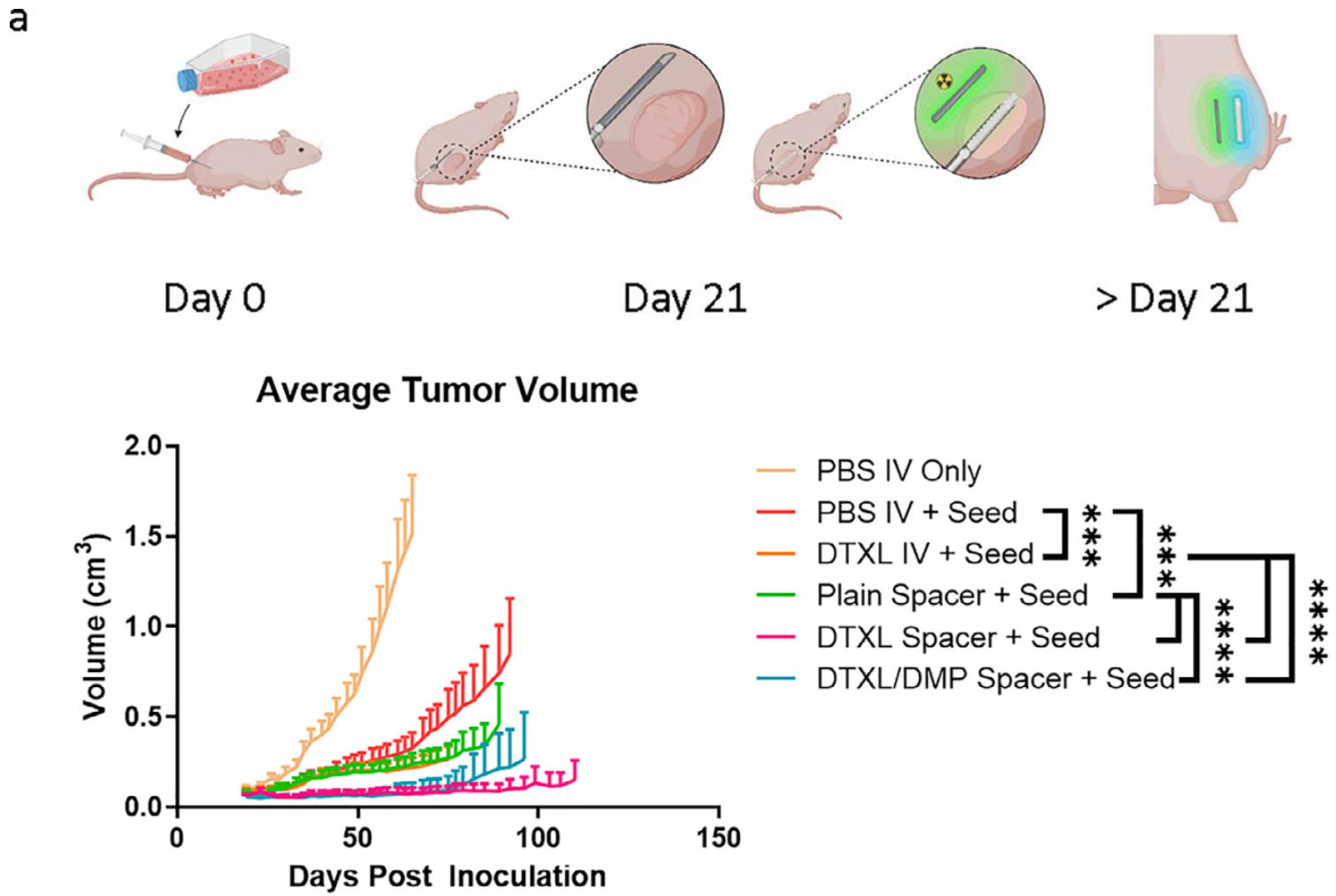
Drug-loaded spacer efficacy



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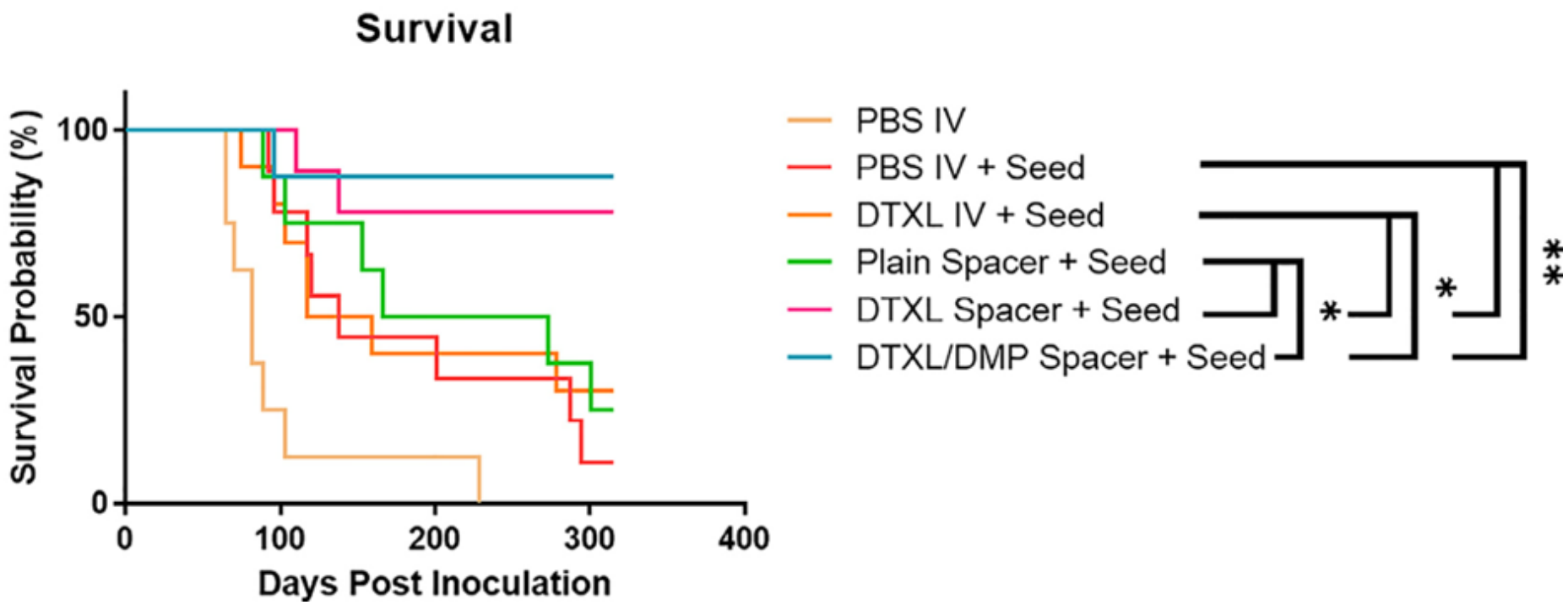
Survival
Survival Probability (%)
100
50
0
0
100
200
300
400
Days Post Inoculation
PBS IV
PBS IV + Seed
DTXL IV + Seed
Plain Spacer + Seed
DTXL Spacer + Seed
DTXL/DMP Spacer + Seed
*
*
*
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Summary

- Spacers in brachytherapy can be loaded with therapeutics
- Drug release can be controlled through spacer design
- Drugs that are effective against PCa, such as docetaxel, can be encapsulated within spacers
- Addition of these therapeutics can improve efficacy
- Future directions:
  - Clinical translation
  - ? Drug loaded spacers as solo treatment

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CAPIO BIOSCIENCES

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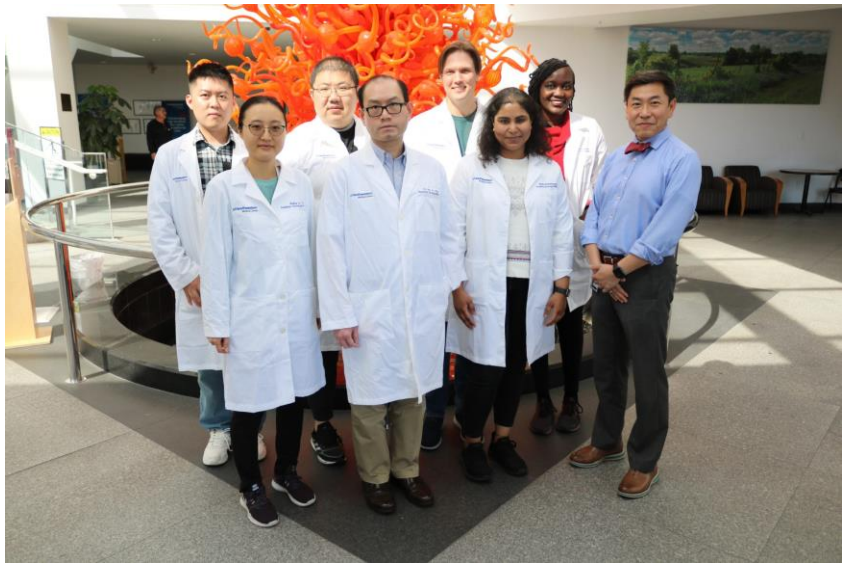

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Wang lab is hiring!!