



**ZENITH**  
**EPIGENETICS**

**Zenith Epigenetics**  
**Advanced Epigenetic Technology**

**November, 2018**

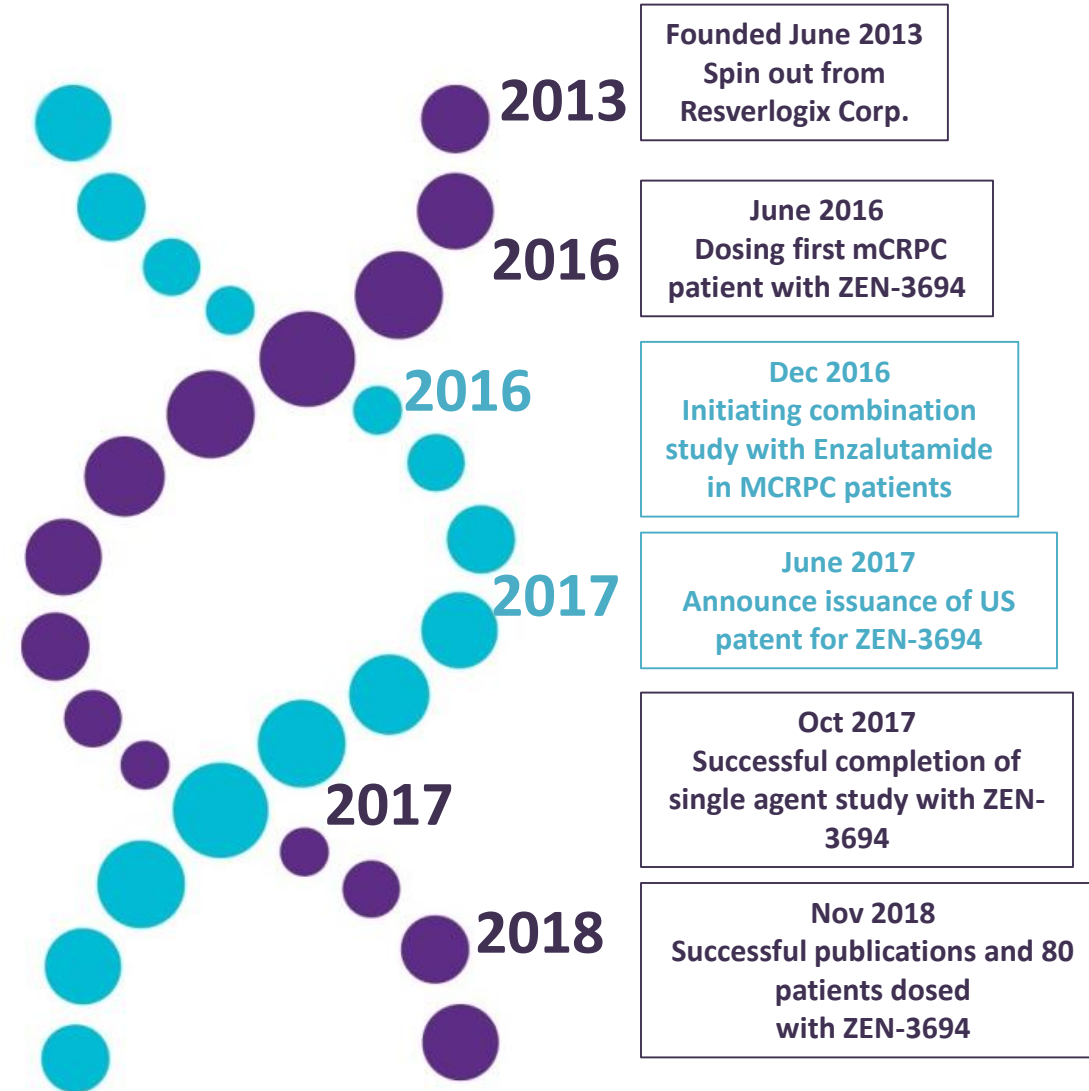
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CONTACT: Donald J. McCaffrey  
Chairman, President & CEO

Suite 300, 4820 Richard Road S.W. Calgary, AB, Canada T3E 6L1  
Tel: (403) 254-9252, Fax:(403) 256-8495, <http://www.zenithepigenetics.com>

# Corporate Profile and Milestones

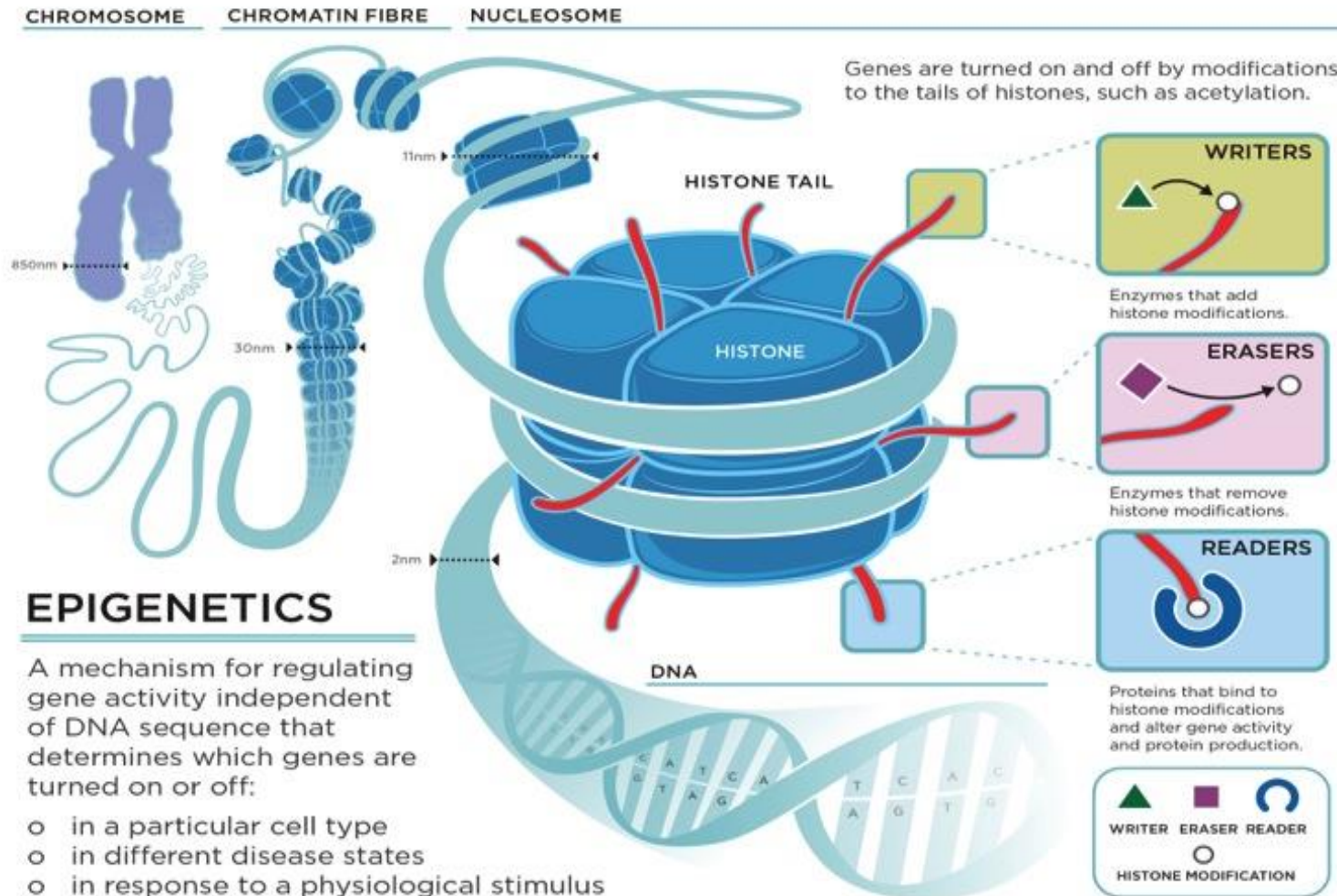
<b>Cash Raised</b> 2014-2018	~US\$50MM @ US\$1.00 & US\$2.00 per unit based on pre-clinical results
<b>Enterprise Value est.</b>	US\$325MM (US\$2.50/Share) est.
<b>Shares Outstanding</b>	129.6MM 142.0MM fully diluted
<b>Cash Burn</b> Current	US\$2MM per quarter







- **Epigenetics – The Mechanism Behind Our Approach**
- The Potential of BET Inhibition
- Prostate Cancer Rationale Review
- Promising Early Clinical Results & Case studies
- Next Steps for Zenith



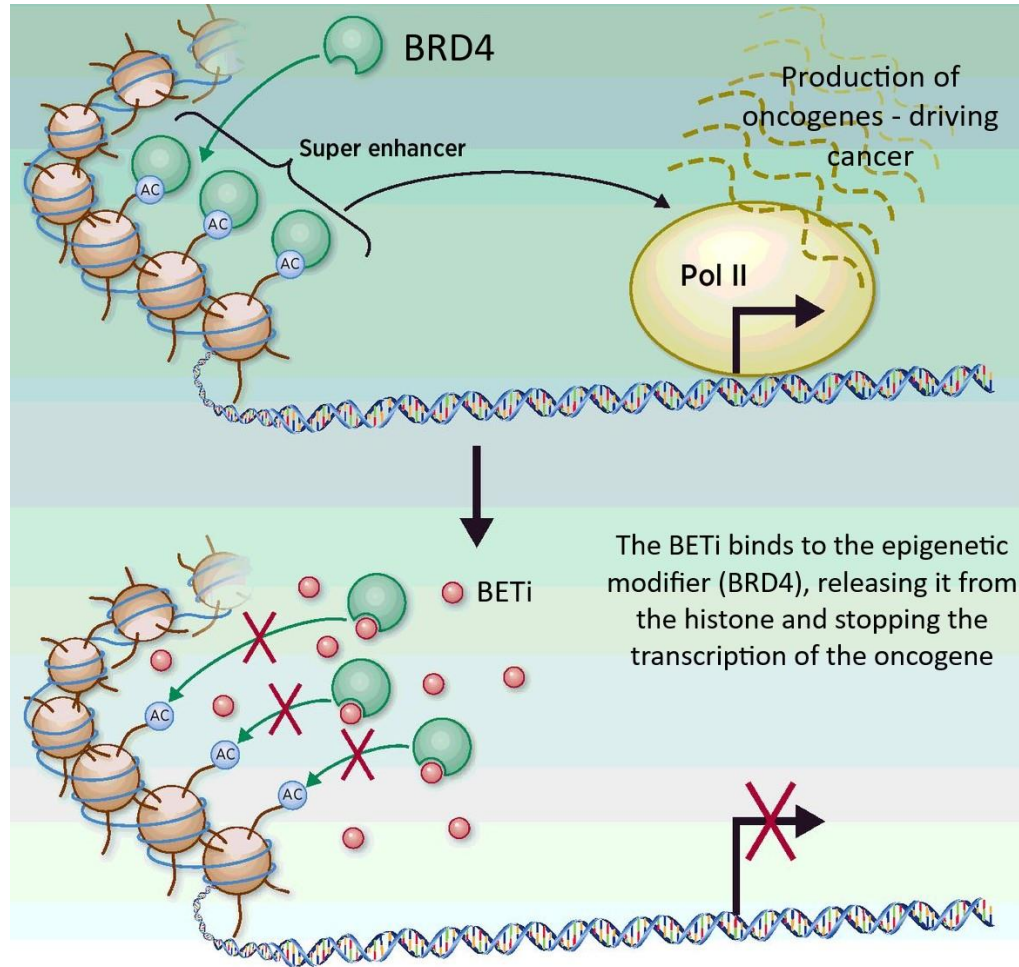
## EPIGENETICS

A mechanism for regulating gene activity independent of DNA sequence that determines which genes are turned on or off:

- in a particular cell type
- in different disease states
- in response to a physiological stimulus

- The epigenetic code refers to modifications to chromatin components that regulate its activity
- Turning genes on or off is regulated by these modifications
- BET (Bromodomain and Extraterminal Domain) proteins recognize these modifications and turn genes on/off

# BET Inhibitors Target Resistance Mechanisms – Sensitizing the Tumor to Existing Therapy

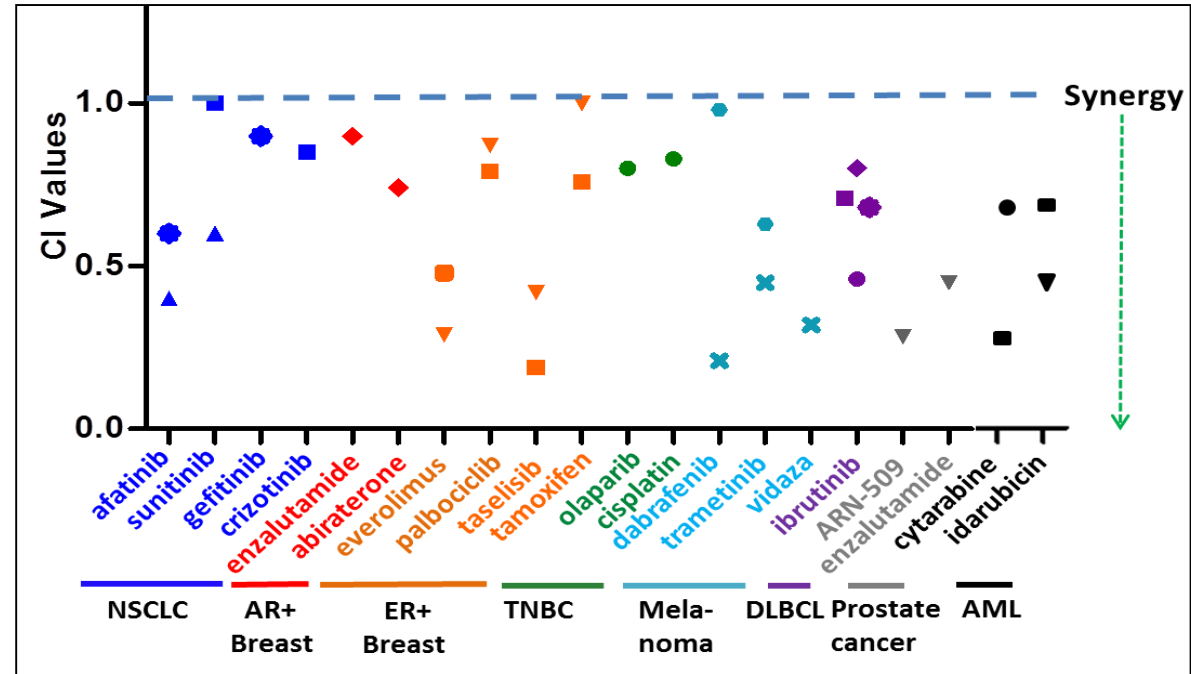
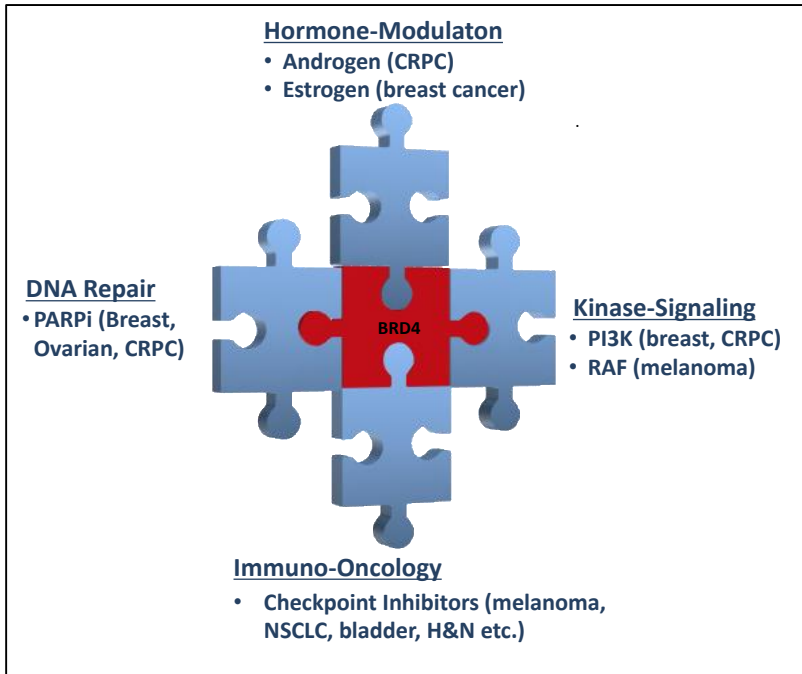


- Many of the escape resistance mechanisms to standard of care treatments involve BRD4
- BETi blocks BRD4 binding, resulting in inhibition of tumor oncogenes by disruption of super-enhancers
- Resistance to several standard of care treatments does not impede sensitivity to BETi, allowing for valuable combination therapy

Adopted from Clinical Cancer Research 2017, 23(7), 1647-55.

# Combination Therapy: The Potential of BET Inhibition and ZEN-3694

BET inhibitors has the ability to work synergistically with other therapies overcoming resistance and enhancing the response to the combination, resulting in broader and extended use of existing therapies

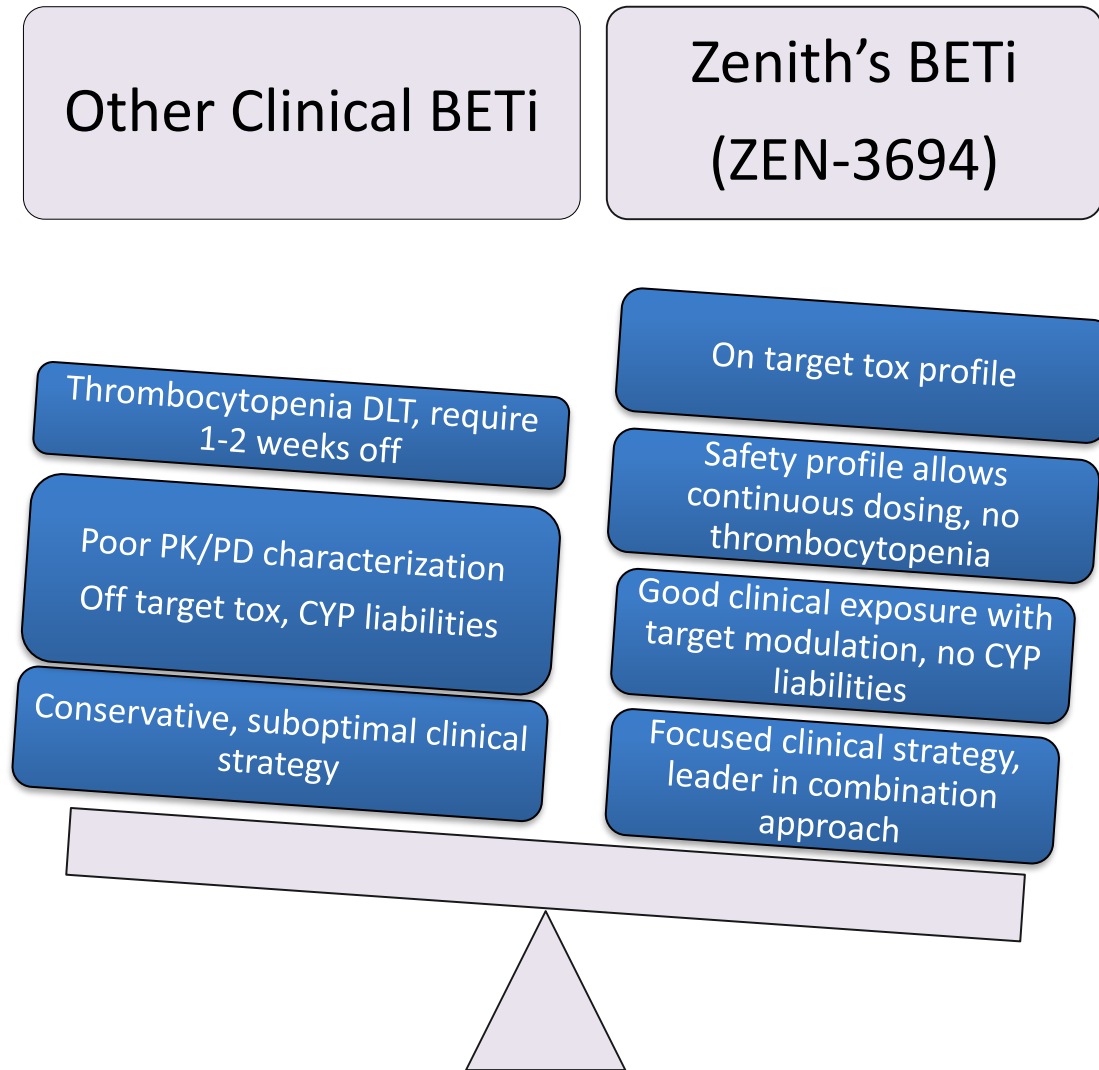


The use of BETi is applicable to a number of cancers and therapies

ZEN-3694 synergizes with several standard of care cancer drugs



# Zenith's BETi program is Clinically Differentiated



Significant initial excitement with BETi

Poor compounds (benzodiazepine derivatives) and suboptimal single agent clinical strategy in all comer trials led to lack of proof of concept

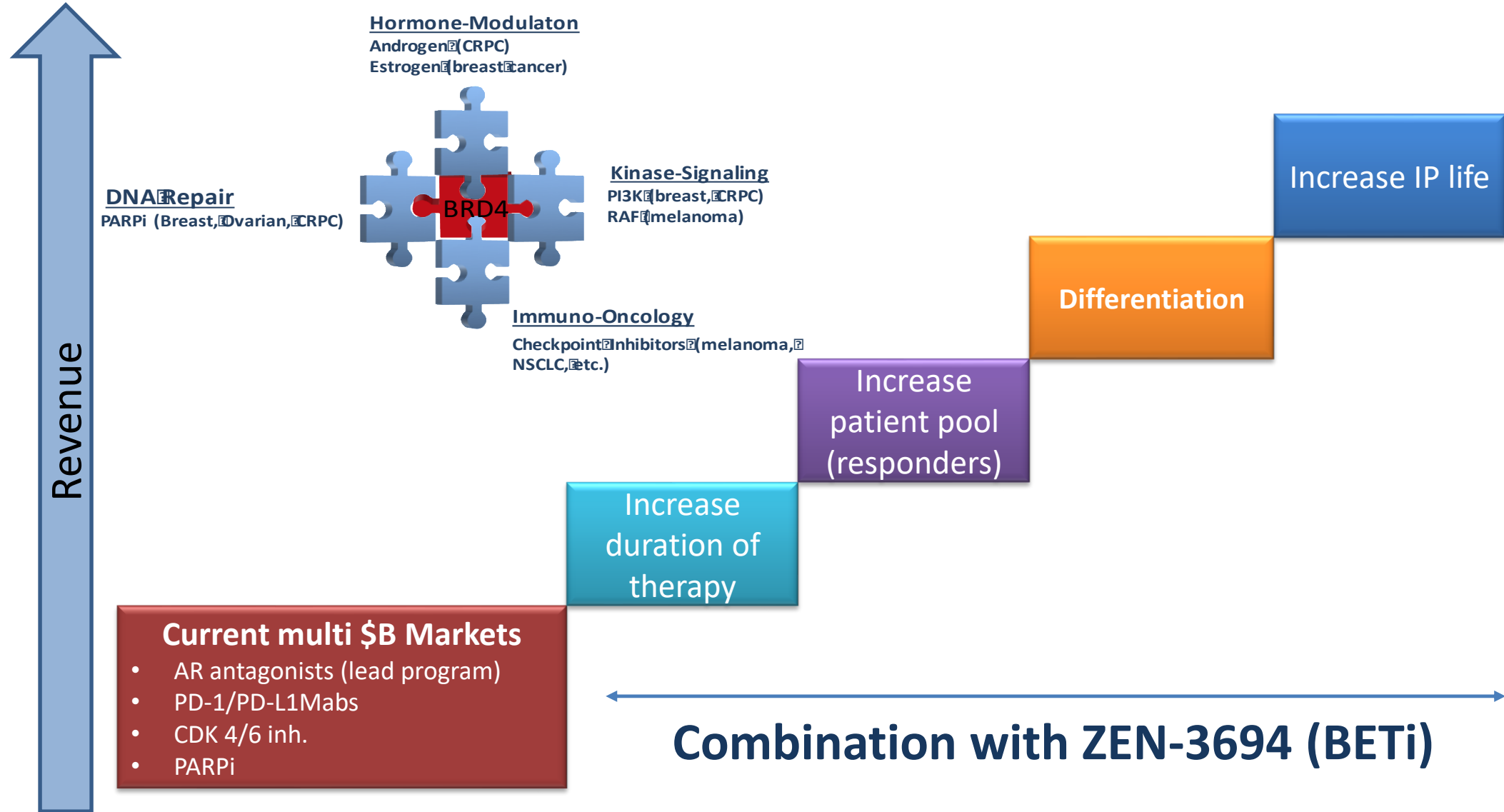
The BETi field now pushing ahead with combination trials in focused clinical trials (BMS, Roche, GSK, Abbvie, BI etc.)





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# The Potential of BET Inhibition & ZEN-3694





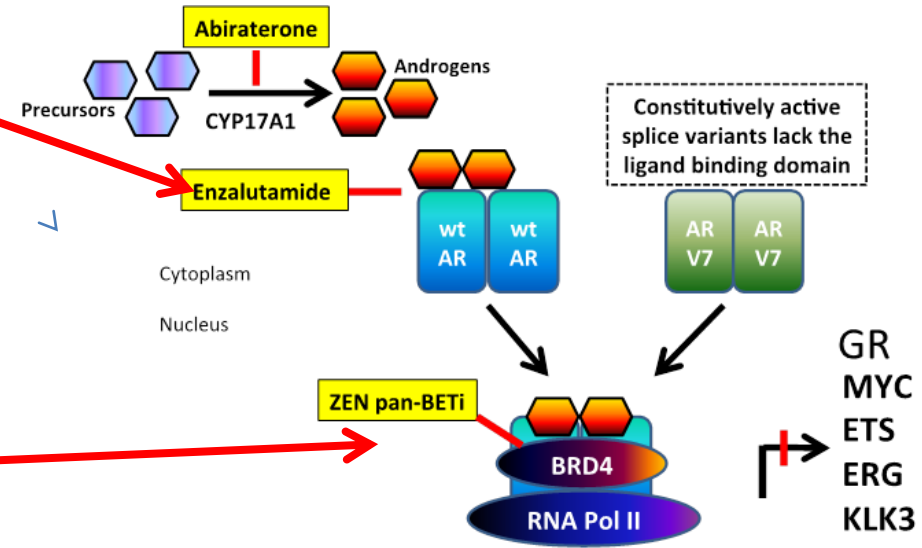
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# ZEN-3694 Potential in Patients Developing mCRPC Resistance to Enzalutamide

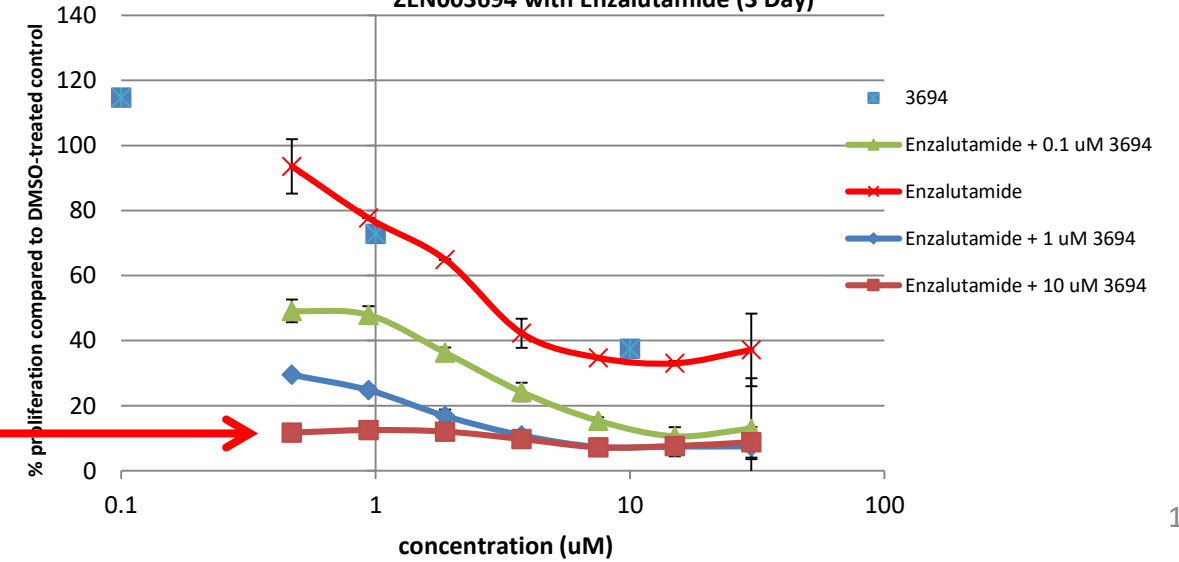
ZEN-3694 works downstream of current therapies

ZEN-3694 works where resistance to existing lead drugs, like Enzalutamide, has evolved

The combination of ZEN-3694 and enzalutamide shows strong synergy and is expected to reduce the development of resistance



Cell Viability in VCAP P3 + 0.1 nM R1881 Treated with various concentrations of ZEN003694 with Enzalutamide (3 Day)







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# Zenith's Principal Investigators



Name	Institution	Comments
<p><b>Eric Small, MD</b> <i>Chief, Dept. of Medicine</i></p> <p><b>Rahul Aggarwal, MD</b> <i>Developmental Therapeutics Specialist, Genitourinary Oncologist</i></p>	<p>University of California, San Francisco (UCSF)</p>	<p>Developed abiraterone - #2 CRPC drug, owned by J&amp;J.</p>
<p><b>Howard Scher, MD</b> <i>Chief, Genitourinary Oncology</i></p> <p><b>Wassim Abida, MD, PhD</b> <i>Medical Oncologist</i></p>	<p>Memorial Sloane Kettering Cancer Center (MSKCC)</p>	<p>Developed enzalutamide - #1 CRPC drug, now owned by Pfizer. Developing ARN-509 for J&amp;J</p>
<p><b>Joshi Alumkal, MD</b> <i>Associate Professor</i></p>	<p>Oregon Health Sciences University (OHSU)</p>	<p>Expert in epigenetics in prostate cancer research</p>
<p><b>Allan Pantuck, MD</b> <i>Professor, Dept. of Urology</i></p>	<p>University of California Los Angeles (UCLA)</p>	<p>Involved in enzalutamide and provenge development</p>
<p><b>Elizabeth Heath, MD</b> <i>Professor, Dept. Hematology/Oncology</i></p>	<p>Karmanos (Wayne State)</p>	<p>Genitourinary oncology specialist</p>
<p><b>Michael Schweizer, MD</b> <i>Oncologist</i></p>	<p>University of Washington Fred Hutchinson Cancer Center</p>	<p>Experience with AR antagonists</p>
<p><b>David M. Nanus, MD</b> <i>Chief, Division of Hematology and Medical Oncology</i></p>	<p>Weill Cornell Medicine</p>	<p>Genitourinary oncology specialist</p>

Single agent study key to understanding drug characteristics and supporting combination study

2016		2017	
1H	2H	1H	2H

Single agent dose escalation;  
enzalutamide and/or abiraterone  
failures N~12

Single agent expansion at RP2D;  
same population as dose escalation  
N=12

## Key Learnings

- Maximum tolerated dose (MTD) defined ✓
- Dose proportional PK ✓
- Good safety profile, prolonged dosing without dose interruption/reduction is feasible ✓
- Target modulation shown at doses below MTD ✓
- Some single agent anti-tumor activity/disease stabilization observed in multiple patients ✓

# Patient X: Prolonged Disease Stabilization

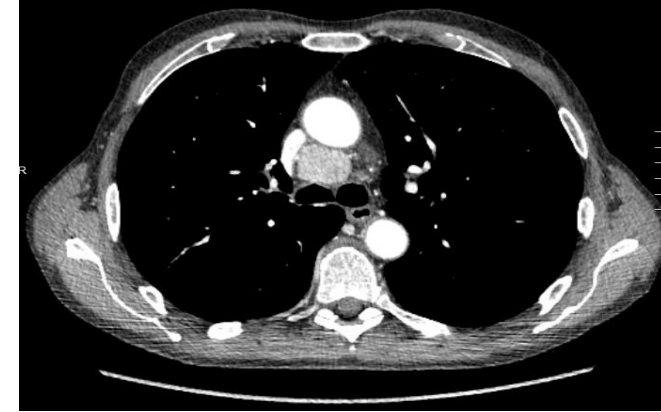
## Patient Profile:

### Prior Therapy for mCRPC

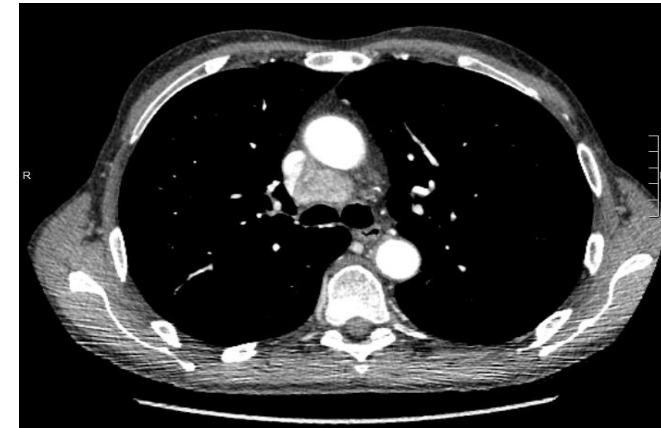
- Provenge
- Enzalutamide: 6/5/2014 – 5/5/2016 – acquired resistance
- Abiraterone: 5/22/2016 – 8/12/2016 – primary resistance

The prognosis for a patient with this profile is typically very poor and the patient would often be offered chemotherapy as the next option.

ZEN-3694: 8/24/2016 – 7/16/2016 (45 weeks) with stable mediastinal nodes over 8 months



Study Entry



32 Weeks



2017		2018		2019
1H	2H	1H	2H	1H

**Combination dose escalation**  
 ZEN-3694 + enzalutamide; Patients progressing on **abiraterone**  
 or **enzalutamide** N~35

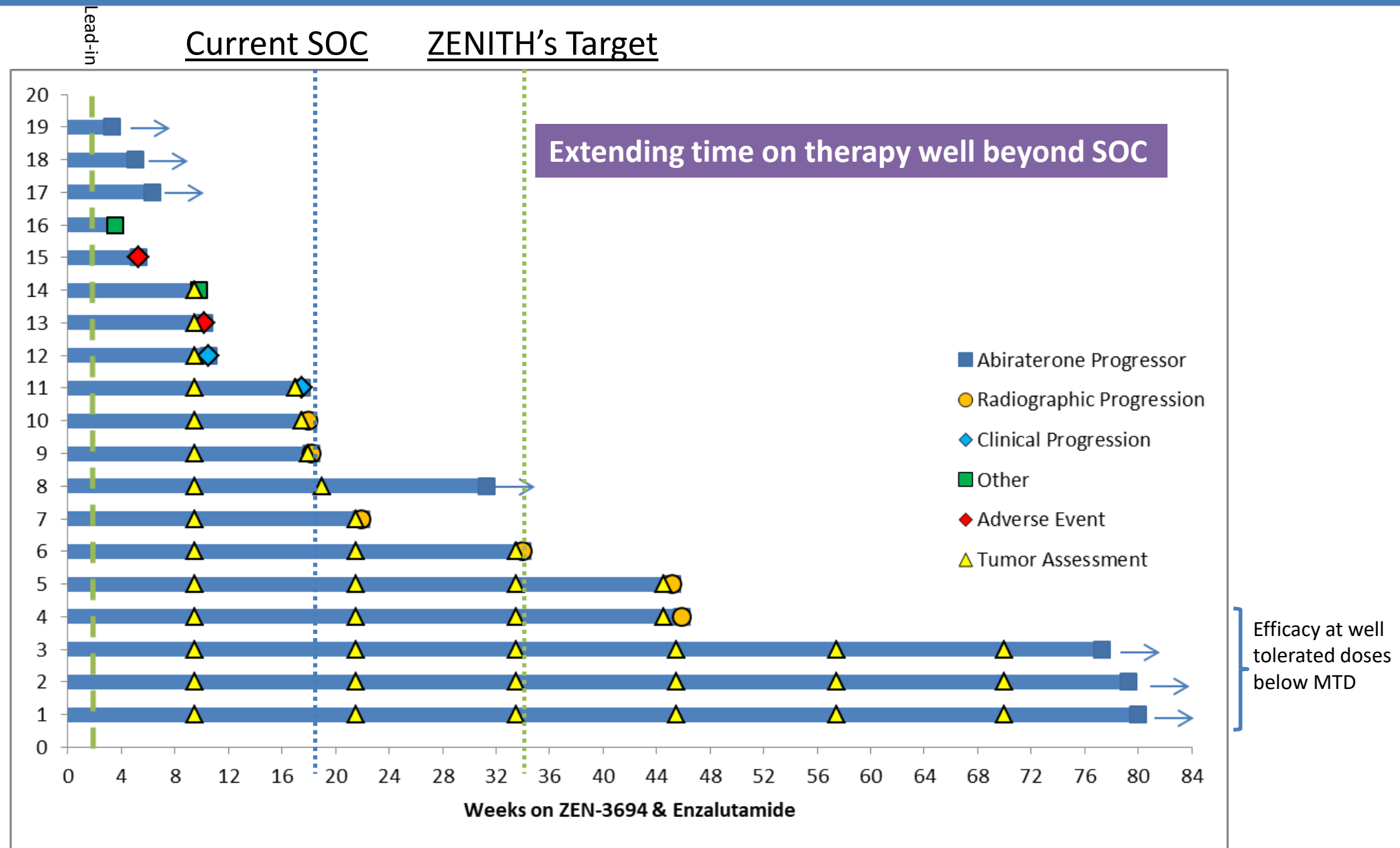
**Combination expansion**  
 ZEN-3694 + enzalutamide; Patients  
 progressing on **abiraterone** N~20-25

**Combination expansion**  
 ZEN-3694 + enzalutamide; Patients progressing  
 on **enzalutamide** N~10-15

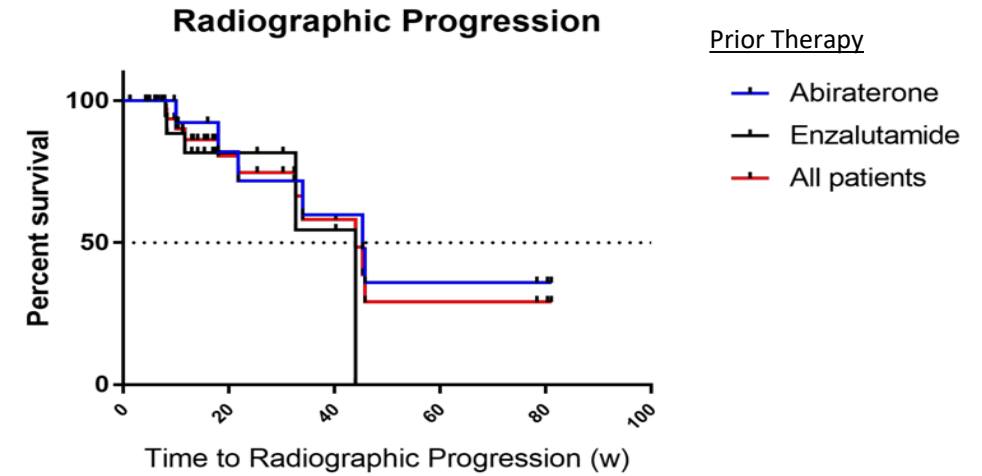
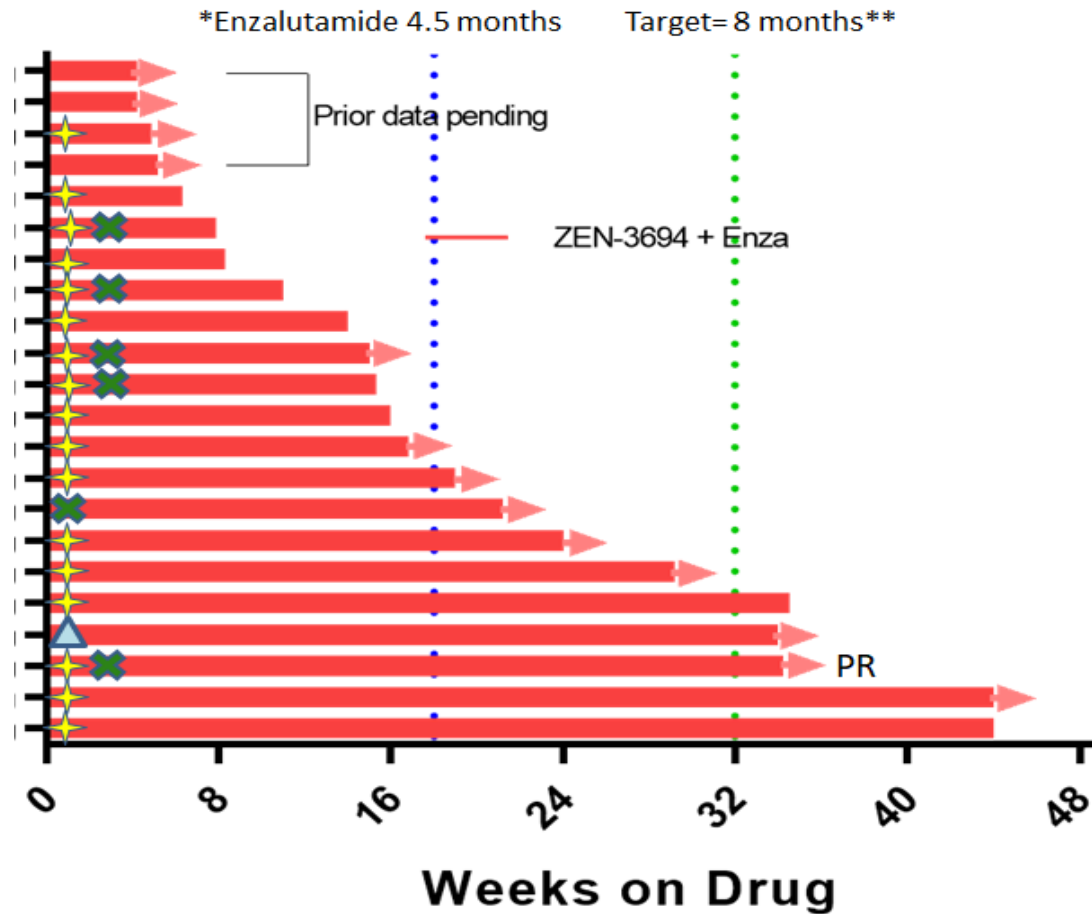
- Dose escalation near completion, Expansion cohorts enrolling
- Robust target modulation at well tolerated doses, prolonged dosing without dose interruption/reduction is tolerated
- Clinical activity in patients progressing on abiraterone/enzalutamide
- Significant response in primary abiraterone progressors (rPFS and PSA)
- **>65 patients dosed to date**

# ZEN-3694 Development in mCRPC: Combination Study Update

## Abiraterone Progressors (Updated September 19, 2018)



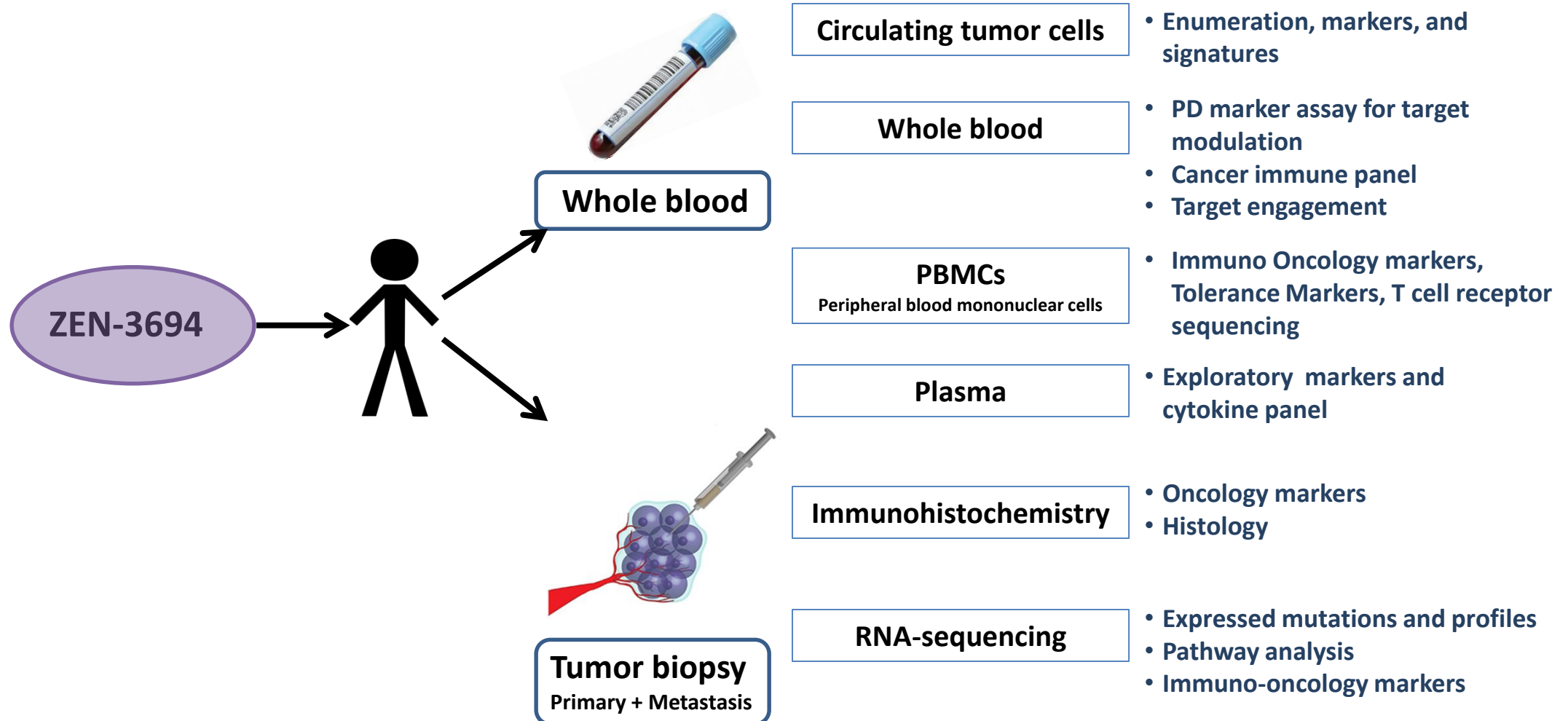
# Response of ZEN-3694 + enzalutamide in patients progressing on enzalutamide: ZEN-3694 re-sensitizing tumors



*Median time to radiographic progression = 10.5 mo., similar for prior abiraterone or enzalutamide therapy*

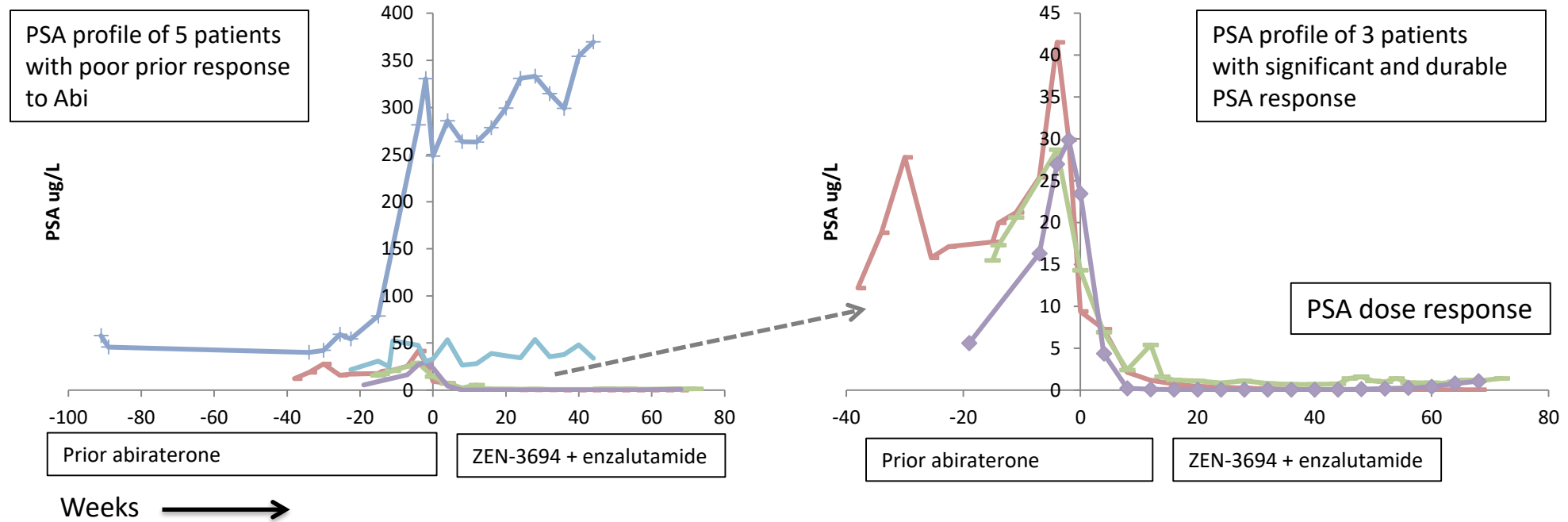
- PR = partial response
- ✕ Progressing radiographically upon study entry
- ★ Progressing by PSA upon study entry
- △ Progressing clinically upon study entry
- Expected time to radiographic progression (3-6 mo.) after PSA progression: Attard et al. 2017, PREVAIL study
- \*\* Target for ZEN-3694 + enzalutamide, 32 weeks
- Swim lanes only shown for patients ongoing and with confirmed radiographic/clinical progression

Translational program designed for molecular profiling ARi resistant patients and effect of ZEN-3694 on resistant markers, potential correlation of response to molecular signature





# Strong Durable PSA Response with ZEN-3694+Enzalutamide in Patients with Poor Prior Response to Abiraterone



## FULL PAPER

Artificial Intelligence

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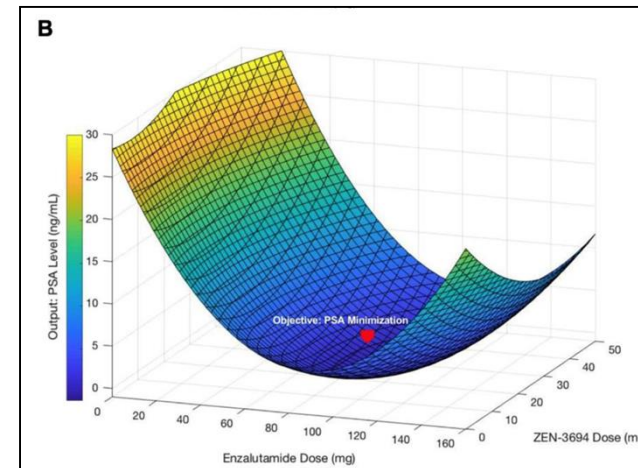
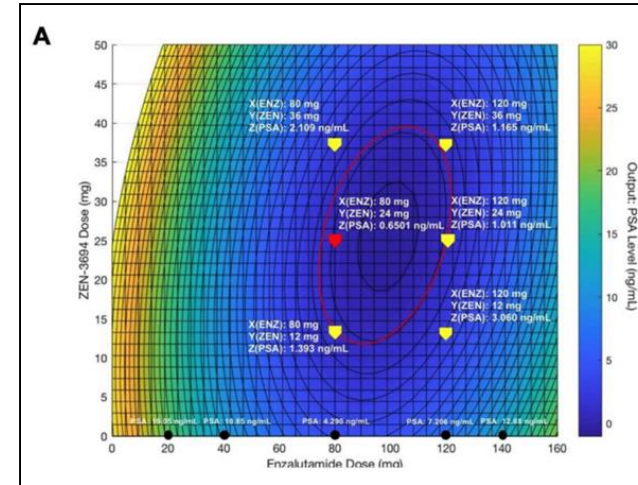
### Modulating BET Bromodomain Inhibitor ZEN-3694 and Enzalutamide Combination Dosing in a Metastatic Prostate Cancer Patient Using CURATE.AI, an Artificial Intelligence Platform

Allan J. Pantuck,\* Dong-Keun Lee, Theodore Kee, Peter Wang, Sanjay Lakhotia, Michael H. Silverman, Colleen Mathis, Alexandra Drakaki, Arie S. Belldegrun, Chih-Ming Ho,\* and Dean Ho\*

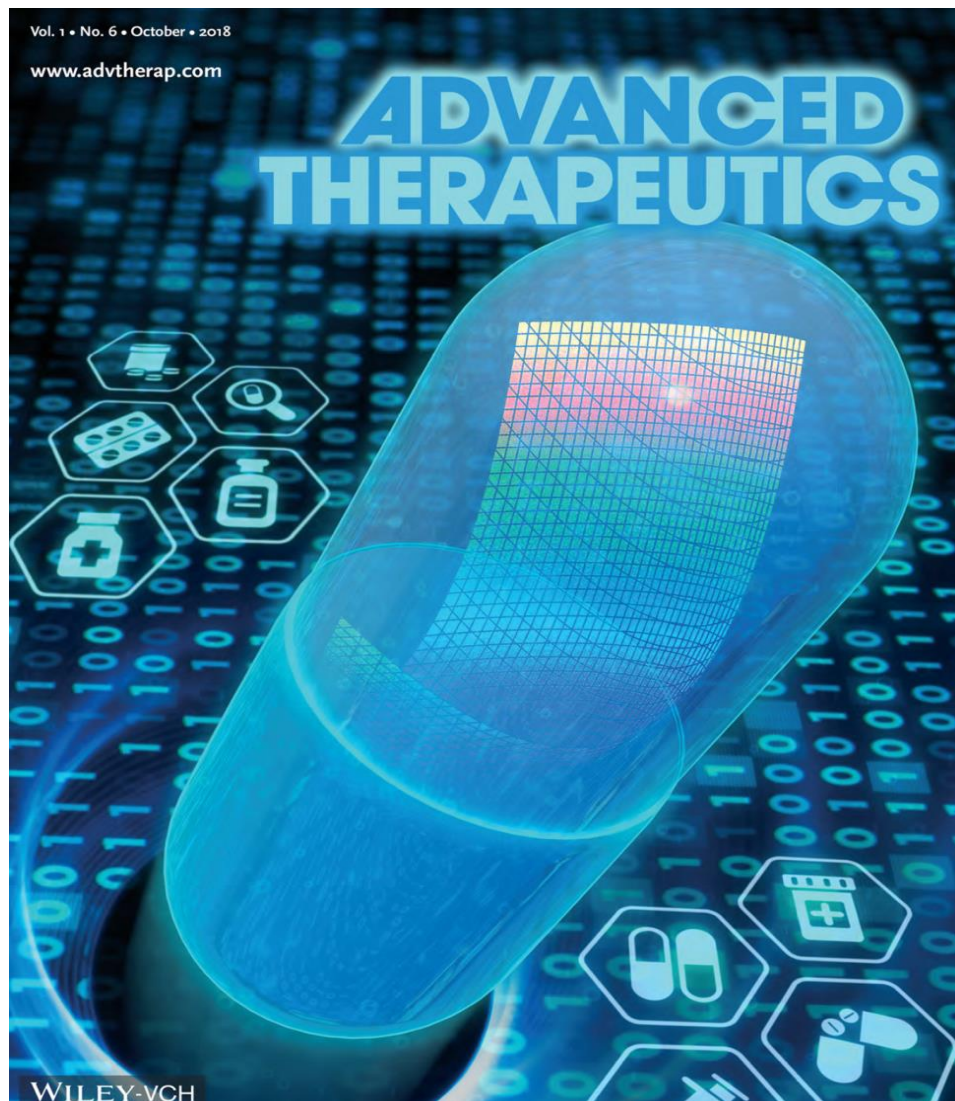
Combination chemotherapy is a cornerstone of cancer treatment. Optimizing its effectiveness requires dose- and time-dependent regulation of drug synergy. In this report, CURATE.AI, an artificial intelligence platform, is used to prospectively guide the dosing of a bromodomain inhibitor (ZEN-3694) and enzalutamide administered in combination to a patient with metastatic castration-resistant prostate cancer to reduce serum prostate-specific antigen (PSA) levels. CURATE.AI successfully identifies substantial ZEN-3694 and enzalutamide dose adjustments, increasing both treatment efficacy and tolerance. CURATE.AI analysis also confirms that the patient's durable response is mediated by ZEN-3694 inclusion in the regimen. Due to CURATE.AI-enhanced efficacy and safety, the patient was able to continue with the combination regimen, resulting in a durable response and no disease progression based on CURATE.AI-sustained control over PSA levels and reduced lesion size.

#### 1. Introduction

Conventional chemotherapy simultaneously addresses multiple aberrant disease pathways to potentially improve treatment outcomes. Drug doses are typically determined using dose escalation to reach a maximum tolerated dose (MTD) or via dose expansion to identify suitable regimen administration guidelines.<sup>[1,2]</sup> These combinations are subsequently administered at fixed doses. While the administration of combination therapy using these approaches has served as a clinical standard for clinical care, the patient's response to therapy evolves during the course of treatment due to the time-dependent, dose-dependent, and patient-specific nature of drug synergy and resulting efficacy and



# Recent Zenith Publication Covers







- Epigenetics – The Mechanism Behind Our Approach
- The Potential of BET Inhibition
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Combination of BETi/PARPi is an innovative strategy to overcome intrinsic and acquired resistance to PARP inhibition, allowing for use of PARP inhibitors across a wider spectrum of cancers and use past the initial development of resistance to PARPi

## Sensitize cancers with primary resistance

(HR-proficient cancers)

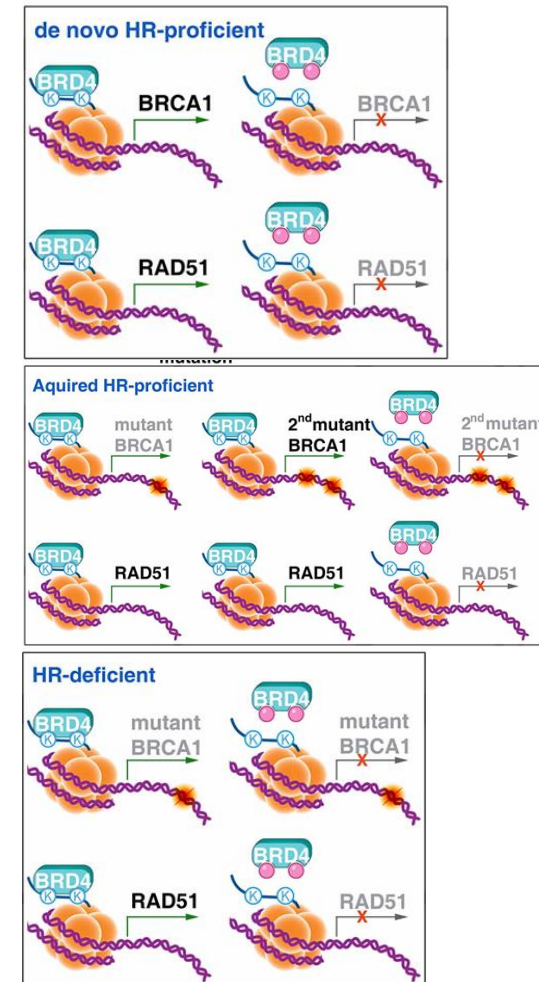
- Repressed BET activity impairs BRCA1 and RAD51 expression, subsequently converting HR-proficient tumors to HR-deficient ones

## Re-sensitize tumors with acquired HR-proficiency to treatment with PARPi

- BET inhibition overcomes PARPi resistance by repressing the expression of secondary BRCA1 mutations that restore BRCA1 function, or by blocking the expression of BRCA1 and RAD51

## Enhance response to PARPi in tumors with HR-deficient cancer (BRCA1/2 mutated)

- BET inhibition further blocks RAD51 expression





Phase 1b/2: Combination with PARPi in TNBC non gBRCA1/2m  
N~50

Objective	<ul style="list-style-type: none"> <li>Show safety and activity of the combination in TNBC patients</li> </ul>
Study design	<ul style="list-style-type: none"> <li>Phase 1b dose escalation</li> <li>Phase 2 Simon two step , open label non randomized</li> </ul>
Patient Population	<ul style="list-style-type: none"> <li>TNBC: non germline BRCA1/2m, advanced metastatic, <math>\leq 3</math> prior chemo therapy regimen, ER&lt;10%, PR&lt;10% and HER2-negative by IHC and/or FISH</li> </ul>
Number of patients (N)	<ul style="list-style-type: none"> <li>N~ 9-12 for Dose escalation</li> <li>Simon 2-stage design</li> <li><math>H_0</math> TNBC = 20% ORR, Target ORR = 40%, N= 17 1<sup>st</sup> stage, N= 17 for 1<sup>st</sup> stage, progress to second stage if number of responders <math>\geq 4</math>, N=20 for second stage, 10% alpha, 90% power</li> </ul>
Dose	<ul style="list-style-type: none"> <li>ZEN-3694 starting dose: 72mg once daily</li> </ul>
Duration	<ul style="list-style-type: none"> <li>6 months for dose escalation; 12 months for expansion cohorts (assuming 10 clinical sites)</li> </ul>
Endpoints	<ul style="list-style-type: none"> <li>Phase 1b: Safety, PK/PD, MTD, RP2D</li> <li>Phase 2 TNBC: ORR, DOR, PFS</li> <li>Exploratory: Explore biomarkers of activity and resistance</li> </ul>

# Prominent Clinical Sites and Investigators

Institution	Investigator	Background
MSKCC	Mark Robson	Led Olympiad study for Astra Zeneca
MD Anderson	Jennifer Litton	Led Embraca Ph. 3 study for Pfizer
University of Kansas	Priyanka Sharma	TNBC specialist
University of Pennsylvania	Susan Domcheck	Breast cancer specialist
Banner Health MD Anderson Cancer Center	Lida Mina	Breast cancer specialist
Jules Bordet (Belgium)	Philippe Afthimos	Led Merck's and BI's BETi studies
VHIO (Spain)	Mafalda Olivera	Involved in ER+ BETi trials for Gilead and GSK
CIOCC (Spain)	Valentina Boni	Breast cancer specialist
UZ Leuven (Belgium)	Kevin Punie	Breast cancer specialist

## Cell Reports

Article

### **BET-Bromodomain Inhibitors Engage the Host Immune System and Regulate Expression of the Immune Checkpoint Ligand PD-L1**

### **BET bromodomain inhibition enhances T cell persistence and function in adoptive immunotherapy models**

Yuki Kagoya,<sup>1</sup> Munehide Nakatsugawa,<sup>1</sup> Yuki Yamashita,<sup>1</sup> Toshiki Ochi,<sup>1</sup> Tingxi Guo,<sup>1,2</sup> Mark Anczurowski,<sup>1,2</sup> Kayoko Saso,<sup>1</sup> Marcus O. Butler,<sup>1,2,3</sup> Cheryl H. Arrowsmith,<sup>4,5</sup> and Naoto Hirano<sup>1,2</sup>

<sup>1</sup>Tumor Immunotherapy Program, Campbell Family Institute for Breast Cancer Research, Campbell Family Cancer Research Institute, Princess Margaret Cancer Centre, University Health Network, Toronto, Ontario, Canada. <sup>2</sup>Department of Immunology, University of Toronto, Toronto, Ontario, Canada. <sup>3</sup>Department of Medicine and <sup>4</sup>Structural Genomics Consortium and Department of Medical Biophysics, University of Toronto, Toronto, Ontario, Canada. <sup>5</sup>Princess Margaret Cancer Centre, University Health Network, Toronto, Ontario, Canada.

**BET bromodomain inhibition cooperates with PD-1 blockade to facilitate antitumor response in Kras-mutant non-small cell lung cancer.** Adeegbe DO, et al. Cancer Immunol Res. 2018

## Zenith is focused on ZEN-3694 combinations with SOC extending and expanding the value of existing therapeutics

- **ZEN-3694 can be administered safely at doses that modulate BET targets**
- **Prostate/XTANDI** combination: Promising clinical activity of ZEN-3694 + Enzalutamide in ARi resistant mCRPC patients
- **TNBC/PARPi** combination: Ph. 1b/2 of ZEN-3694 + PARPi in TNBC (non germline-BRCA1/2m) to commence soon
- **PD-1/PD-L1** combination with ZEN-3694 has compelling pre-clinical and clinical rationale
- **ER+ Breast Cancer:** Preclinical rationale to address resistance to CDK4/6 inhibitors





**ZENITH**  
**EPIGENETICS**

**Leading epigenetic company translating bromodomain  
biology into impactful therapies**