2nd Annual Capital Markets Day

Dr Frank Bedu-Addo
CEO, PDS Biotechnology Corporation

Altering the landscape of immunotherapy

PDS Biotechnology

Protein Delivery Sciences

Next-Generation Cancer Immunotherapies

NetScientific PLC Capital Markets Day - June 14 2016

Investment and Partnership Highlights

Innovative immunotherapy platform technology harnessing immune system's power to fight disease

1 Immunotherapy Platform

- Innovative T-cell activating platform – **Versamune®**
- Advantages over current approaches already valued in $billions

2 Differentiated Technology/Approach

- Simple and differentiated by modes of action
- ***Developing clinical-stage products across several cancers***

3 Big Pharma & National Cancer Inst. Validation

- NCI committed to run 3 Phase 2 trials (PDS retains ownership)
- Merck KGaA partnership; preclinical studies completed
- Additional partnerships under discussion with notable parties

4 Funding

- NCI partnership saves > $40 million in equity capital
- Considering IPO in UK or private investment to raise $40-50 million to fund multiple phase 2 clinical programs

5 Significant Near-Term Opportunity for Value Inflection

- Multiple Phase 2 clinical trials being initiated in 2017-2018
- Targeting interim Phase 2 clinical trial readouts within 2 years

Strategy – Maximize opportunity for clinical and commercial success

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Experienced management team with stellar track record

Sir Richard Sykes Chairman	• Chairman and CEO of Glaxo 1995-2000, and GSK until 2002
Frank Bedu-Addo, PhD President, CEO	• Sr. exec.- KBI BioPharma & Cardinal Health • Development - Abelcet® (Liposome Company/ Elan), PEG-Intron® (Schering-Plough/Merck)
Gregory Conn, PhD Chief Science Officer	• 35+ years of experience - Merck, Regeneron & Covance/Diosynth • In-depth experience with biotech product dev.
Robert Shepard, MD Chief Medical Officer	• Former Global Medical Lead for oncology for AstraZeneca/ MedImmune; CMO – Cornerstone • Former FDA Medical Officer, Cancer Biologics
Michael King, MBA Chief Financial Officer	• Former CBO/CFO of Aprecia Pharmaceuticals; Head US Strategy, Sandoz GmbH; McKinsey
Panna Dutta, PhD VP of Development and Manufacturing	• 25+ years of drug development experience – Pfizer, Baxter, Medicines Co.; led development & successful FDA approval for multiple products

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Cancer immunotherapy:
Significant emerging clinical potential

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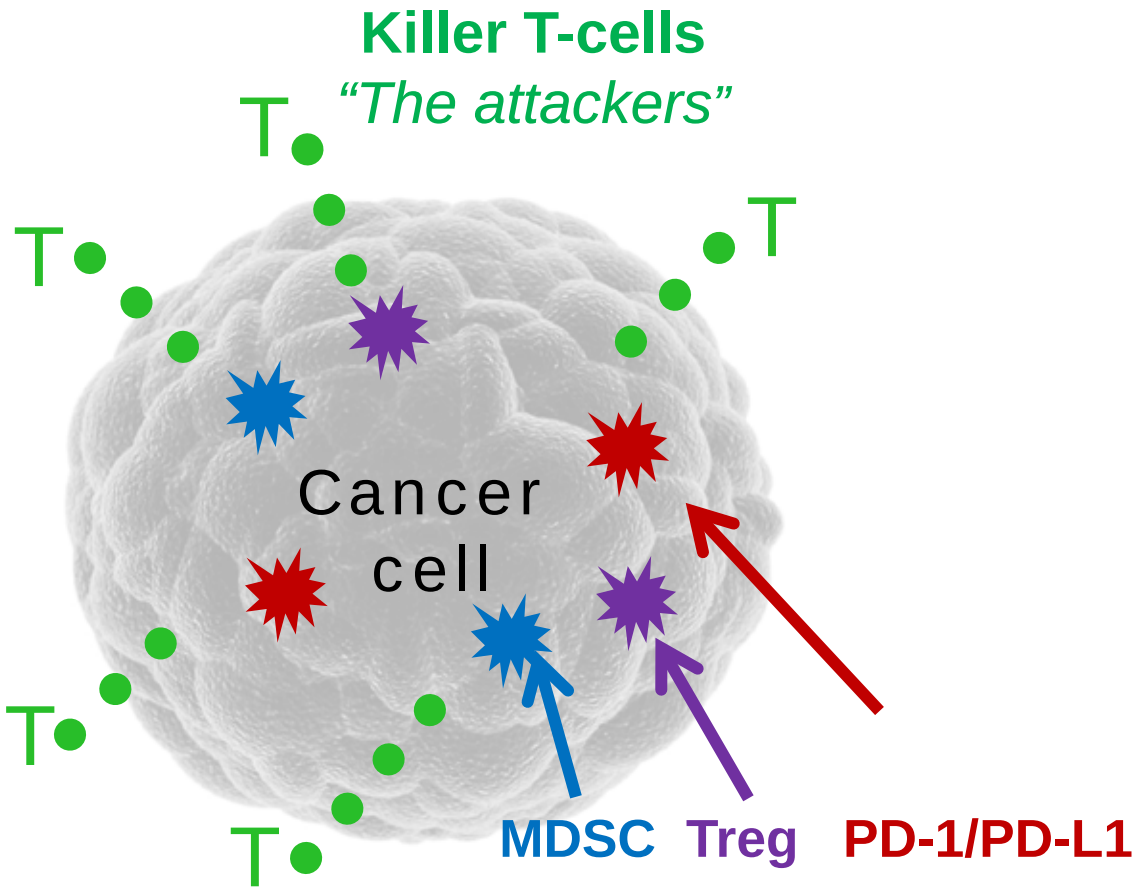
Immunotherapy Goal: Shift balance of “attackers” vs. “defenders” to favor ability of “attackers” to overcome “defenders”

T-cell induction is critical to the anti-tumor effect



Ultimate goal
“Enable” a sufficient number of potent or “strong” killer T-cells to overcome and outlast the defenders

The best understood immune suppressor cell types - *“The defenders”*

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Immunotherapy – Current key approaches and technologies

Current technologies present significant advancements with some limitations

- **Cancer vaccines**
  - Overview: Prime the immune system to generate tumor specific T-Cells
  - Positioning: Key additions to checkpoint inhibitors as combinations to enhance the tumor destroying capabilities by enhancing T-cell attack

- **CAR-T cells**
  - Overview: T-cells removed and engineered outside the body to target tumors
  - Advantages: Large number of T-cells generated ex-vivo & infused in billions
  - Disadvantages: Sub-optimal safety with deadly “cytokine storms”. Also complex with no ability to impact immune suppression (defenders)
  - Positioning: Terminal cancer patients who have failed existing treatments

- **Check-point inhibitors**
  - Overview: Block the PD-1 and PD-L1 T-cell suppressors
  - Advantages: Allow existing T-cells to perform killing function
  - Disadvantages: Sub-optimal safety potency – No T-cell induction
  - Positioning: Terminal cancer patients who have failed existing treatments

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Immunotherapy: Limitations and opportunities

- ***Critical Limitations***
  - Checkpoint inhibitors and CAR T-cells too unsafe for early stage cancer
  - Complexity and cost also prevent application to early stage cancer

Opportunity: A safe and effective immunotherapy could dominate the larger and potentially more responsive early-stage cancer population - Versamune®

- ***Combination immuno-oncology – the "next frontier"***
  - Combinations of checkpoint inhibitors with other technologies could compound the toxicity of the therapy and even further restrict the patient population
  - Combination with other complex approaches could lead to exorbitant and unsustainable cost of treatment

Opportunity: A safe, cost effective and potent technology that lowers the dose of the checkpoint inhibitors due to potent T-cell activation and reduction of complimentary immune suppressors should result in a superior anti-cancer therapy - Versamune®

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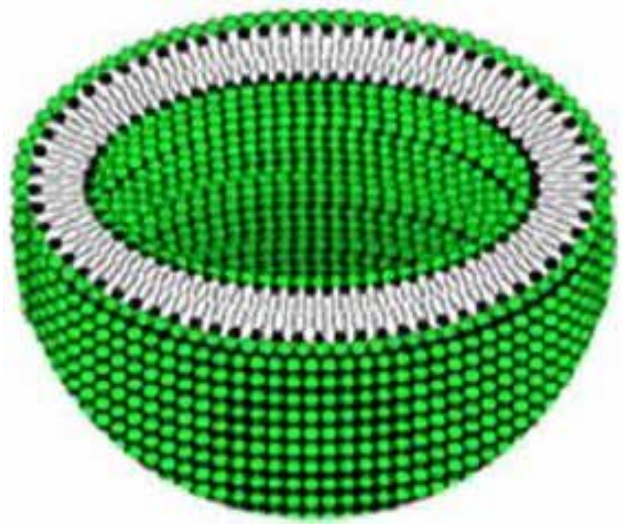
The Value Proposition:

The first true multi-mechanism platform

Overcomes "bottlenecks" and facilitates safer, simpler and more effective immunotherapy

Versamune® T-Cell activating platform



Cross-section of Versamune® Nanoparticles: 100-200nm in size

Versamune® is combined with specific protein/peptides unique to particular cancers

Administered by subQ injection

Ingredient: A simple positively charged synthetic lipid (fatty acid) called R-DOTAP

Versamune® nanoparticles form spontaneously in aqueous environment

Developed at Univ. of Pittsburgh School of Medicine and acquired by PDS

Versamune® patent portfolio: *8 patents* cover composition and use of any cationic lipid to induce an immune response and/or reduce immune suppressors

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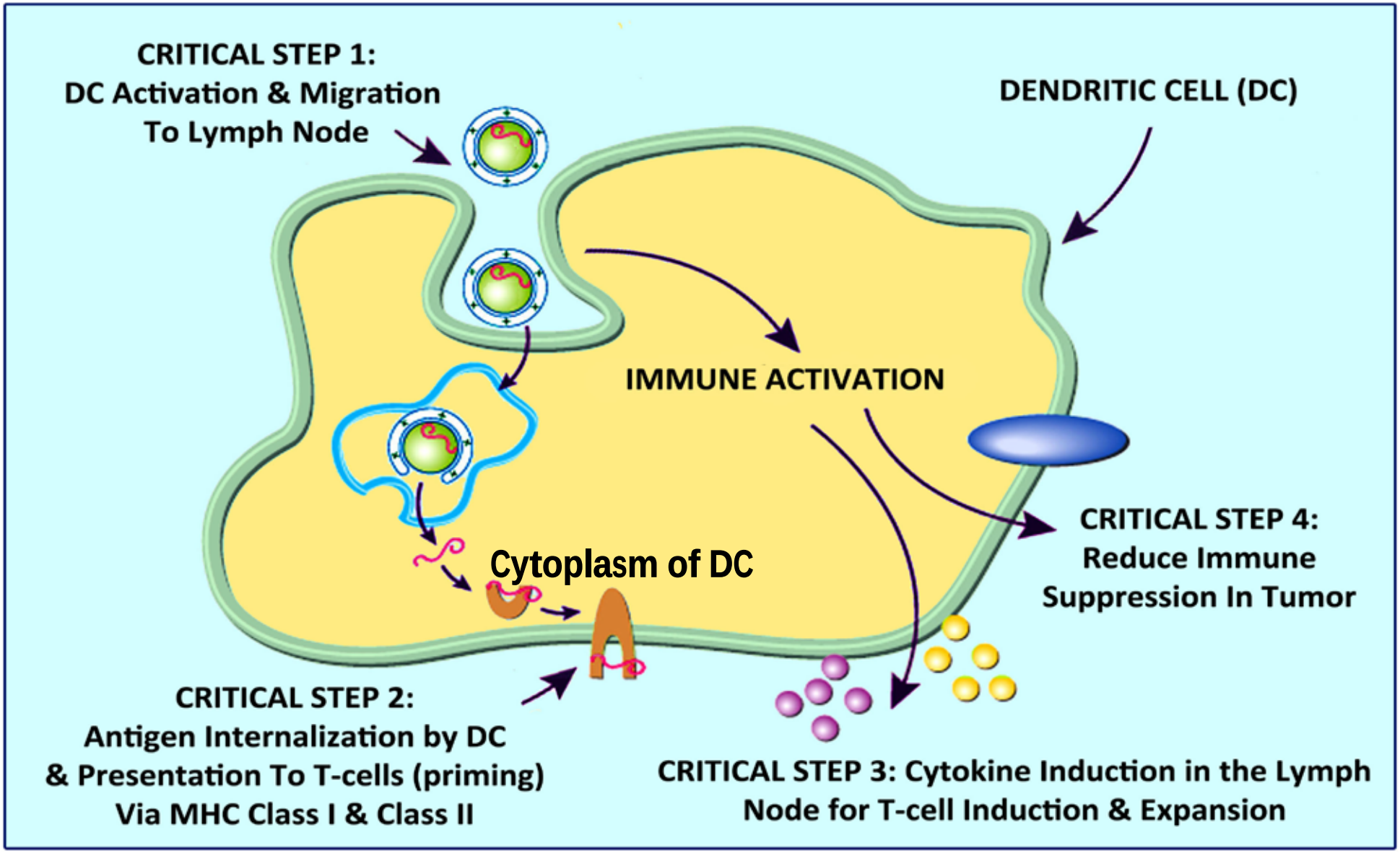
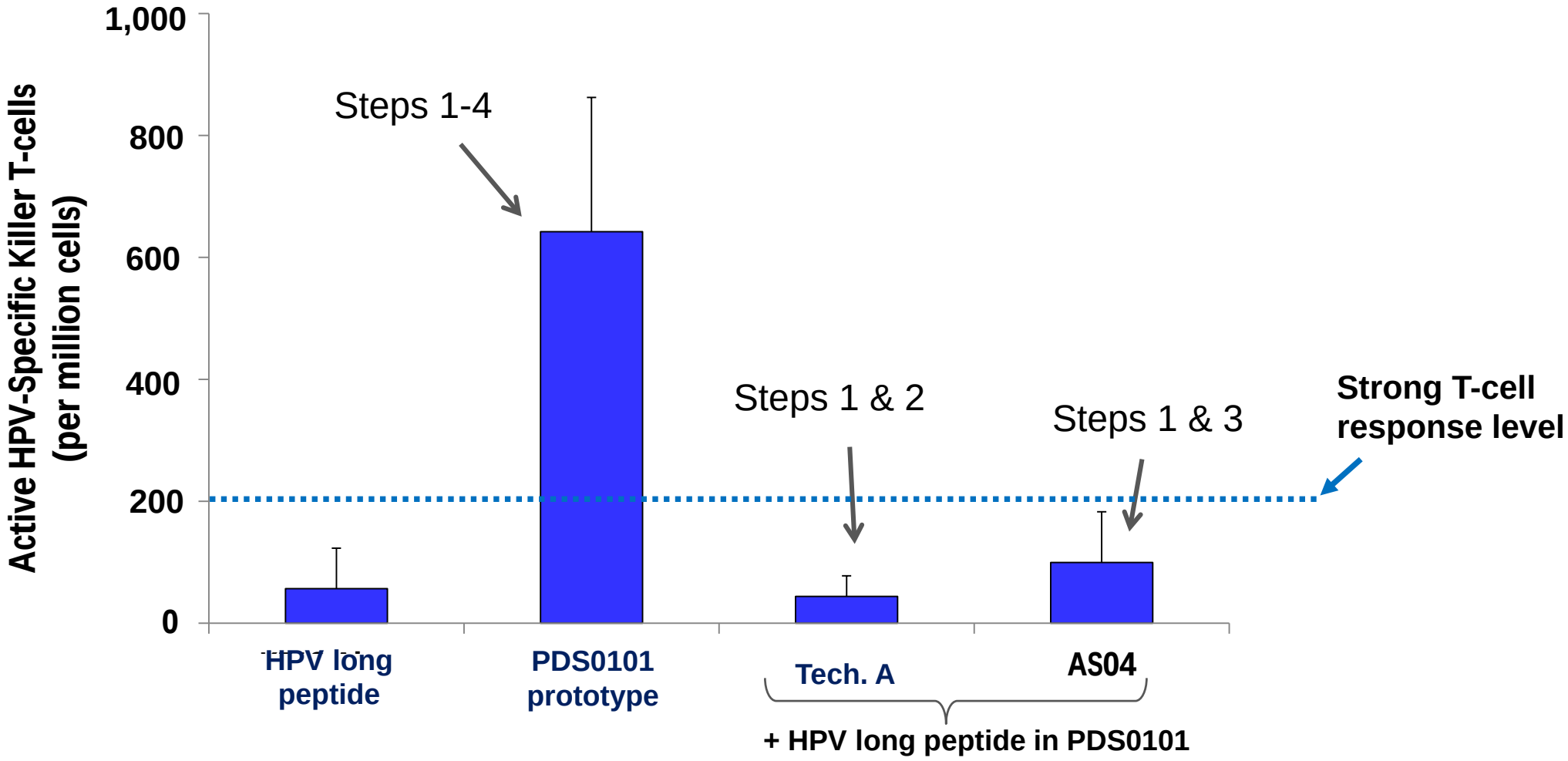
Critical steps required for full therapeutic T-cell mediated immune response (*Versamune® is the only proven to facilitate all four*)



Versamune®: Activation of all critical pathways leads to superior induction of active killer T-cells (*ELISPOT study – HPV cancer*)



AS04: GSK adjuvant
Tech. A: Positively charged delivery system that activates step 1 (uptake) only

Source: University of Kentucky School of Medicine, Dept. of Immunology

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Clinical data

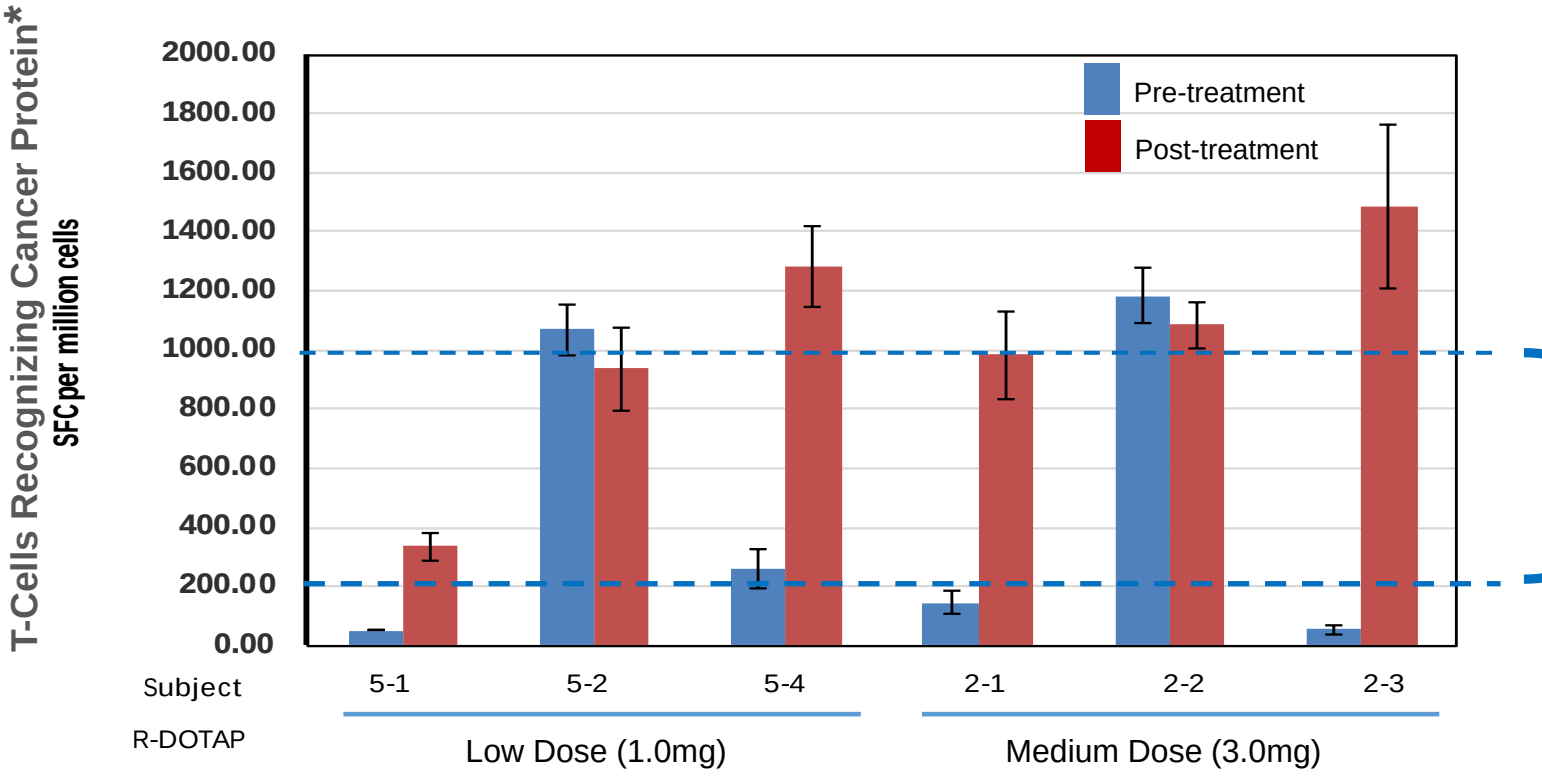
Human Proof-of-Principle
Human HPV-specific T-cell Induction
(PDS product # 1 - PDS0101)

Phase 1 human trial - 100% T-cell induction efficacy in small patient population

Strongly activated T-cells in the 4 of 6 patients who had low pre-treatment T-cells (Cohorts 1 & 2)

Excellent T-Cell responses* in Phase I clinical trial: Max peak responses 2 weeks after administration

Versamune® Created Highly Potent Immune Responses



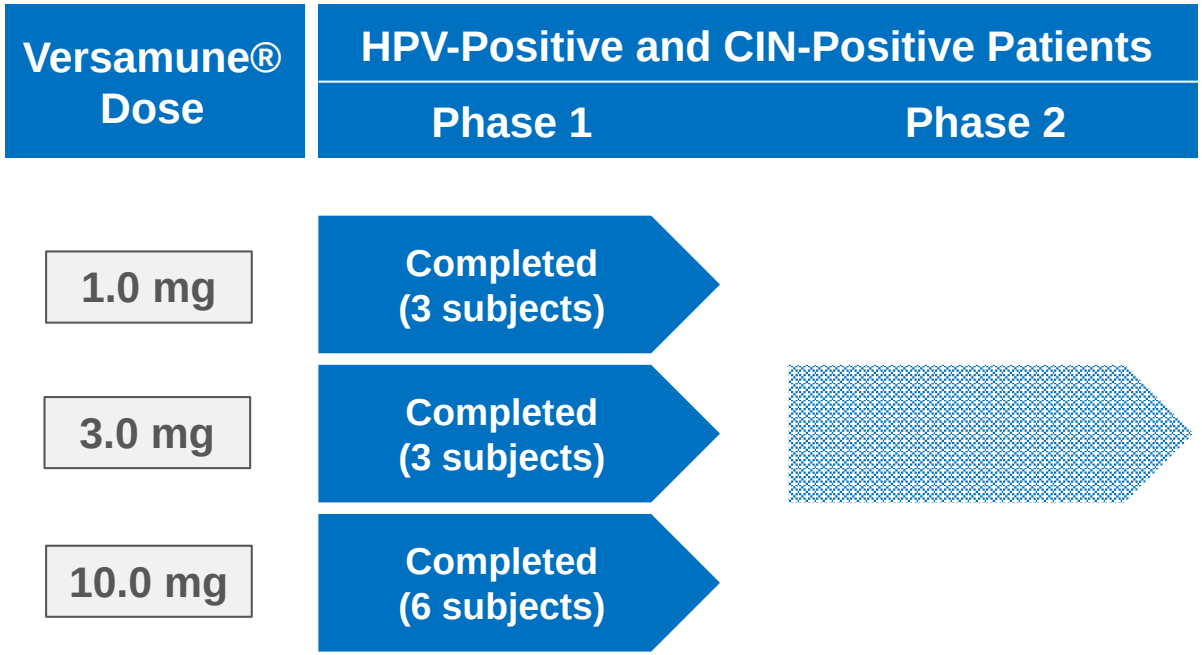
Versamune® Response – 4 – 7X "Strong" (200 spots)

High T-cell induction also seen in all 6 high-dose patients (10.0mg dose)

* ***IFN-γ ELISPOT –SFC/10^6 Cells. Most commonly reported measure of T-cell efficacy***
Measurement: all T-cells recognizing HPV (induced IFN-γ levels)

Versamune® demonstrated excellent safety profile in Phase 1 clinical trial

PDS0101 clinical trial data: No safety issues, even at the highest doses



- **SAFE**: Organ function / blood chemistry
- **SAFE**: Systemic / inflammation (fevers etc.) / immunology
- **SAFE**: Transient injection site reactions only (immune response)
- **SAFE**: Maximum tolerated dose – None / Safe at all tested doses

Safety profile is a result of:

1. High uptake from injection site by immune system & minimal blood presence
2. Biodegradable nanoparticles – broken down into fatty acids & excreted

Versamune® safety profile is unusually good in immunotherapy

Drug Development Strategy and Pipeline

PDS0101 Target Markets

Head-to-head comparisons with top competitors

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PDS pipeline selection strategy

Focus on maximizing opportunities for clinical and commercial success

- Select indications and targets where the cancer proteins (antigens) and immune response to the disease or cancer is well understood
  - Relevant preclinical models
  - Highly expressed antigens on the tumors
  - Antigens highly compatible with the platform that can be efficiently presented to the immune system for T-cell priming

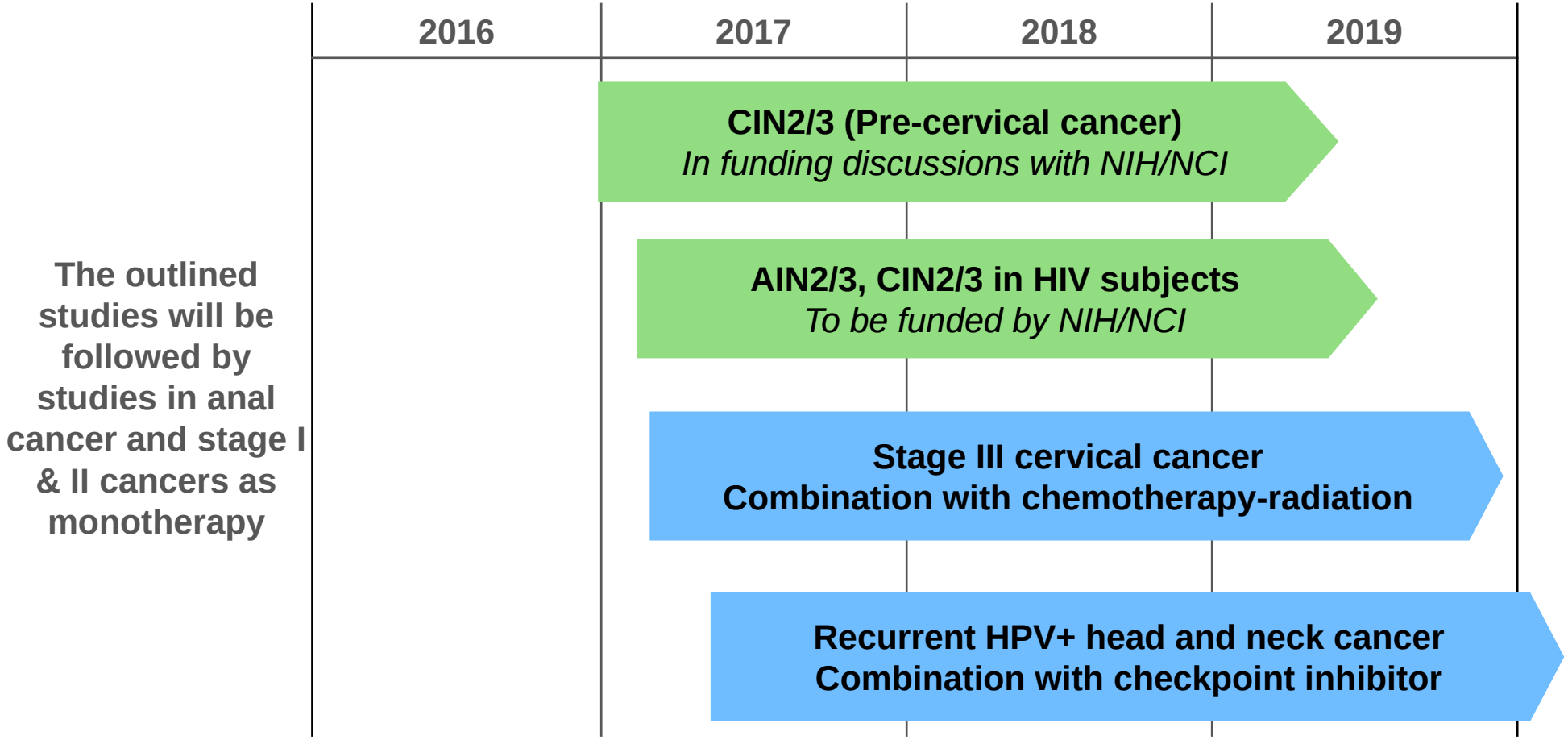
- Select indications where the target has been well validated and convincing clinical data demonstrated with other competitive products
  - Demonstrate superior efficacy to top “successful” programs in preclinical and early clinical studies
  - Demonstrate superiority in at least one clinically relevant characteristic that will enable the product to be highly competitive

PDS has developed and selected a clinical pipeline with high probability for clinical success based on the above principles

PDS Drug Development Pipeline: Phase 2 clinical trials in HPV cancers

PDS0101: Broad application in HPV related cancers and pre-cancers

Current projected timetable, subject to change:

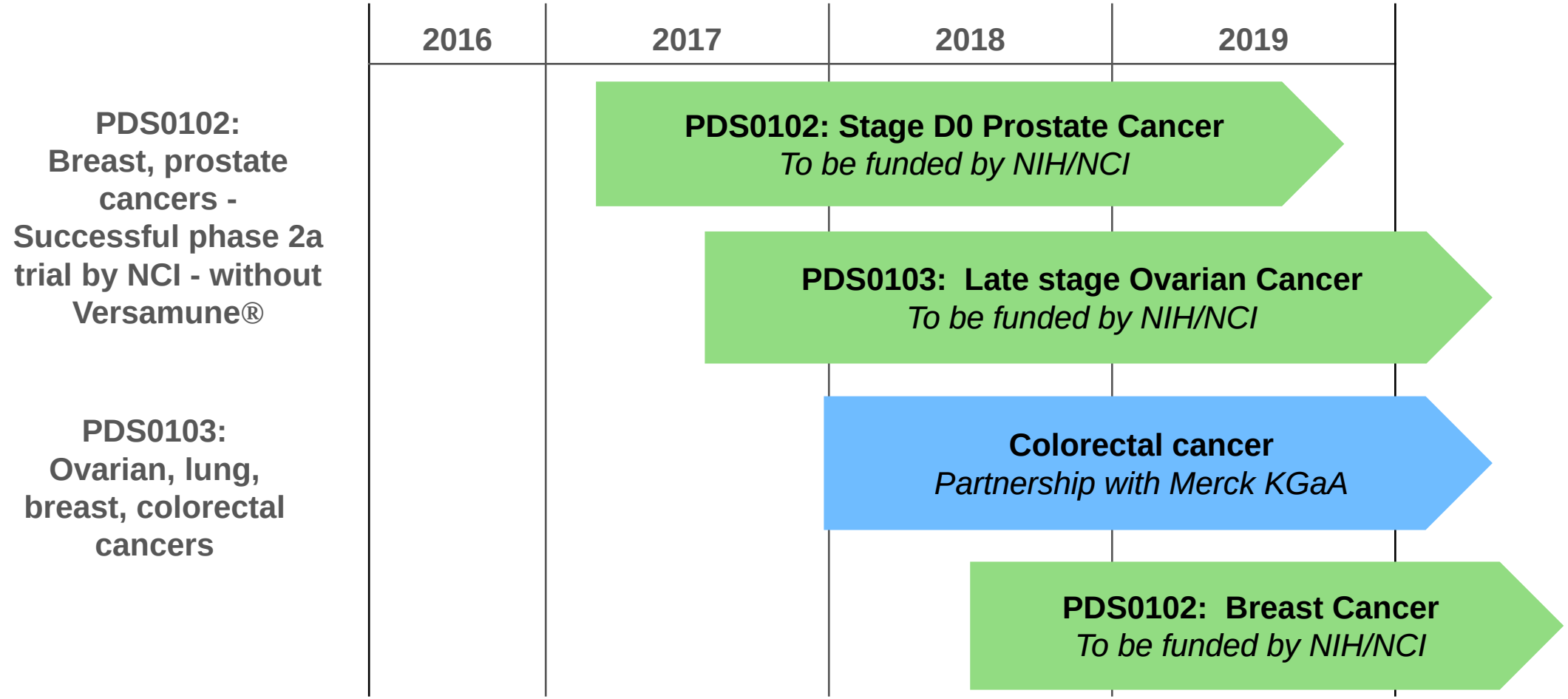


NCI collaboration substantially increases upside valuation leverage

PDS Drug Development Pipeline: Phase 2 Trials in Non-viral Cancers

Phase 2 clinical trials to be funded by partners – Annual revenues for each > $1 B

Current projected timetable, subject to change:



NCI collaboration substantially increases upside valuation leverage

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PDS0101: Excellent probability for clinical & commercial success

PDS0101 unique combination of safety, potency low COGs presents excellent opportunity

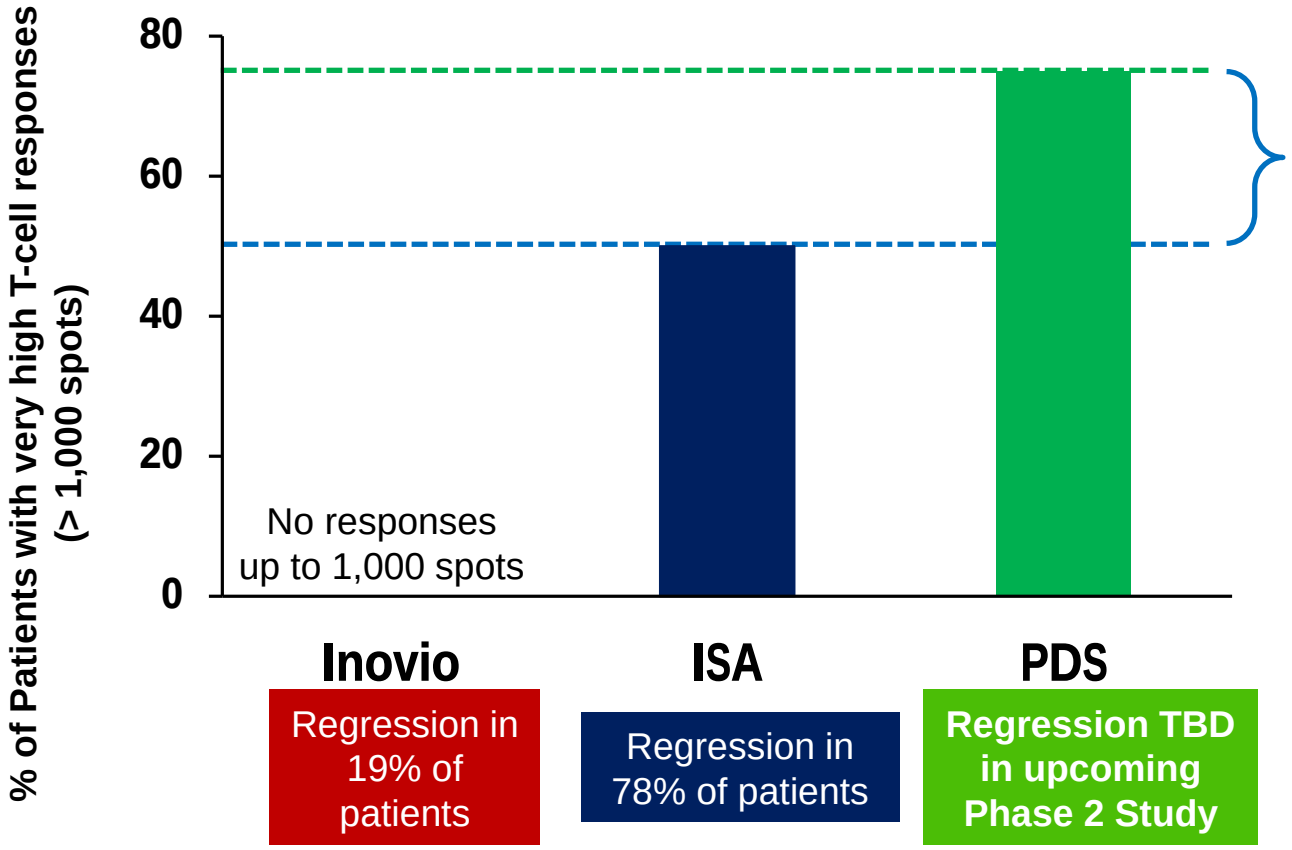
- No approved therapy to treat the HPV induced pre-cancer (neoplasia)
- High-grade neoplasia is treated by surgery – over 80% effective
  - Severe side effects e.g. infertility, pre-term labor, cervical stenosis in ~15%
    - Precludes surgery in low-grade neoplasia
  - Risk of recurrence and progression after surgery could be as high as 20%
- PDS0101 immunotherapy presents excellent potential to treat pre-cancer & cancer
  - ISA Pharma - >70% regression in high-grade vulvar neoplasia (Phase 2)
  - Advaxis – Best results to date in recurrent cervical cancer (Phase 2)
  - ***PDS0101 is significantly superior in potency and safety to both products***
- ***Significant opportunity for PDS0101***
  - Potency – PDS0101 significantly superior to Advaxis, ISA and Inovio
  - Safety – Only PDS0101 has safety profile for high and low grade neoplasias
  - Simplicity and cost of goods – Only PDS0101 can replace surgery

PDS0101 Phase 1 study – Suggests superiority to best human HPV T-cell data

PDS "Best in Class" advantages in T-cell potency, safety and overcoming immune suppression

Comparison of HPV-Specific T-Cell Induction – Max. responses

PDS0101 vs. ISA Pharma & Inovio (Previous "Successful" Phase II HPV Programs)



Data suggests PDS0101 may provide superior T-cell potency and hence clinical benefit

PDS0101 has additional advantages that pertain to clinical benefit – reduction of immune suppressor cells e.g. Tregs

* ELISPOT study: IFN-γ levels/10^6 PBMCs

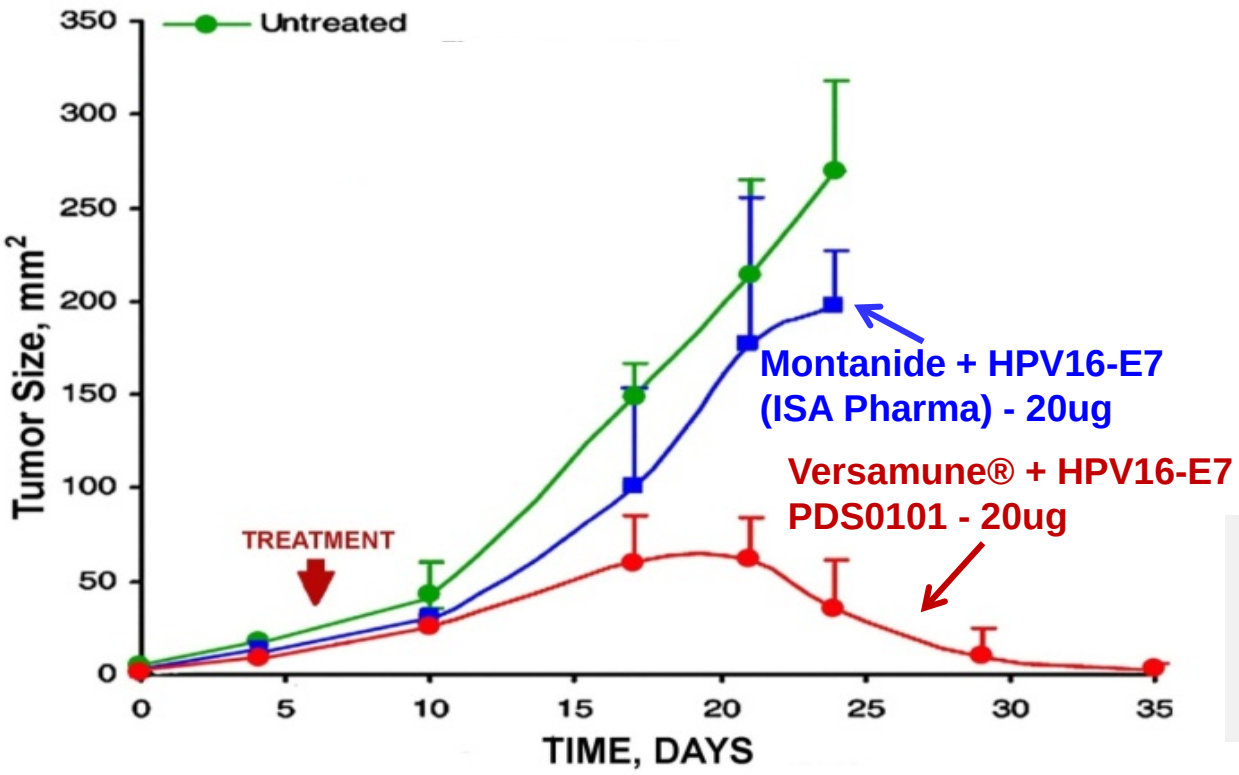
PDS0101: Combined low and medium Phase I doses (expected Phase II dose)

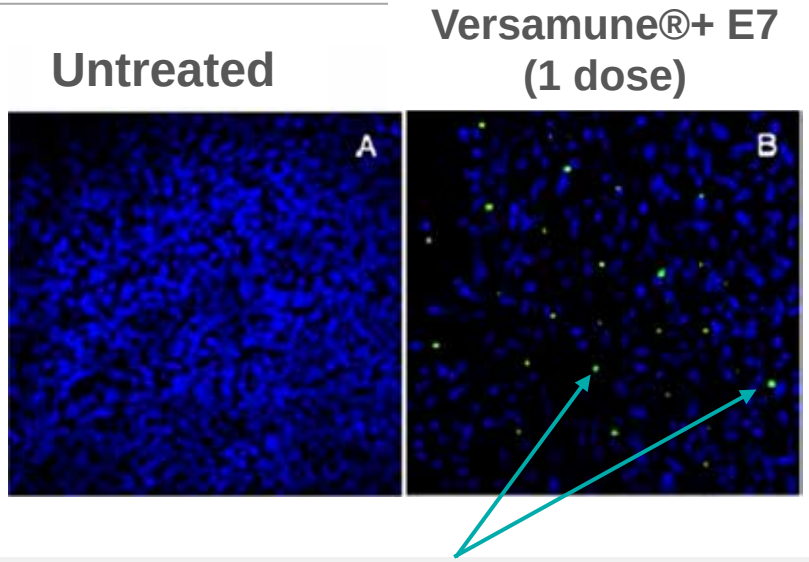
ISA: Data extract from Clin. Cancer Res 2008; 169 14(1) & NEJM 2009, 361, 1838-47 (ISA – ISA5 most potent group)

Inovio: Data extract from The Lancet 2015, 386, 2078

Versamune®: Multi-action mechanism leads to superior cancer treatment

Superior pre-clinical HPV tumor regression vs. ISA Pharma and leading T-Cell activators





- CD8+ (killer) T-cells infiltrate tumors
- Studies show induction of cell death
- Evaluations 7 days after treatment

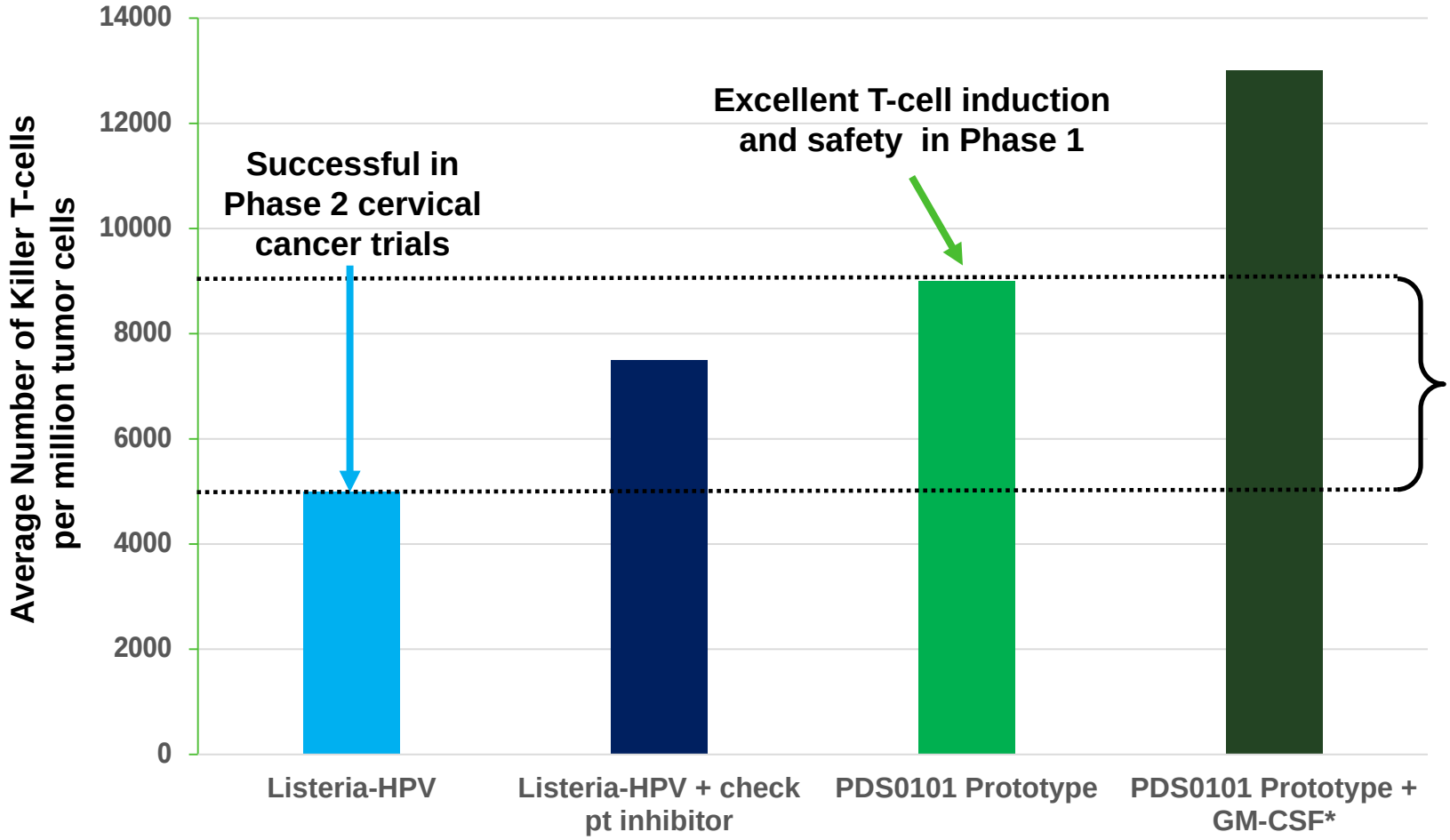
Single Dose Study (Established HPV-Positive Tumors)

- T-cell activators (adjuvants) e.g. Montanide (ISA Pharma), CpG fail to induce tumor regression
- Versamune® mediates potent tumor regression with a single SubQ dose
- Data generated in several hundred animals to date

Source: University of Pittsburgh School of Medicine & UNC Department of Molecular Pharmaceutics

NCI studies suggest PDS0101 is superior to Advaxis “successful” product

Significantly superior pre-clinical T-cell induction by PDS0101 (Independent study)

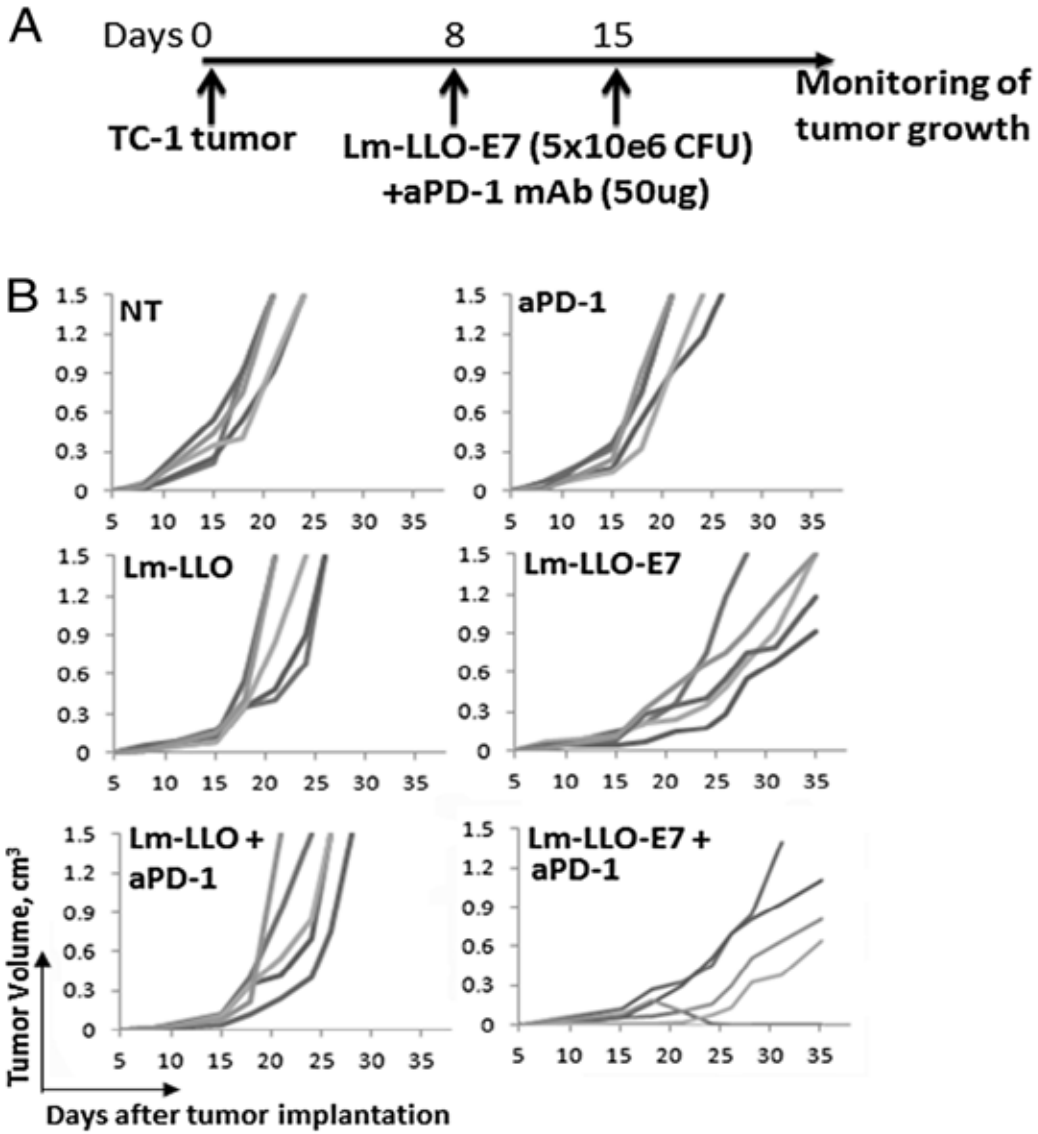


PDS Biotech’s Versamune® and PDS0101 out-perform Advaxis’ live Listeria bacteria technology - even when combined with checkpoint inhibitor

*PDS0101 + GM-CSF *Not yet tested in humans – reduces population of MDSC immune suppressor cells*
All studies done by the same investigators at the NIH’s National Cancer Institute, Cancer Vaccine Division

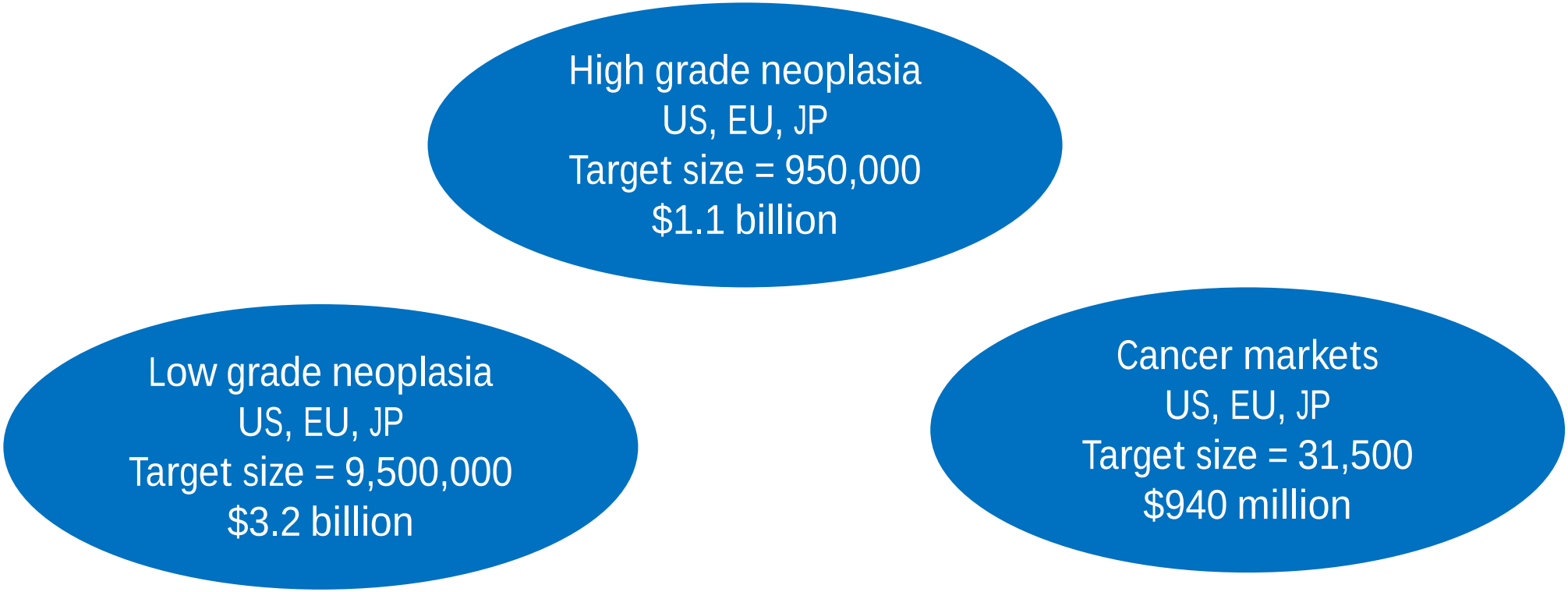
Regression of established TC-1 HPV-positive tumors (mouse model)

Advaxis Listeria bacteria T-cell activating immunotherapy



PDS0101 market size and projected revenues (excluding licensing)

Year 5 peak sales revenues for US, EU and Japan could be $2-5 billion



Estimated worldwide low-grade, high grade and cancer markets at 30% market penetration – approx. $7 billion

- Market Analysis by F. Potter Consulting – Oct 2015 (incorporates effect of current Merck and GSK preventive HPV vaccines
- Pre-cancer revenues based on US pricing of CIN2/3 procedures: $1,634 in 2010; $2,721 in 2023
- 40% market penetration assumed for high grade, 30& for low grade pricing: US - $3,750; EU - $2,500; Japan - $3,125
- Cancer revenues based on pricing: US - $37,500; EU - $25,000; Japan - $31,250

Results of PDS0101 human clinical trials and comparative analysis

Human data was accurately predicted by preclinical studies

1 Safety

- First effective cancer immunotherapy with a safety profile suitable to address early stage cancer & pre-cancer

2 Potency

- Significantly superior T-cell potency to all competitors - Human studies & head-to-head pre-clinical comparisons

3 Synthetic, low COGs

- Possibly the simplest immunotherapy to date
- Synthetic nanotechnology platform + peptides

Positioning

- Only immunotherapy with simplicity (cost), safety and potency to replace surgery as first-line treatment for pre- and early-stage cancers
- First capable of true "reduced risk" combination with checkpoint inhibitors. Opportunity for improved safety and potency (expanding existing market)

Superiority to "successful clinical" products projects excellent success probability
A true "disruptive" approach to immunotherapy and cancer treatment/prevention

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Questions?