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Nanomedicines for targeted cancer-specific delivery

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Theranostec Overview

- Focus on precision nanomedicines
  - Improves both therapeutic delivery and tumor penetration
- Combination of diagnostic and therapeutic activities
  - Image-guided diagnosis and surgery improves tumor removal
  - Additional trimodal therapeutic activity eliminates remaining tumor
- Pursuing Head and Neck Cancers as lead indication
- Lead compound TheraPhD shows positive *in vivo* activity in animal models
- Strong patent protection for nanoparticle technology
- Raised 300k in non-dilutive SBIR funding
- Seeking $20M for IND-enabling studies and phase I clinical trials

Conventional Chemotherapy

Targeted Nano-therapy

Head and Neck Cancers Are an Increasing Threat

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- 550,000 new cases every year globally
- 6th most prevalent cancer
- Market valued at $1.3B, projected to reach $2.3B by 2025
- 90% are Squamous Cell Carcinomas (HNSCC)
  - 2015 5-year survival rate: 62.3%
  - Survival rate unchanged over 24 years
  - Tumors are difficult to remove completely
  - Tumor recurrence is leading cause of death

Current Standard of Care is Inadequate

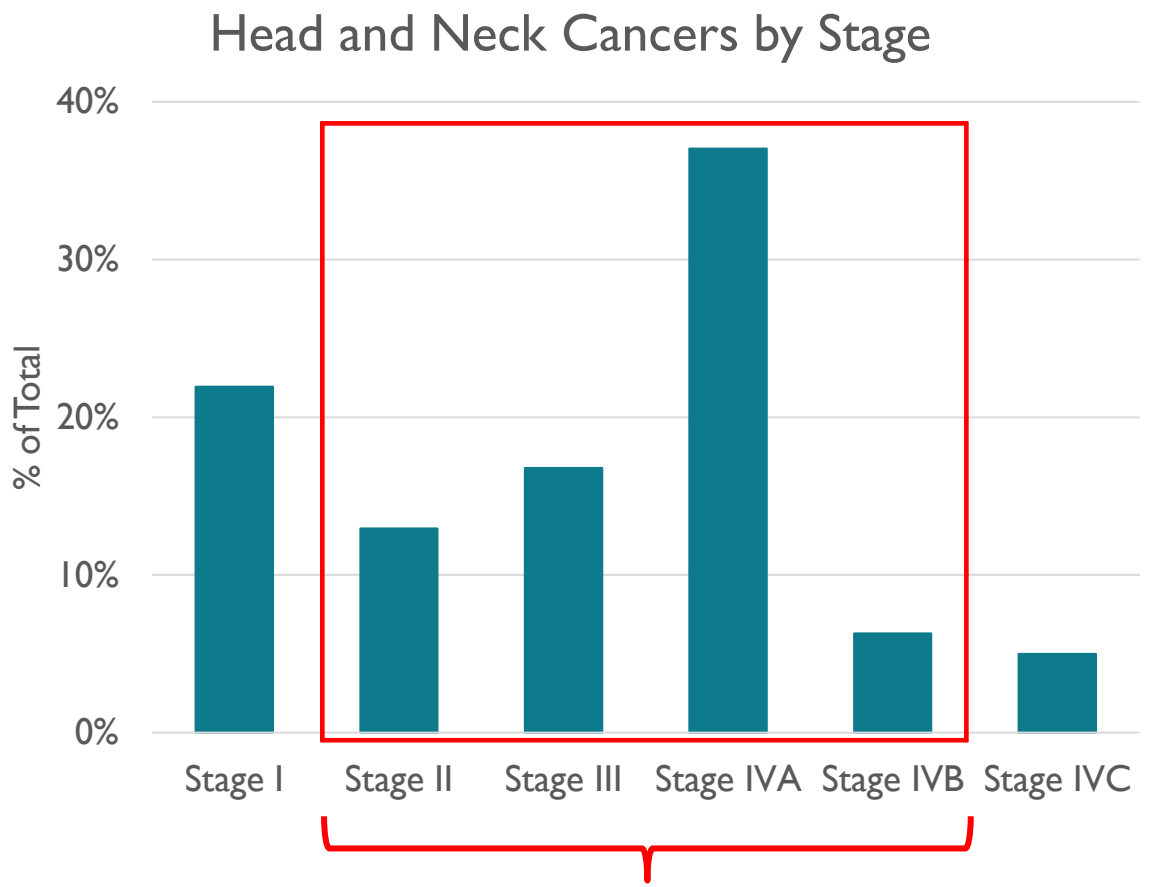
Surgery:

- Difficult to remove due to location
- Doesn't fully remove margin

Chemotherapy:

- Significant off-target activity and side-effects due to toxicity
- Lack efficacy – inefficient at eliminating tumors completely

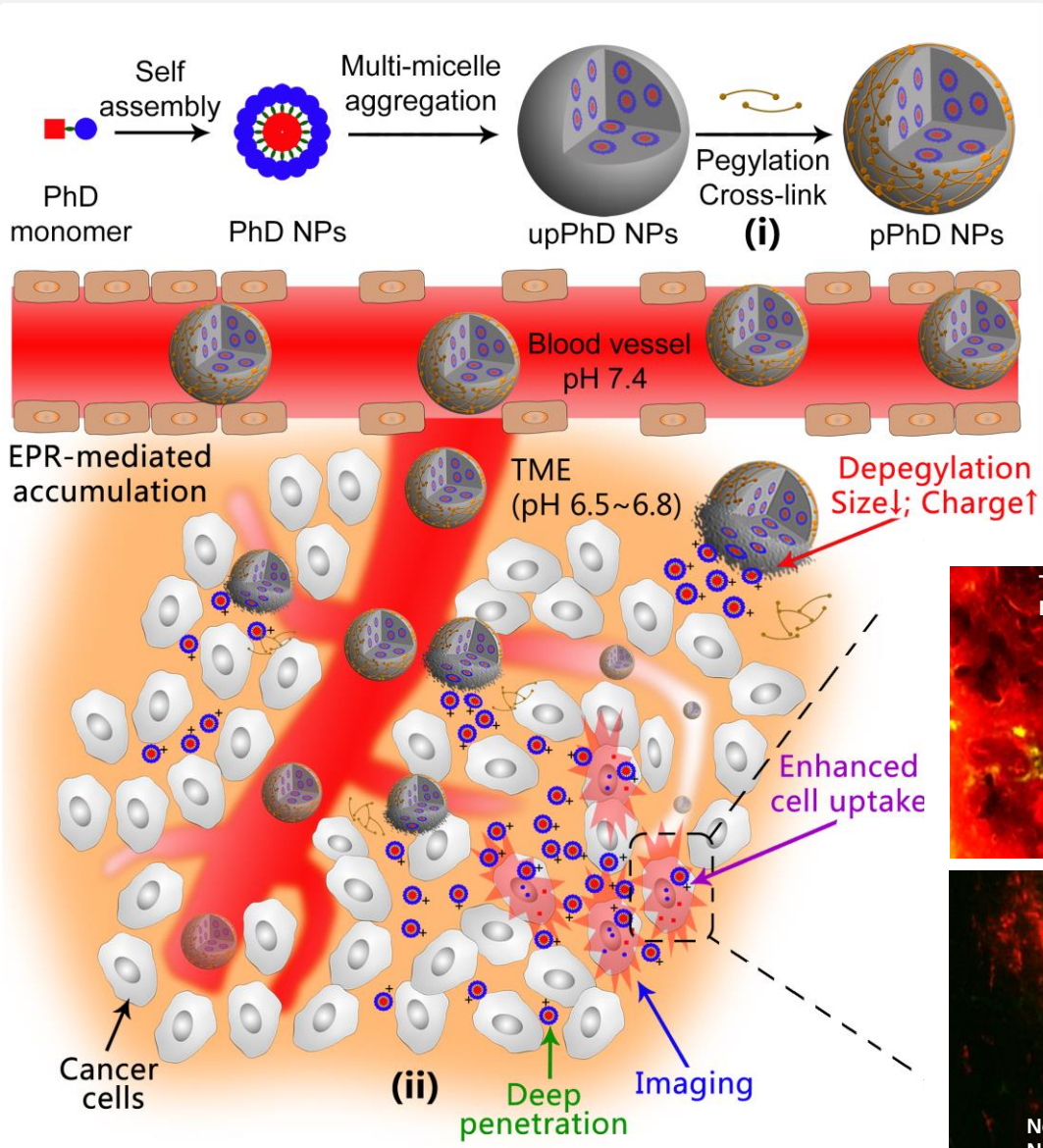
No current agent has both diagnostic and therapeutic activities

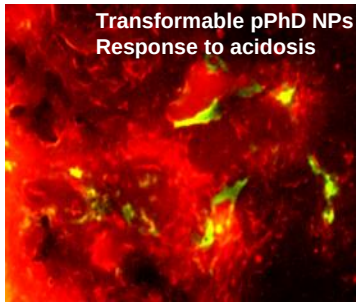


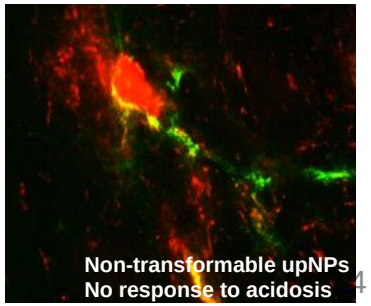
Theranostec Addresses 75% of Cases

Solution: Nanovehicles with Trimodal Therapeutic Activity

- **"Trojan-Horse" nanovehicles made of cross-linked, self-assembling nanoparticles**
  - High drug content
  - Excellent stability
- **Unique trigger mechanism releases active compounds only in the presence of the tumor**
  - Enhanced tumor accumulation & penetration
  - Reduced toxicity
  - Widened therapeutic window

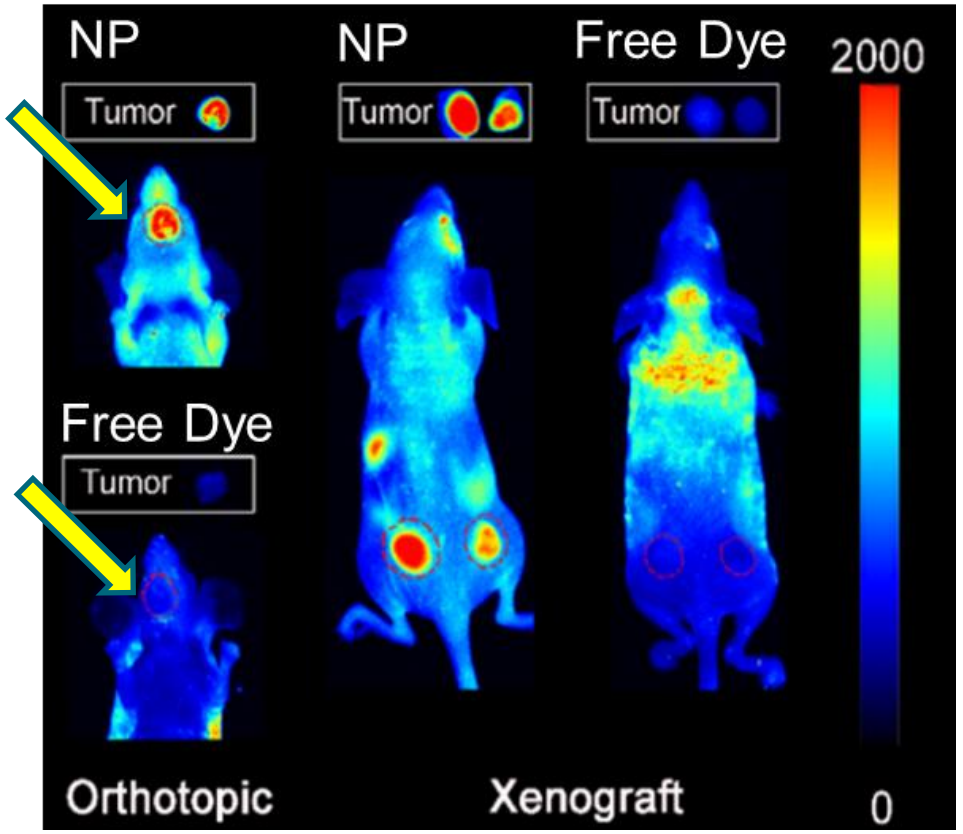


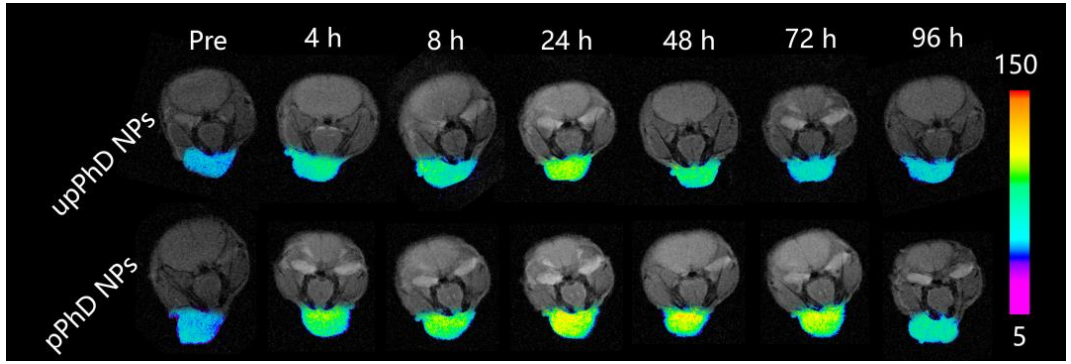




Improved Surgery Through Imaging-guidance

- **TheraPhD can also be used as a tumor imaging agent**
- **Can be used to more easily delineate the tumor from healthy tissue**
  - Increasing surgical precision
  - Reducing chance of tumor recurrence
- **TheraPhD capable of dual imaging modalities**
  - Near-infrared fluorescence imaging (NIRFI)
  - Magnetic resonance imaging (MRI)





Treating Residual Tumor Through Phototherapy & Trimodal Therapeutic activity with TheraPhD

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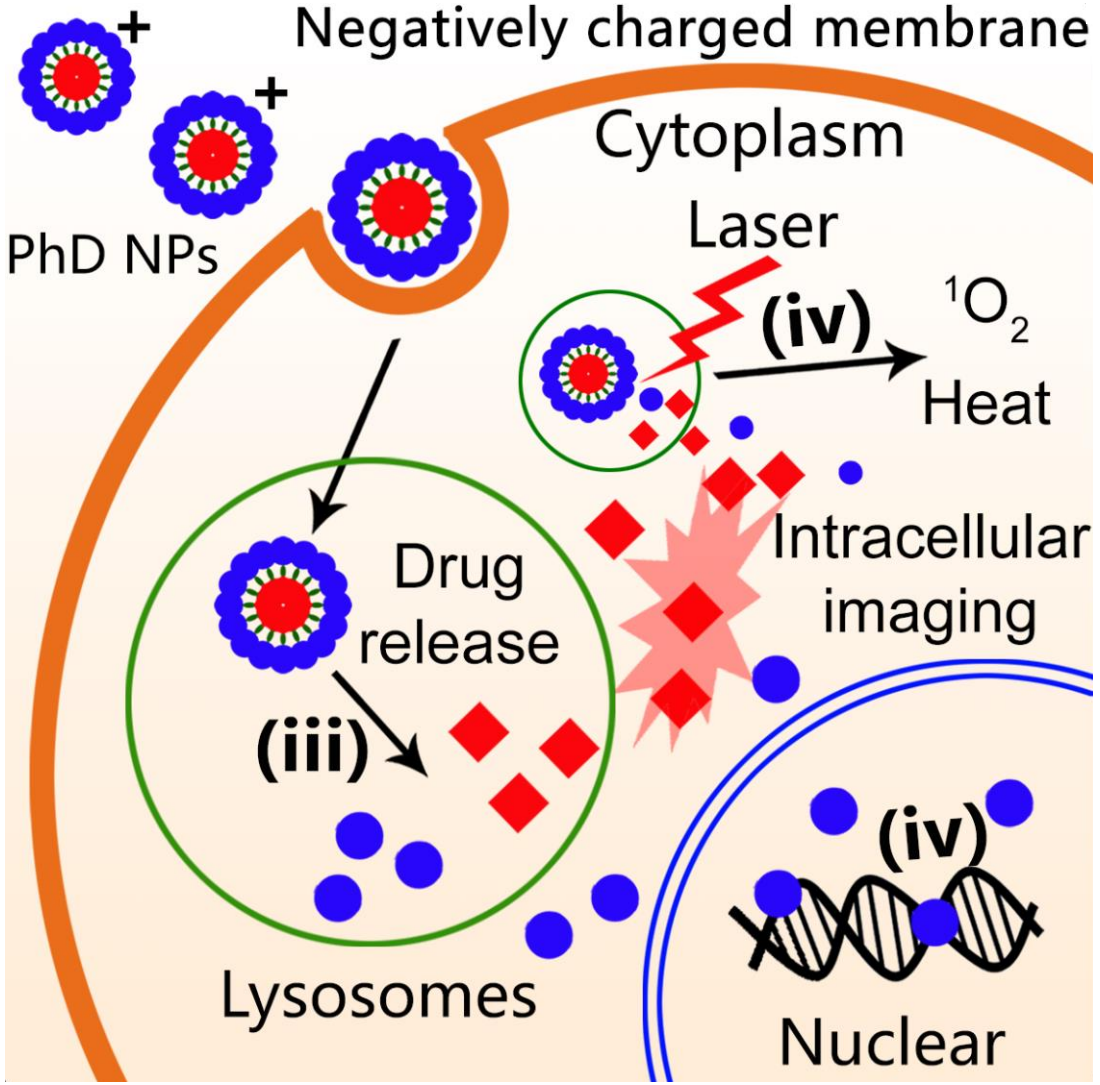
- **Trimodal therapeutic activity combines chemo- and photo-therapeutic activities**
  - Chemotherapeutic, Photothermal, Photodynamic
- **Targeted laser phototherapy amplifies the anti-tumor efficacy and prevents off-target activity**
  - Phototherapy can be used to tune therapeutic effect to the desired level
  - Can be used post-surgery to clean up residual tumors



TheraPhD Has Extremely Positive *In Vivo* Activity

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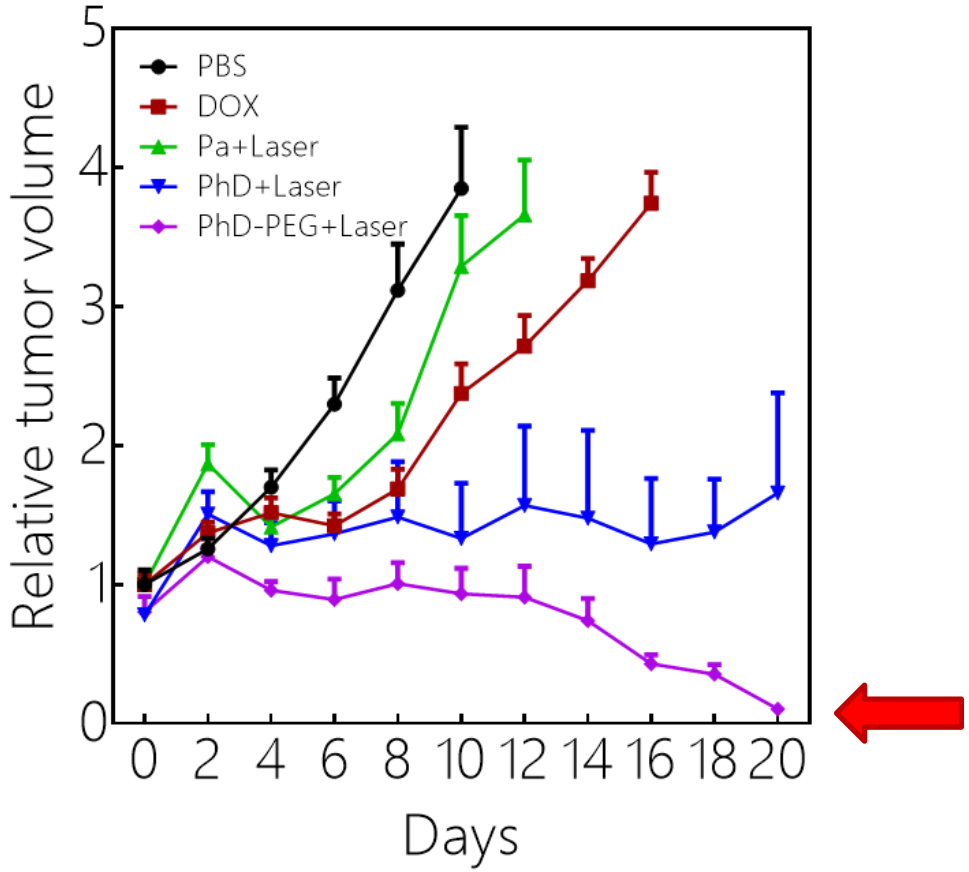
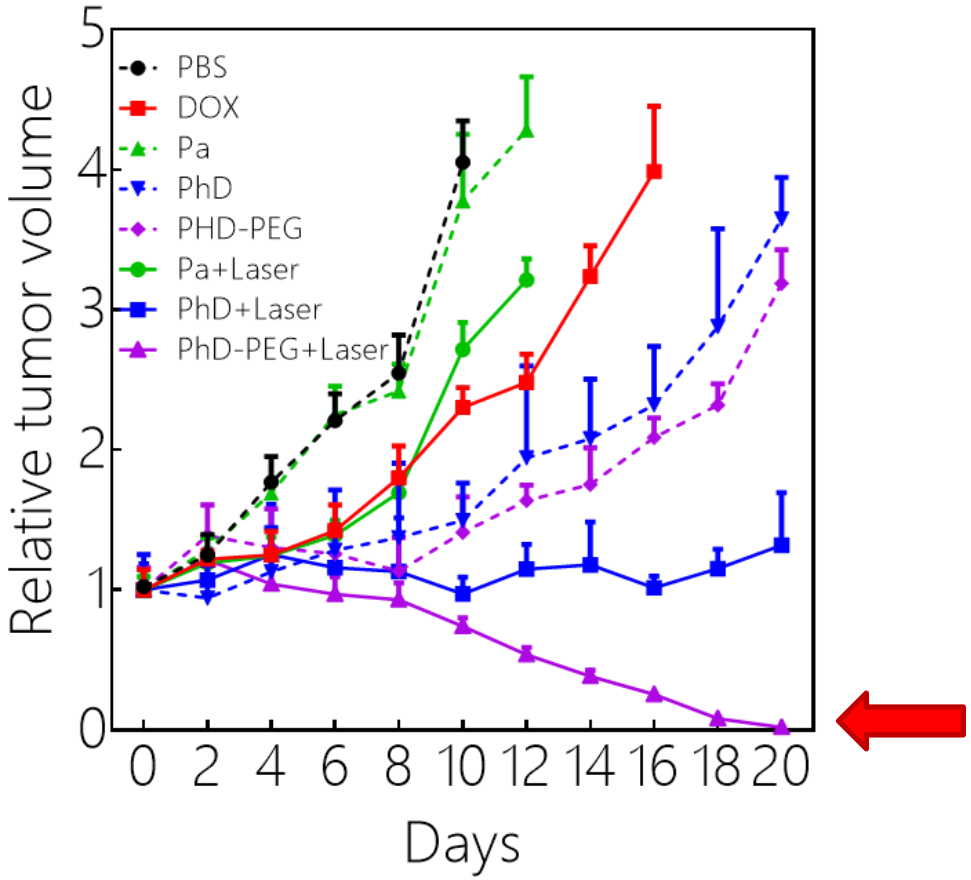
Orthotopic model



Subcutaneous model



TheraPhD nanoparticles completely eliminated oral cancers in both models

Milestones & Funding

Development Stage	Preclinical POC	Pre-IND	Phase I
Funding Required	$300k	$2M	$18M (Series A)
Milestones	✓ SBIR Phase I-funded ✓ Formulation Optimization ✓ Early In vivo evaluation ✓ PK/PD	• Efficacy/ Toxicity evaluation • GMP production • CMC section development	• Clinical Evaluation

Patents	• TheraPhD nanoparticle technology is currently under patent • US Patent US2018/037895
Publications	• Recent results published in Nature Communications (2018, 9, 3653)
Funding	• Received SBIR Phase I grant to optimize activity/stability and evaluate the diagnostic and therapeutic activity *in vivo* ($300k). • A new NIH grant just awarded to the Dr. Li's lab at UC Davis to conduct studies in companion animals (3M).

Team and Advisors

Team

Dr. Yuanpei Li, PhD
Founder & CEO
- Associate Professor of Biochemistry and Molecular Medicine at UC Davis
- Expert in nanotechnology and drug delivery

Dr. Cindy Lin, DVM, PhD
Founder & COO
- Research Associate Professor at UC Davis
- Expert in both *in vitro* and *in vivo* studies

Dr. Aaron Lindstrom, PhD
Principal Scientist
- Postdoctoral Scholar at UC Davis
- Expert in medicinal chemistry and drug design

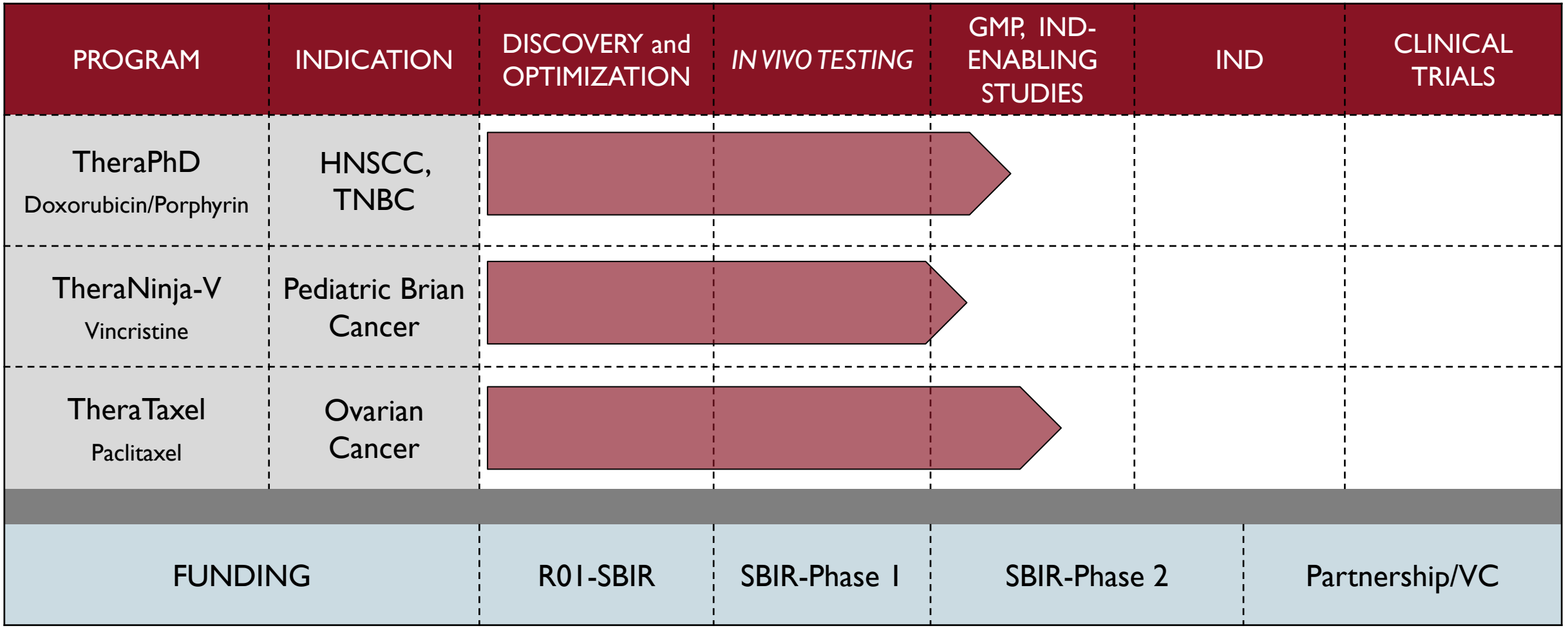
Advisors

Dr. Gregory Farwell, MD
Chair of the Department of Head and Neck Surgery, UC Davis
- Expert in head and neck cancers
- 25 years experience as practicing surgeon

Dr. Rick Harkins, NIH CAP advisor
- Prior Principal Scientist at Bayer Healthcare 35 years experience in the managing partnerships with U.S. academic research institutions and emerging life science firms

Lloyd Kunimoto
CEO of Amfora, Inc.
- 25 years experience in successfully leading biotechnology and biopharmaceutical companies

Theranostec Pipeline Drives Growth Potential



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Seeking $20M in funding for IND filing and phase I clinical trials

- Completion of the GMP production of TheraPhD and IND-enabling Pharm/Tox Studies
- IND filing will follow completion of these results
- Phase I clinical trials in patients with solid tumors

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