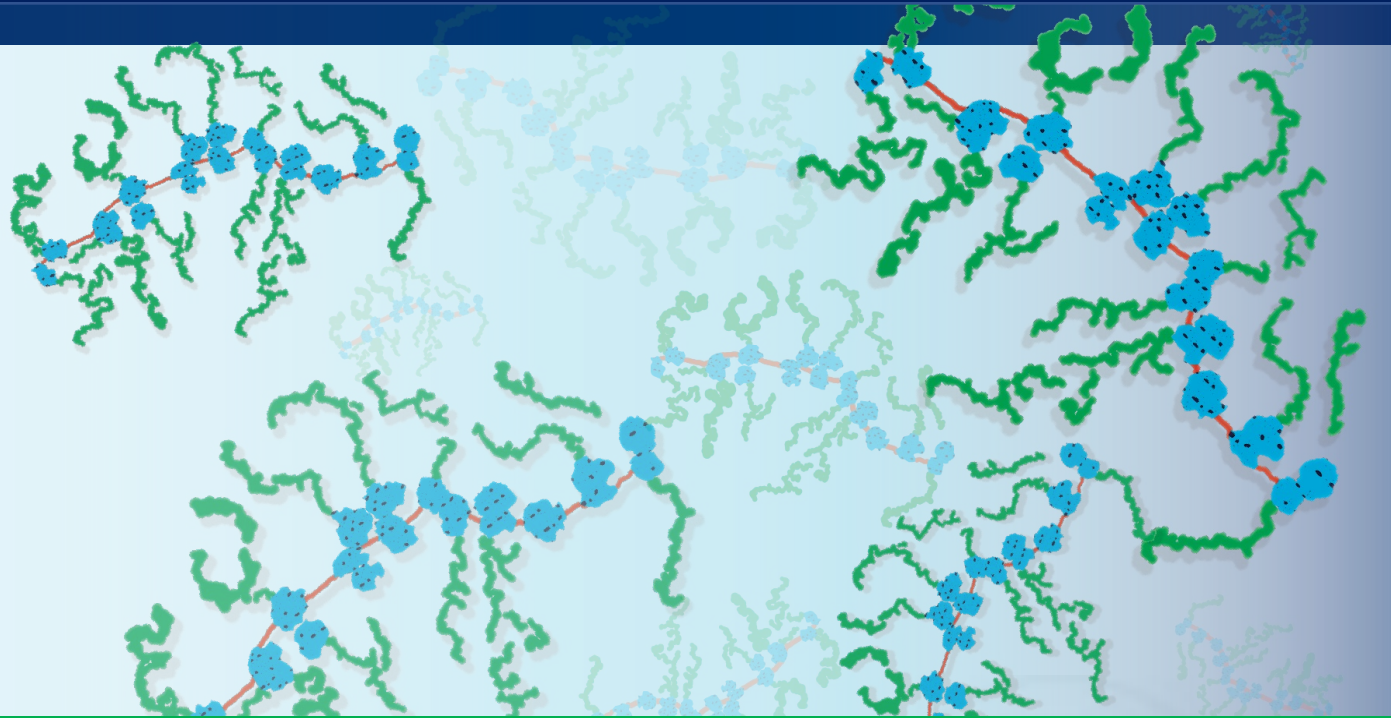




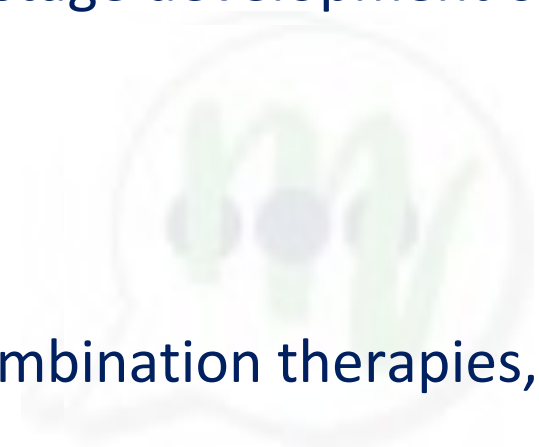
*The Cure is in the Message*



Randall N. Hyer, MD, PhD, MPH  
CEO

# WHY MERLIN, WHY NOW?

- **WHO we are: World class leadership, experts, and boards**
  - Experienced team with proven drug approvals and launches
- **WHAT we have: Therapeutic mRNA platform leveraging in-house expertise and key partnerships with leading institutions**
  - Novel, 1<sup>st</sup>-in-class cancer immunotherapy with human survival data confirmed in mouse models (exclusive IP license with Children's Hospital of Philadelphia)
  - Partnerships with strategic research institutions to support early-stage development of additional assets
- **WHY now: Series A to support rapid entry into clinic**
  - IND(s) planned for 2024
  - USP6 potential expansion for indications in numerous cancers, combination therapies, neo-adjuvant and adjuvant settings



# WHO is Merlin?



## CEO

Randall Hyer, MD, PhD, MPH

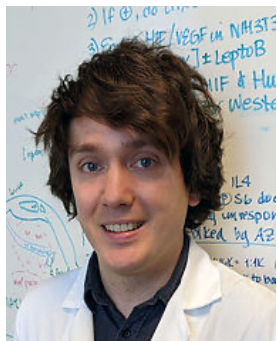
- Former SVP Global Medical at Moderna
- Led COVID vaccine global rollout
- Spearheaded approval of Heplisav-B HBV vaccine at Dynavax



## CSO

Ju-Tao Guo, MD

- Co-inventor, Merlin HBV technology
- Leading viral and HBV expert
- Discovery of HBV capsid-inhibitor drug class



## VP, Research and Development

Ian Henrich, PhD

- Co-inventor, Merlin USP6 technology
- Expert on mRNA therapeutics, USP6, and tumor biology

## • **Scientific Advisory Board**

- Harvey Alter, MD (Nobel Laureate 2020, discovery of hepatitis C virus)
- Stanley Plotkin, MD (Sabin Gold Medal, pre-eminent vaccinologist)
- Margaret Chou, PhD (Professor, CHOP, co-inventor of USP6 technology)
- Mike Mitchell, PhD (Professor, UPenn, expert in LNP/drug delivery technology)
- Chen Liu, MD, PhD (Chair, Pathology, Yale University, liver expert)

## • **Board of Directors**

- Tim Block, PhD (Co-inventor of Merlin HBV Technology, Fellow National Academy Inventors, President Emeritus Blumberg Institute)
- Loren Danzis, Esq (Partner, Fox Rothschild LLP)
- Carol Brosgart, MD (Clinical Professor of Medicine, UC San Francisco)

# Launched 4/22/2022

## Blumberg Institute launches MERLIN Biotech, a spinout company leveraging mRNA technology for therapeutics and vaccines

NEWS PROVIDED BY  
Pennsylvania Biotechnology Center (PABC)  
April 22, 2022, 15:30 GMT



*Dr. Randall N. Hyer, former senior vice president for global medical affairs at Moderna, is chief executive officer.*

DOYLESTOWN, PENNSYLVANIA, UNITED STATES, April 22, 2022 /EINPresswire.com/ -- The Baruch S. Blumberg Institute has announced the launch of MERLIN Biotech, a new platform start-up biotechnology spinout company leveraging proven mRNA technology to develop novel therapeutics and vaccines against targets that address important unmet medical needs, including



Blumberg Institute



**“We are very excited about the prospects for MERLIN Biotech because our mRNA technology takes advantage of the latest innovations in mRNA delivery and mRNA-directed protein production.”**

**— Randall N. Hyer, MD, PhD, MPH**

Health Care

## Blumberg Institute in Bucks County spins out biotech firm led by former Moderna executive

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Blumberg Institute CEO Randall Hyer  
NAPOLÉON

By John George – Senior Reporter, Philadelphia Business Journal  
Apr 22, 2022, 2:07pm EDT

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Can a 6-minute  
behavioral  
assessment  
*really* help you  
make the right  
hiring decision?  
TRY IT YOURSELF.

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Kreischer Miller is a leading accounting, tax, and advisory firm serving Greater Philadelphia.

RECOMMENDED

# Merlin's Priority is USP6 to IND and Phase I

\* USP6: Ubiquitin Specific Protease 6

	DISCOVERY	IN-VITRO	IN-VIVO	PRE-IND	IND	FIH
<b>ONCOLOGY</b>						
USP6* (Pediatric Ewing Sarcoma)						
USP6 (Adult Solid Tumors)						



## Institutional Partners To Advance Early-Stage Assets

	DISCOVERY	IN-VITRO	IN-VIVO	PRE-IND	IND	FIH
<b>CHRONIC HEP. B</b>						
SUBDOMINANT						
IRES TRIGGER						
<b>VACCINES</b>						
LYME						

PARTNER



East Coast University



# Merlin is Addressing Unmet Medical Needs of Enormous Significance and Value

- **Oncology: Pediatric and adult solid tumors**

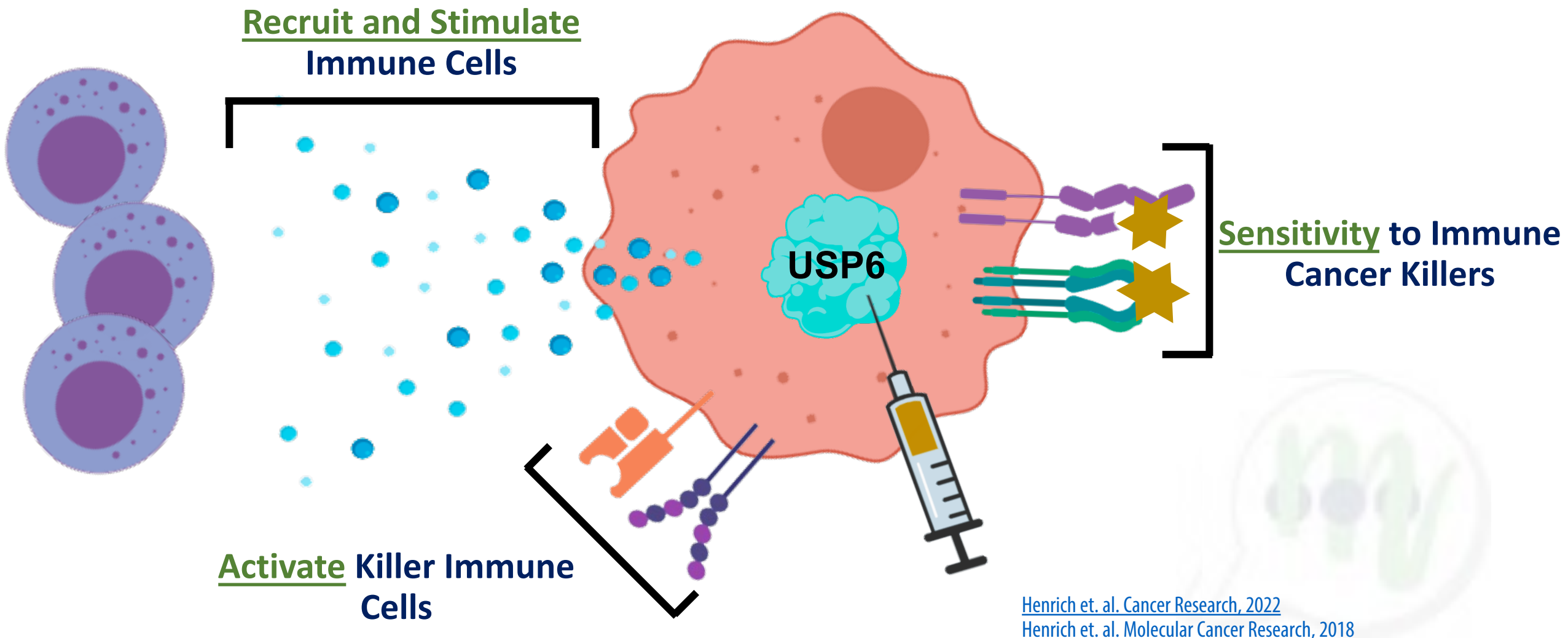
- Pediatric: Ewing's sarcoma (rare pediatric cancer)
  - Adult: multiple cancers, neo/adjuvant setting, combination therapies
- Adult cancer-agnostic approach significantly increases potential market size while Ewing's sarcoma has incentives as a rare pediatric disease

- **Partnering with leading institutions to advance platform for infectious disease (Chronic Hepatitis B (CHB) and Lyme)**

- Therapeutic CHB vaccine against new epitopes to break tolerance
- Prophylactic vaccine for Lyme using mRNA against tick protein OspA
- CHB \$4.6bn, Lyme \$1bn+

# SOLUTION:

## Merlin's Lead mRNA-Delivered Cancer Therapy: USP6

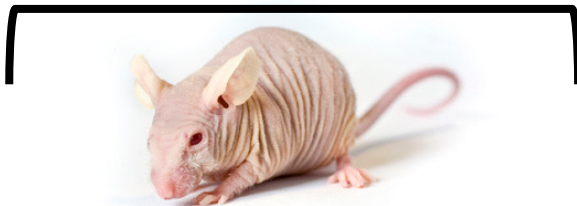


# USP6 Data in Immunocompromised Mouse Model that Closely Aligns with Relapsed/Refractory Cancer Patients

USP6 is naturally found only in higher order primates and requires human transplants into immunocompromised mice



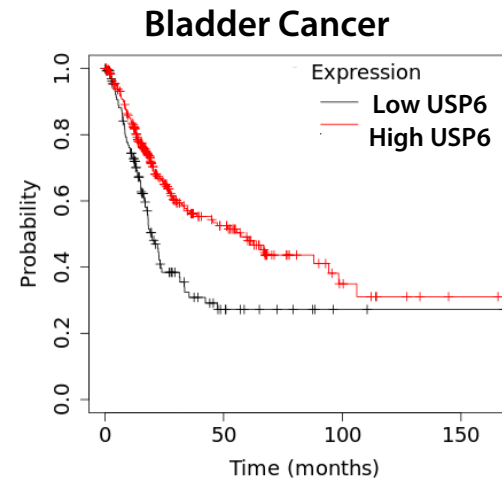
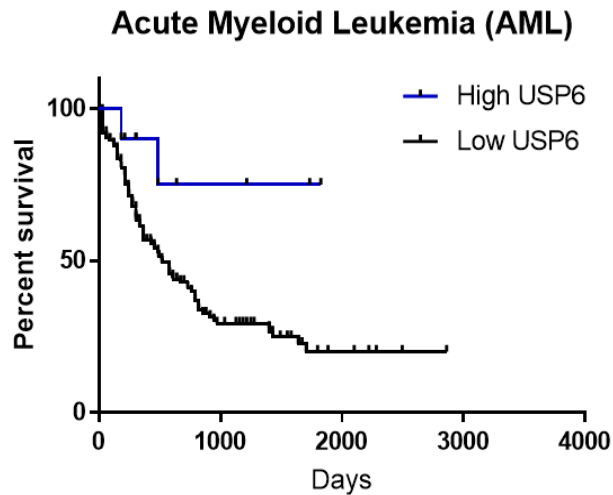
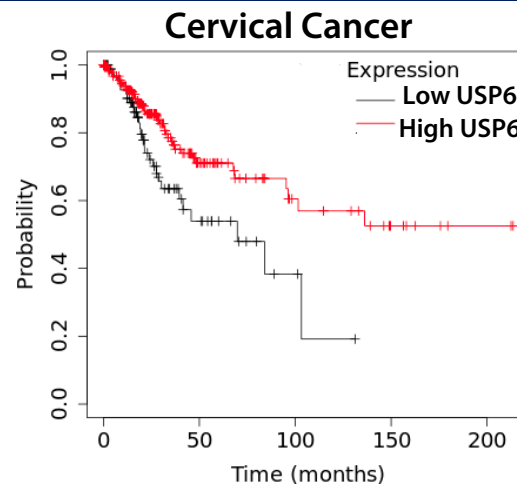
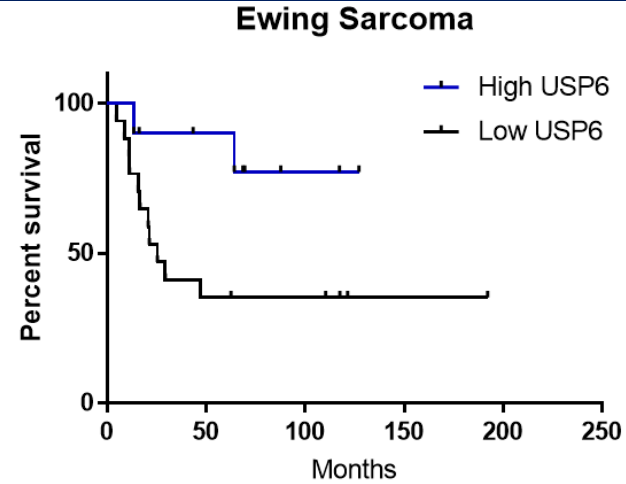
Immunotherapy efficacy in nude mice represents high bar



	<u>Conventional Model</u>	<u>Relapsed/Refractory Cancer Patients</u>	<u>USP6 Model</u>
<u>Immune System</u>	Fully functional	Dysfunctional	Dysfunctional
<u>Genetic Diversity</u>	Limited (Inbred)	Diverse	Diverse (Outbred)
<u>Current IO Efficacy</u>	High	Very Limited	Very Limited



# Real World Validation: High levels of USP6 in Patient Tumors Correlates with More Favorable Outcome



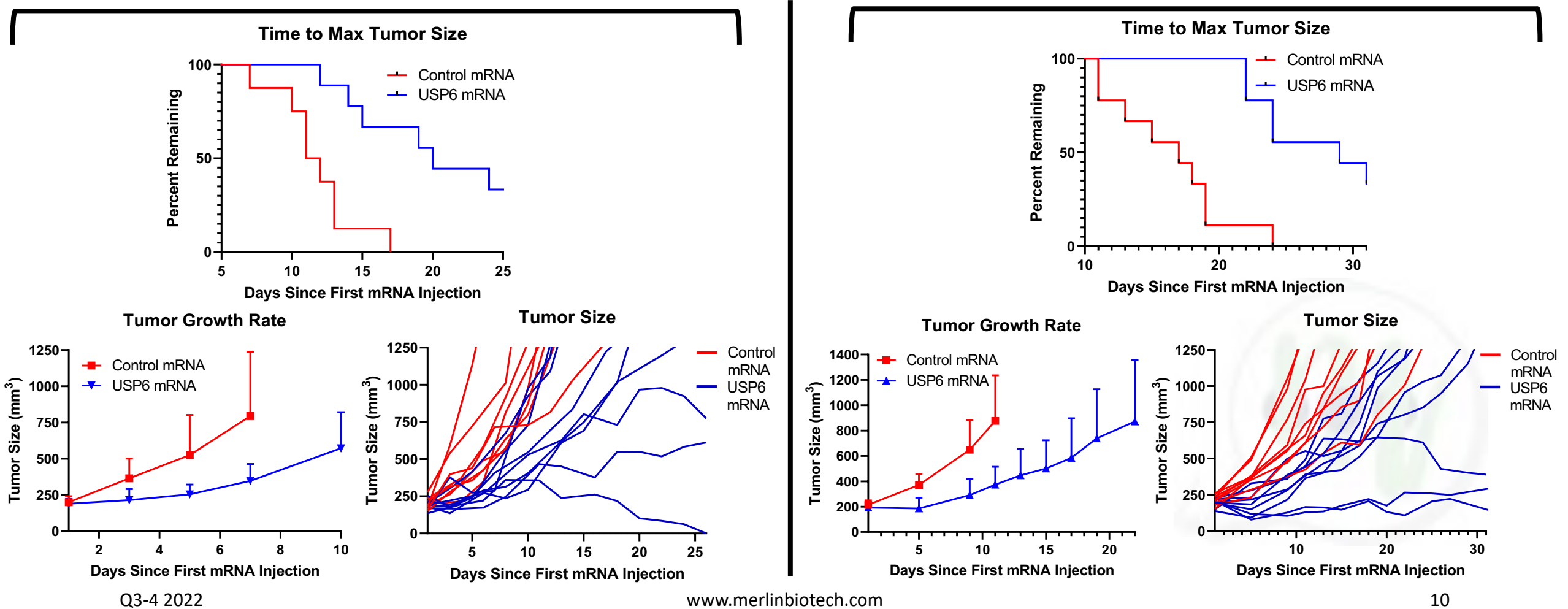
**Additional cancers: pancreatic, ovarian, lung, etc.**

# Intra-tumoral USP6 Therapy Confirms Human Survival Data Despite Immunocompromised Model

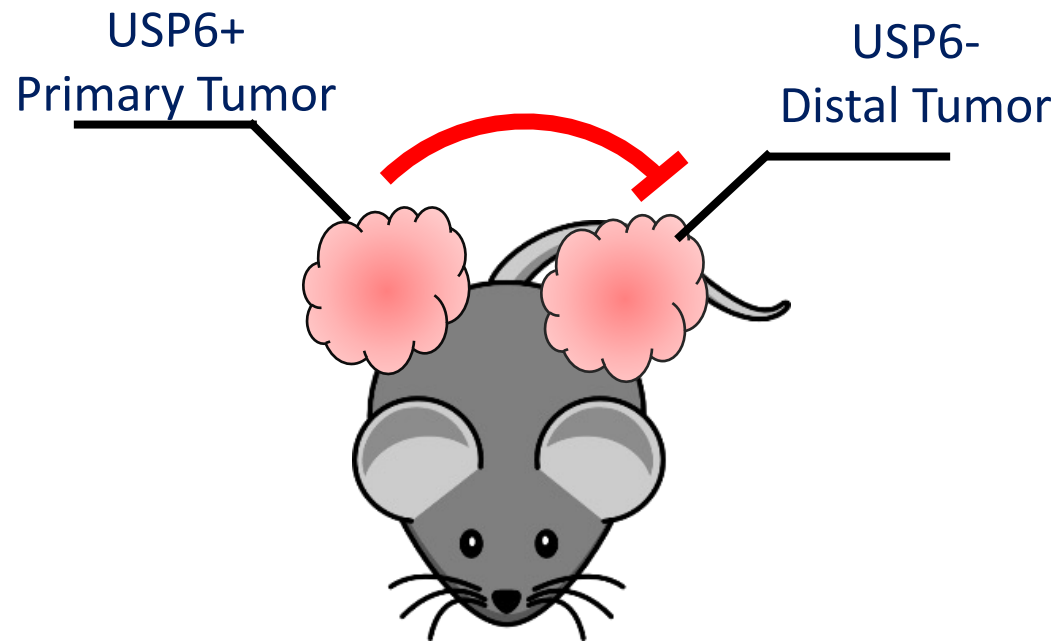
Single Agent Activity in Two Distinct Immunocompromised Cancer Models

EWING SARCOMA “Pediatric Cancer”

ADULT CANCER

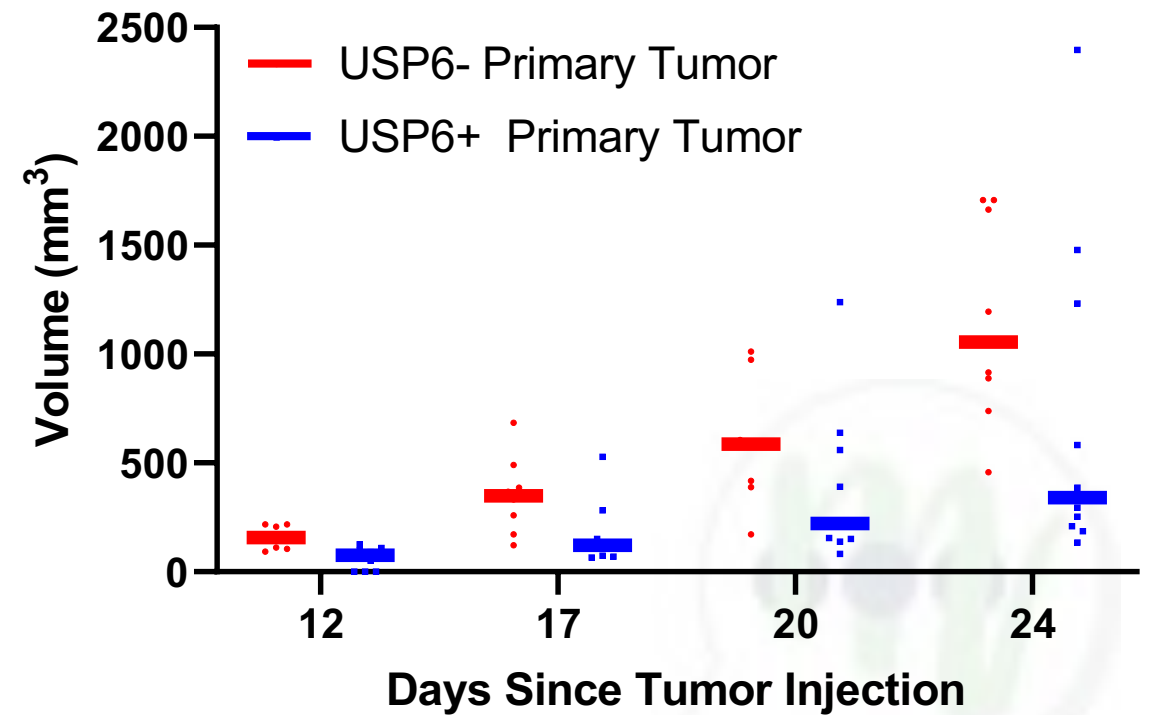


# Local Expression of USP6 is Sufficient to Inhibit Distal Tumor Growth



## EWING SARCOMA

### USP6- Distal Tumor Size



**COMPELLING ABSCOPAL EFFECT DESPITE IMMUNOCOMPROMISED MODEL**

# LARGE MARKET: Merlin's USP6 Market Size Driven by Potential Application to Numerous Cancers, Indication Expansions

## US Patient Population with Potentially Injectable Tumors

BREAST

330,000

OVARIAN

22,000

LYMPHOMA

86,000

SKIN

80,000

LIVER

49,000

SARCOMA

12,000

### USP6 broad immuno-modulator

- Numerous potential indications
- Expansion to adjuvant/neo-adjuvant
- Expansion to possible combination with other cancer therapies (CAR-T)

### Immuno-Oncology ROI\*

- Median return: \$14.50/\$1 (3.50-55.10)
- Median time to recover costs: 5 years (2-10)

Global Cancer Drugs \$133BN  
33% of cancer drugs >\$1BN

# WHY MERLIN, WHY NOW?

- **WHAT we have: novel cancer therapy with human survival data confirmed in mouse model**
  - Broad IP worldwide through licensing agreement with Children's Hospital of Philadelphia
  - Rich pipeline with multiple shots on goal
- **WHO we are: world class leadership, experts, and boards**
  - Distinguished, innovative, and experienced
  - Proven product approvals
- **WHY now: early-stage opportunity for clinical entry within 2 years**
  - IND potentially in 2024
  - USP6 potential for indications in numerous cancers, combination therapies, neo-adjuvant and adjuvant settings



Randall N. Hyer, MD, PhD, MPH

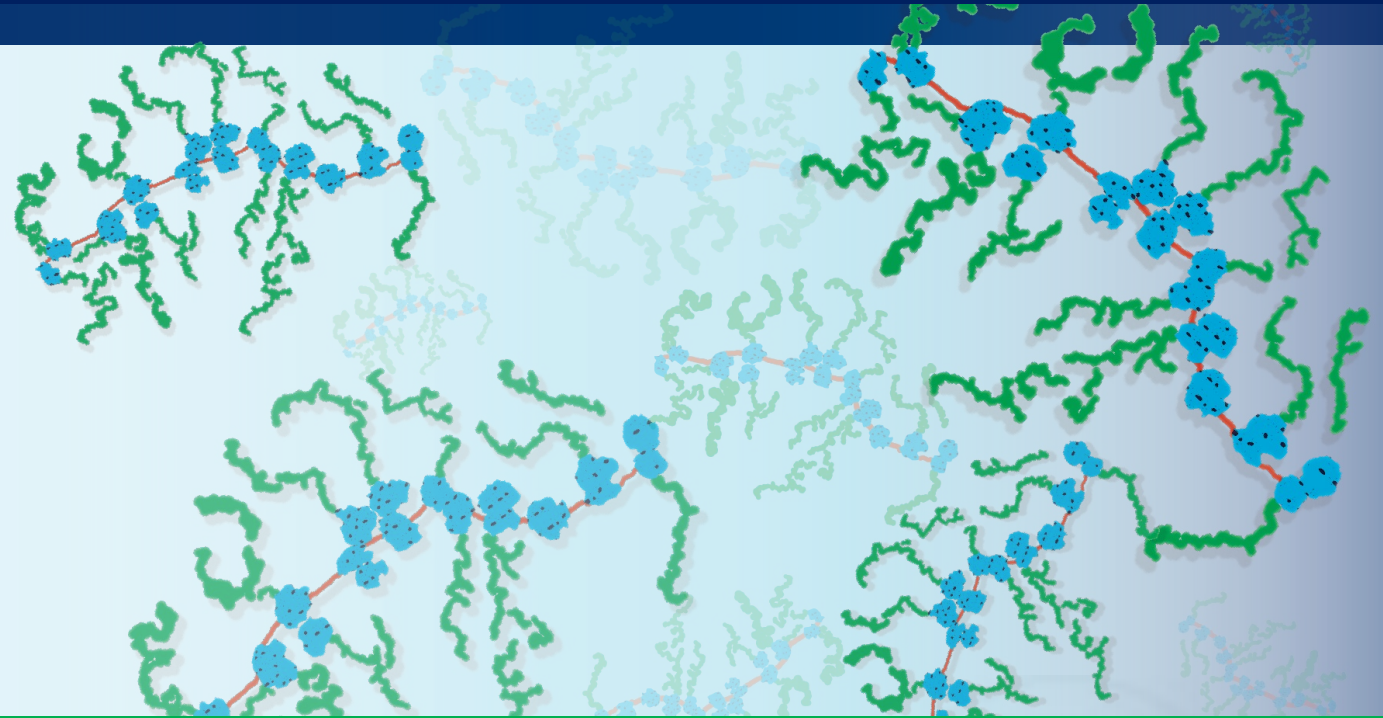
CEO, MERLIN Biotech

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Tel 215 489 4900 | Mob 202 330 1160



*The Cure is in the Message*



# QUESTIONS?