

**November 2015 Company Presentation** 

### **Forward Looking Statements**



This presentation contains forward-looking statements, including, but not limited to: statements regarding Advaxis's ability to develop the next generation of cancer immunotherapies; and the safety and efficacy of Advaxis's proprietary immunotherapy, axalimogene filolisbac. These forward-looking statements are subject to a number of risks, including the risk factors set forth from time to time in Advaxis's SEC filings, including but not limited to its report on Form 10-K for the fiscal year ended October 31, 2014, which is available at http://www.sec.gov.

Advaxis undertakes no obligation to publicly release the result of any revision to these forward-looking statements, which may be made to reflect the events or circumstances after the date hereof or to reflect the occurrence of unanticipated events, except as required by law. You are cautioned not to place undue reliance on any forward-looking statements.



Our Company

**ADVAXIS OVERVIEW** 

### **Advaxis Company Overview**



#### **Background**

- Core technology live attenuated Listeria monocytogenes (Lm) bacterial vector stimulates the immune system to view tumor cells as bacterial infected cells and target them for elimination
- Alters tumor microenvironment by increasing tumor fighting cells and decreasing tumor protecting cells
- ~50 employees with lab, office, and vivarium located in Princeton, NJ

#### **Financial Snapshot**

- Raised ~\$165M since October 2013
- Cash: ~\$120M as of August 2015

#### **Summary of Strengths**

- Extremely versatile platform technology can be used to treat any type of cancer through targeting driver mutations and/or neoepitopes
- Existing collaborations with Merck & Co., Inc.; AstraZeneca/MedImmune, LLC; and Incyte Corp.
- Straightforward and scalable manufacturing process
- Highly proprietary technology (80+ patents) with low royalty obligation (2.5%)

### **Key Value Drivers**



#### *Lm* Technology™ Candidates in Development

- Axalimogene filolisbac Comprehensive clinical development program in early and late stage HPVassociated cancers
- ADXS-HER2 Clinical development program in multiple HER2 expressing solid tumors
  - > AT-014 for canine osteosarcoma anticipated launch in 2016 (licensed to Aratana/NASDAQ:PETX)
- ADXS-PSA Clinical development program in metastatic castration-resistant prostate cancer (mCRPC) as monotherapy and in combination with KEYTRUDA®
- Orphan Drug Designations for invasive cervical cancer, head and neck cancer, anal cancer, and osteosarcoma

#### **Preclinical Pipeline**

- ADXS-NEO Neoepitope-based immunotherapy targeting mutations identified in an individual patient's tumor using massive parallel sequencing; IND anticipated mid-2016
- ADXS-TNBC Triple negative breast cancer; IND anticipated mid-2016
- Other Lm Technology minimum immunotherapy product candidates targeting tumor driver mutations, including survivin, ISG15, PSCA, WT1, and others

#### **Combination with Other Cancer Therapies**

- Synergistic response with checkpoint inhibitors (PD-1 and PD-L1) and costimulatory molecules (OX40 and GITR) in preclinical models
- Enhanced response in combination with radiation in prostate cancer models

## **Experienced Management Team**















David Mauro, MD, Ph.D.

Chief Medical Officer







Robert Petit. Ph.D.

Chief Scientific Officer





Chief Financial Officer



AstraZeneca



**KEYTRUDA** 

(pembrolizumab) for Injection 50 mg





Chris French, MBA VP, Compliance



Robert Ashworth VP, Regulatory



**Tom Hare** VP, Clinical Operations



**Mayo Pujols** VP, Manufacturing









# Strong Collaborations with Academic Institutions and Foundations





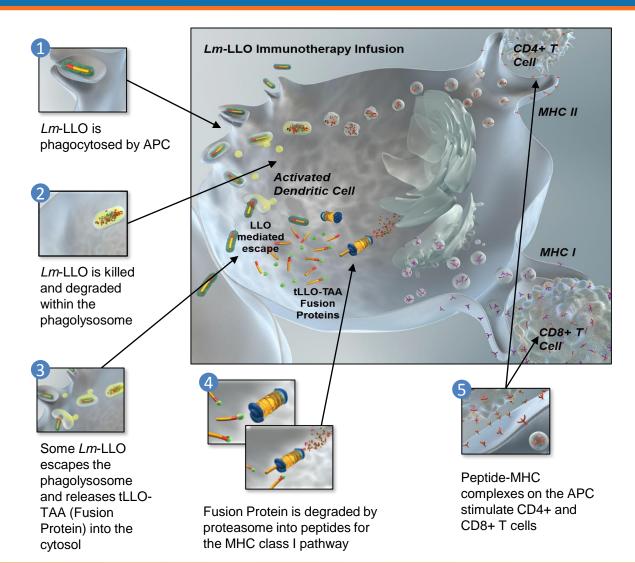


Our Immunotherapy

LM TECHNOLOGY<sup>TM</sup>

# *Lm* Technology™ Overview: Harnessing Unique Life Cycle of *Lm* in APCs





#### **Summary**

- Lm-LLO and Tumor Associated Antigen (TAA) presented and taken up by dendritic cells (antigen presenting cells or APCs)
- Dendritic cells activated and generate an immune response through both the MHC I and MHC II pathways
- Robust T-cell response generated towards antigen secreted by Lm-LLO and redirected to tumors expressing the same TAA
- "Perceived" acute infection stimulates a strong innate immune response through multiple pathways (e.g. STING)
- Over-rides checkpoint inhibitors and negative regulators of cellular immunity

MHC, major histocompatibility complex



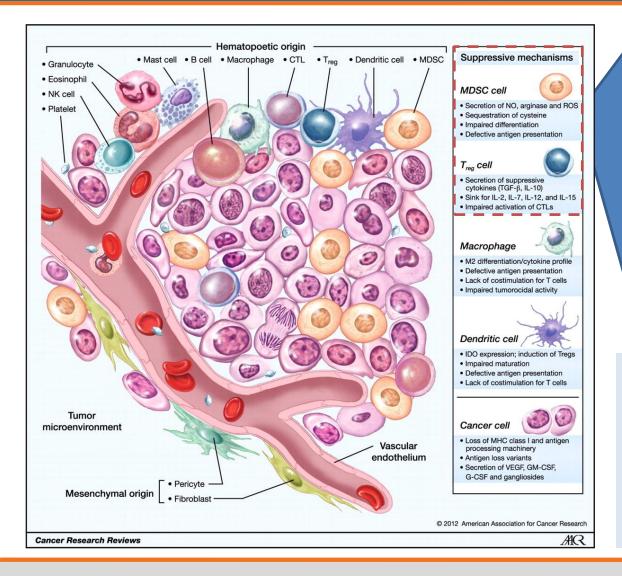
Our Immunotherapy

### IMPACT ON THE TUMOR MICROENVIRONMENT

# *Lm* Technology™ & Tumor Microenvironment: Suppressing Treg and MDSC Activity



**IMMUNOTHERAPIES** 



#### MDSC cell



- Secretion of NO, arginase and ROS
- Sequestration of cysteine
- Impaired differentiation
- Defective antigen presentation

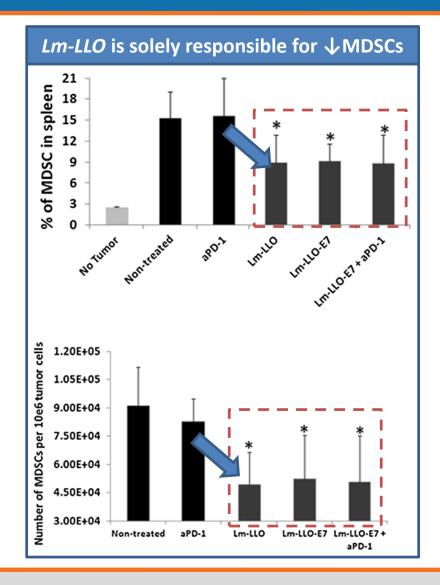
#### T<sub>reg</sub> cell

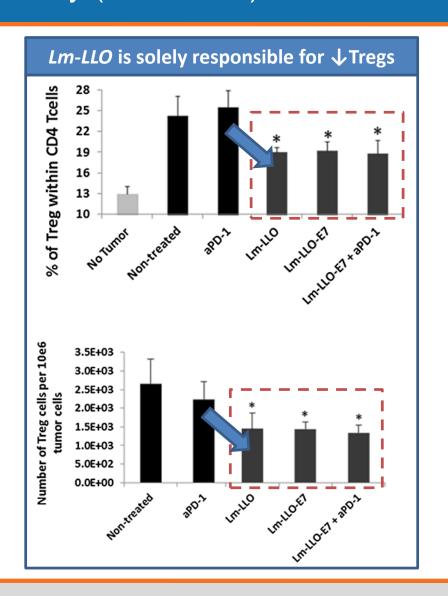


- Secretion of suppressive cytokines (TGF-β, IL-10)
- Sink for IL-2, IL-7, IL-12, and IL-15
- · Impaired activation of CTLs
- Tregs and MDSCs are the key cells that tumors manipulate to avoid detection by the immune system and evade destruction
- Lm-LLO, Advaxis's proprietary technology, decreases the relative % of Tregs and MDSCs in the TME

# *Lm* Technology™ & Tumor Microenvironment: Suppressing Treg and MDSC Activity (Preclinical)









Our Immunotherapy

# SYNERGY WITH CHECKPOINT INHIBITORS & COSTIMULATORY MOLECULES

## Lm Technology™ & Checkpoint Inhibitors: Synergistic Tumor Killing in the Microenvironment



#### CTLA-41 block results in:

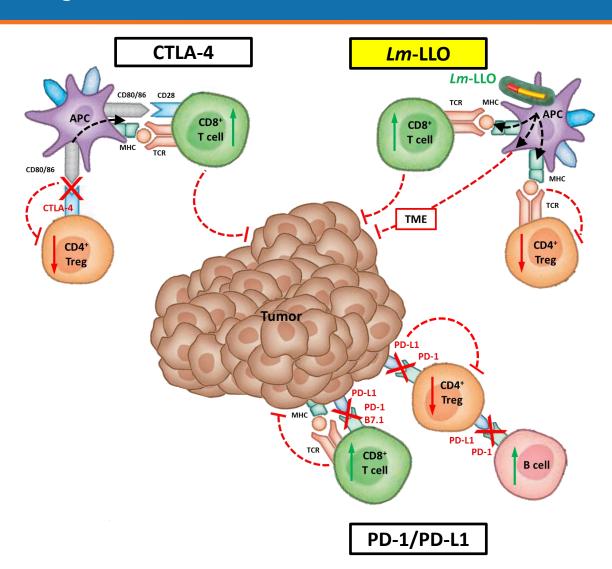
- Down-regulation of CD4<sup>+</sup> Tregs
- Upregulation of CD8+ tumor infiltrating effector T cells

#### PD-1<sup>1</sup> block results in:

- Recognition of tumor cells by T cells
- Proliferation and function of CD8<sup>+</sup> tumor infiltrating effector T cells

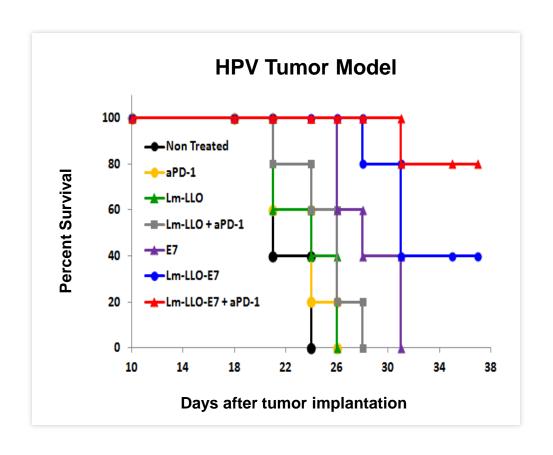
#### PD-L1<sup>1</sup> block results in:

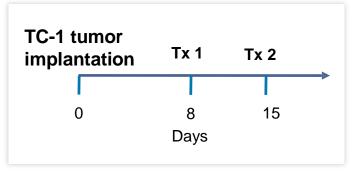
- Recognition of tumor cells by T cells
- Proliferation and function CD8<sup>+</sup> tumor infiltrating effector T cells
- No CD4<sup>+</sup> Treg activation
- Increase in B cell antibody production



## Lm Technology™ & Checkpoint Inhibitors: Axalimogene Filolisbac & PD-1 Preclinical Data







Treatments:	
Lm-LLO-E7:	5x10 <sup>6</sup> cfu
CT-011 mAb:	50 µg

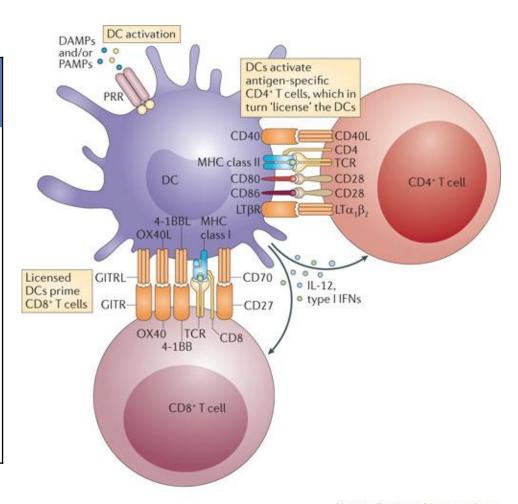
Low dose *Lm*-LLO immunotherapy can be combined with a checkpoint inhibitor

# Lm Technology™ & Costimulatory Molecules: Improved Targeting and Priming of CTLs



## Role of Costimulatory Molecules in the Adaptive Immune Response

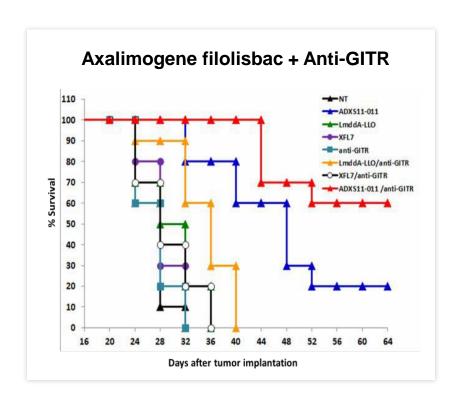
- DCs are activated by pathogenassociated molecular patterns (PAMPs)
- CD40 signaling results in the production of IL-12 and upregulation of OX40 ligand (OX40L) and GITR ligand (GITRL)
- Priming of CD8+ T cells by MHC class I peptides upregulates OX40 and GITR
- Stimulation of OX40 and GITR generates robust CD8+ T cell activation, proliferation, and effector function

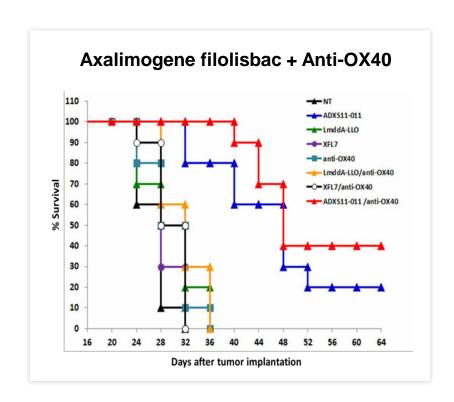


Nature Reviews | Immunology

# Lm Technology™ & Co-Stimulatory Molecules: A D V A X I S Axalimogene Filolisbac & GITR or OX40 Antibodies IMMUNOTHERAPIES™

#### **HPV Tumor Model**





Lm-LLO immunotherapy can be combined with agonistic antibodies to immune co-stimulatory molecules



Our Clinical Trials

## TIMELINES, DESIGN, AND RESULTS

# Clinical Development Three Active Programs with 4 Orphan Indications



Product	Indi	Indication		Phase 2	Phase 3	Partner
Cervical Cancer*						
		AIM2CERV – Adjuvant Randomized vs. Placebo			Phase 3	CCC commencement amount com
	М	Metastatic – Randomized vs Cisplatin/Axalimogene Filolisbac	Phase 1	Phase 2		
	IVI	Metastatic – GOG-0265		Phase 2		COC Surrous armost care
		Metastatic – Single Arm High Dose	Phase 1/2			
	С	Metastatic – Combo with durvalumab (MEDI4736)	Phas	e 1/2		<b>I</b> MedImmune
Axalimogene	C	Stage I-IIa – Combo with epacadostat (INCB24360)		Phase 2		Incyte
(ADXS-HPV)	Filolisbac  Head and Neck Cancer*					
(ADAS-III V)	М	Neoadjuvant – Window of Opportunity		Phase 2		Mount Sinai
	С	Metastatic – Combo with durvalumab (MEDI4736)	Phas	e 1/2		<b>I</b> MedImmune
	Anal Cancer*					
		Adjuvant Randomized vs Control		Phas	e 2/3	RTOG° RADIATION THERAPY ONCOLOGY GROUP
	М	Adjuvant – Single Arm High Risk	Phas	e 1/2		BROWN
		Metastatic – Single Arm (FAWCETT)		Phase 2		
Prostate Cancer*						
ADXS-PSA	С	Metastatic – Combo with KEYTRUDA® (pembrolizumab)  Phase 1/2		MERCK		
	HER2-positive Solid Tumors (including Osteosarcoma*)					
ADXS-HER2	ADXS-HER2 M Metastatic – Single Arm Phas		Phase 1			
	М	Pediatric Osteosarcoma		Phase 2		CHILDREN'S ONCOLOGY GROUP
M Monotherapy	py C Combination In Progress (FDA accepted IND and/or ongoing trial Planned		nned			



Our Clinical Trials

# AXALIMOGENE FILOLISBAC: COMPANY SPONSORED PHASE 2 STUDY

# Axalimogene Filolisbac Phase 2 Study Study Schema—Recurrent Cervical Cancer



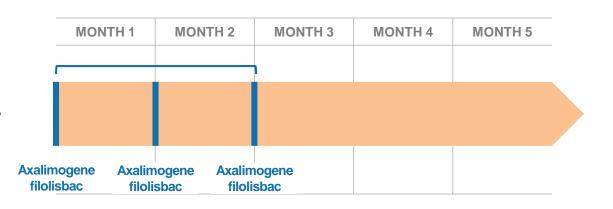
#### **Primary Efficacy Endpoint:** Overall Survival

#### **ARM A**

## Axalimogene Filolisbac Monotherapy

1x10<sup>9</sup> cfu x 3 doses q 28 days (days 0, 28, 56) as an 80 ml infusion over 15 min

N = 56



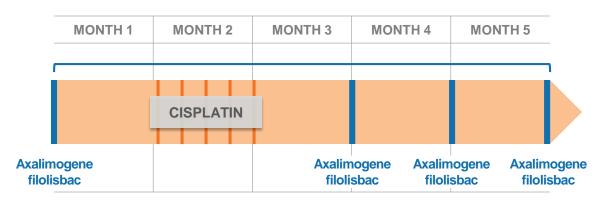
#### **ARM B**

#### Axalimogene Filolisbac + Cisplatin

1x10<sup>9</sup> cfu x 4 doses q 28 days (days 0, 88, 106, 134) as an 80 ml infusion over 15 min

Cisplatin 40 mg/m<sup>2</sup> weekly x 5 (days 30, 37, 44, 51, 58)

N = 54



Naproxen 500 mg BID (day -1, 0) and promethazine 25 mg BID (pre-dose 8 hours) administered as premedications Ampicillin 500 mg QID (days 3-9) administered post-infusion

## Axalimogene Filolisbac Phase 2 Study Safety in Recurrent Cervical Cancer



109 patients received 264 doses of axalimogene filolisbac at 1x109 cfu	(N=109)
Grade 1-2 AEs (76 patients reported)	41 (38%)
Chills/Shivering	41 (38%)
Flu-Like Symptom	13 (12%)
Vomiting	6 (6%)
Nausea	5 (5%)
Fever	5 (5%)
Dizziness	2 (2%)
Cytokine Release Syndrome	1 (1%)
Headache	1 (1%)
Weight Decreased	1 (1%)
Blood Alkaline Phosphatase Increased	1 (1%)
Grade 3 AE (1 patient reported)	
Fever	1 (1%)

## **Axalimogene Filolisbac Phase 2 Study** Efficacy in Recurrent Cervical Cancer



#### Survival Analyses at 12, 18 and >24 Months

Patients	<b>Overall</b> (N=109)	Axalimogene Filolisbac Alone (N=55)	Axalimogene Filolisbac + CISPLATIN (N=54)
12-Month Survival	32%	29%	35%
	(35 / 109)	(16 / 55)	(19 / 54)
18-Month Survival	22%	22%	22%
	(24 / 109)	(12 / 55)	(12 / 54)
≥ 24-Month Survival	18%	15%	20%
	(16 / 91*)	(7 / 46)	(9 / 45)

- There was no statistically significant difference in median overall survival between axalimogene filolisbac alone or in combination with cisplatin
- Tumor response was comparable between treatment groups at 12, 18, and 24 months
- The objective response rate in both arms was 10% and the disease control rate was 38%

<sup>\* &</sup>gt;24 month survival rate is based on 16 known to be alive out of 91 patients from the OS efficacy population with at least 24 months of documented follow-up data



Our Clinical Trials

# AXALIMOGENE FILOLISBAC: GOG-0265 STUDY

# Axalimogene Filolisbac: GOG-0265 Study Study Schema—Phase II Open Label, 2-Stage



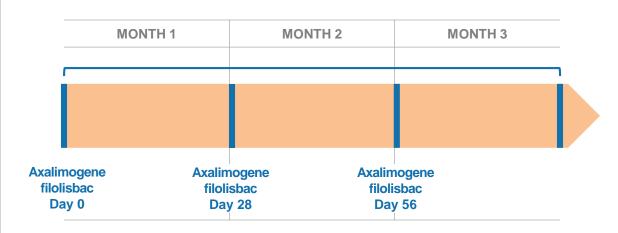
#### **Primary Efficacy Endpoint:** 12-month survival

#### Axalimogene Filolisbac Monotherapy in Recurrent Cervical Cancer

1x10<sup>9</sup> cfu x 3 doses q 28 days (month 1, 2, 3) as an 80 ml infusion over 15 min

#### N = ~67 (Stage 1 and 2)

- Persistent or recurrent metastatic cervical cancer (PRmCC)
- ≥ 1 prior chemotherapy regimen for PRmCC, excluding that received as a component of primary treatment
- GOG PS 0/1
- Measurable disease ≥ 1 target lesion (RECIST 1.1)

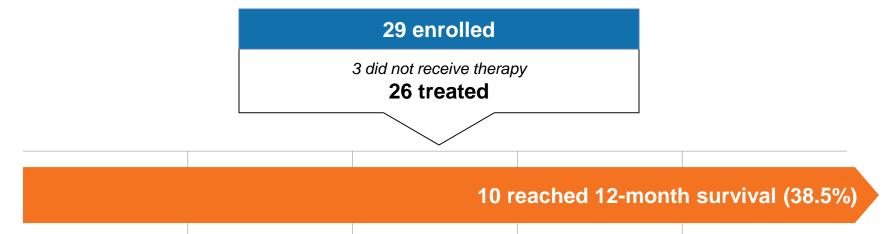


(Tewari KS, Monk BJ. Curr Oncol Rep 2005; 7(6):419-34.)

GOG, Gynecologic Oncology Group

# Axalimogene Filolisbac: GOG-0265 Study Stage 1 Final Data (September 2015)





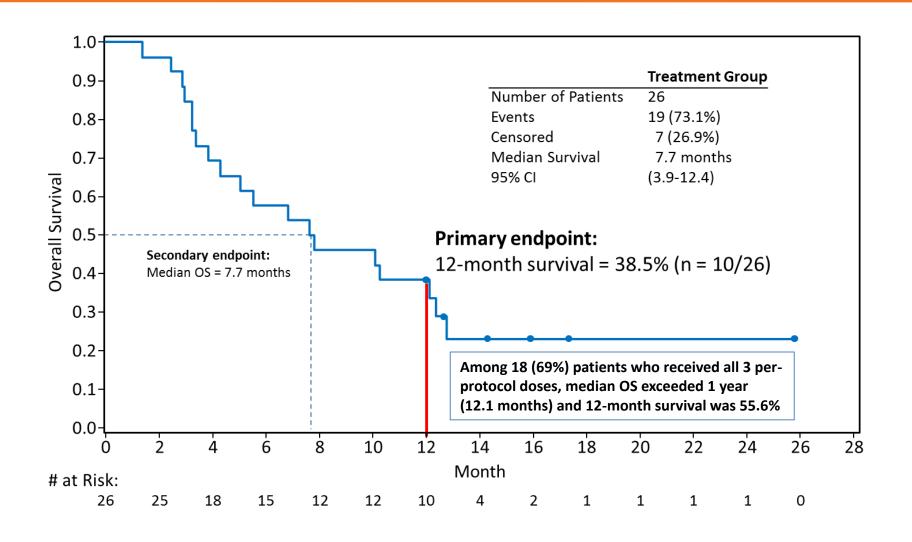
Met statistically pre-defined 24.5%12-month survival efficacy threshold\* and has proceeded to Stage 2 additional enrollment of n=37

Adverse Event Summary (N = 26 patients)				
Pts with $\geq 1$ Adverse Event (AE)	26 (100%)			
Pts with <u>&gt;</u> 1 treatment-related AE	24 (92%)			
Grade 1 - 2 only	19 (73%)			
Grade 3	4 (15%)			
Grade 4	1 (4%)			

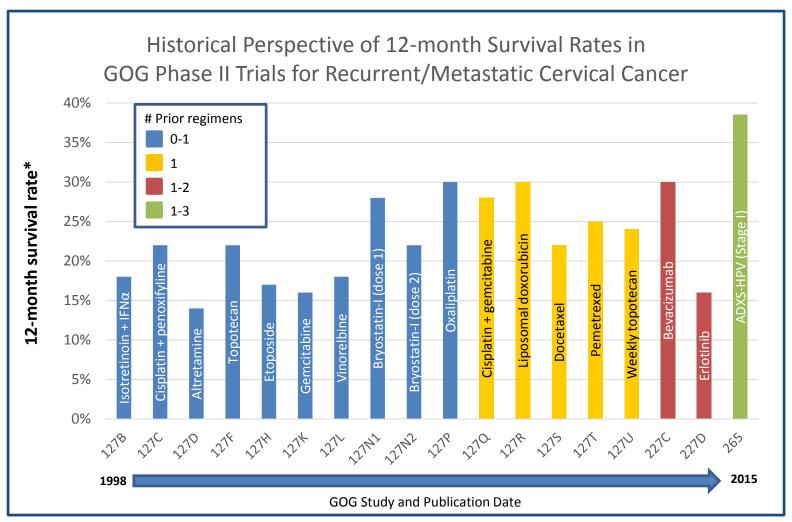
<sup>\*</sup> Threshold derived from pooled review of 12-month survival rates in completed GOG phase II trials in similar patient population

# Axalimogene Filolisbac: GOG-0265 Study Stage 1 Final Data—Overall Survival





# Axalimogene Filolisbac: GOG-0265 Study In the Context of Historical 12-Month Survival Rates



<sup>\*</sup>derived from product limit estimate of probability of surviving >12 months

## Clinical Significance of GOG-0265 Stage 1



## Historical Perspective

- Between 1998 and 2015, the GOG conducted serial single arm two-stage trials of various monotherapy and combination regimens in recurrent persistent metastatic cervical cancer
- Trial inclusion criteria has evolved from initially restricting to 0 or 1 prior regimens in the metastatic setting, to most recent inclusion of up to 3 or more prior therapies
- Prior to 2015, the 12-month survival rate in a GOG study has never exceeded 30%
  - When isolating only studies including ≥ 1 prior regimen, this value is ~15-20%, and informed the GOG 0265 Stage I  $\rightarrow$  Stage 2 minimum threshold

## Current Standard of Care

- First-line treatment of recurrent persistent metastatic cervical cancer is cisplatinbased chemotherapy, plus bevacizumab in those patients appropriate for antiangiogenic therapy
  - > Trials studying second-line and later therapy now need to address management of the chemotherapy/bevacizumab pretreated population

#### GOG-0265

- GOG 0265 study includes a more refractory patient population (1 3 prior regimens) than previous trials and includes post-progression chemotherapy / bevacizumab patients
- As of June 2015, 10 (38.5%) patients treated with ADXS-HPV have reached 12months survival, exceeding historical survival rates in a refractory and heterogeneous patient population

# Axalimogene Filolisbac: GOG-0265 Study Next Steps



- GOG-0265 opened to stage 2 enrollment of an additional 37 patients
  - Stage I efficacy threshold met (24.5% 12-month survival)
  - Accrual update: 44/67 (including stage 1)
- Safety and early efficacy findings support protocol amendment to allow continuous cycles of ADXS11-001 treatment until disease progression
- An international Advaxis-sponsored Phase 3 study of ADXS11-001 as adjuvant treatment of high-risk locally advanced cervical cancer (AIM2CERV) is under development in collaboration with the GOG Foundation

# Axalimogene Filolisbac: Planned Phase 3 Study Schema—ADXS AIM2CERV Study



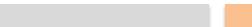
#### Randomization 1:2 between Reference and Treatment Groups

# Primary objective is progression free survival

- High risk
- FIGO stage I-II with positive pelvic nodes
- FIGO stage III-IV
- Any FIGO stage with para-aortic nodes

Cisplatin (at least 4 weeks exposure) and Radiation (minimum 40 Gy external beam radiation therapy)

## RANDOMIZE



Placebo IV Up to 1 year

**Reference Group** 

#### **Treatment Group**

ADXS11-001 (1 x 10<sup>9</sup> cfu) Up to 1 year

Follow-up for overall survival



Our Clinical Trials

## AXALIMOGENE FILOLISBAC: ANAL CANCER

## Axalimogene Filolisbac: Phase 1/2 Anal Cancer A D V A X Study Schema—Open Label Combo at BrUOG

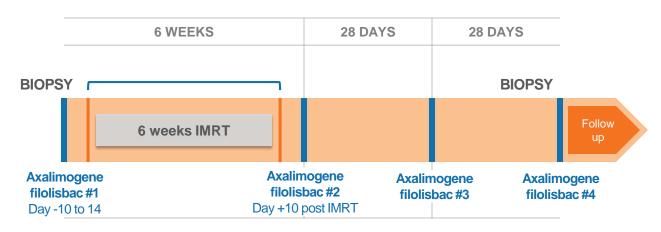


#### **Primary Efficacy Endpoint:** 6-month CR-rate

#### **Axalimogene Filolisbac**

1x109 cfu x 4 (1 prior to chemoRT and 3 post, q 28 days) as a 500 ml infusion over 30 min

- N = 25
- Primary stage II-III anal cancer
- High risk of recurrence
- **HPV-positive**



IMRT = 5-FU, Mitocyin, and Radiation

BrUOG, Brown University Oncology Group

Perez K et al. IANS 2015: Abstract 23

## Axalimogene Filolisbac: Phase 1/2 Anal Cancer A D V **Preliminary Data**

Study open: April 2013

N = 10 / 25 patients enrolled

#### **Efficacy Summary as of March 2015:**

- 10 patients received study treatment
- All patients who have completed treatment achieved CR
- No patient has developed recurrence
  - Historical 3-year recurrence rate in similar patient population = ~45%
- Follow-up range: 0.5 months 24 months

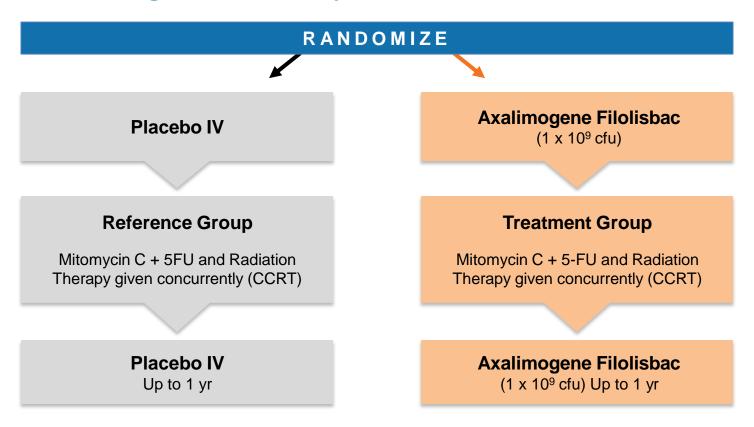
#### **Safety Summary as of March 2015:**

Chills, occasional rigors, flu-like symptoms  $\rightarrow$  resolved prior to leaving clinic (~2 hours)

# Axalimogene Filolisbac: Planned Phase 2/3 NRG/RTOG Study for Locally Advanced Cancer



#### **High Risk, Locally Advanced Anal Cancer**



Study design is currently being proposed to NCI CTEP



Our Clinical Trials

**ADXS-HER2** 

### **ADXS-HER2**

## Phase 1 Study in Canine Osteosarcoma (UPENN)



#### **Study Goals:**

- Identify MTD
- Safety
- Tumor-specific immunity
- Prevention of metastases
- Prolongation of survival

#### **ADXS-HER2**

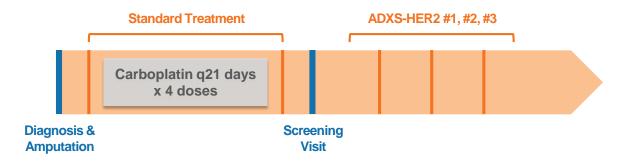
4 dose levels tested:

2x10<sup>8</sup> cfu 5x10<sup>8</sup> cfu

1x10<sup>9</sup> cfu

3x109 cfu

- N = 18 dogs
- Canine osteosarcoma (OSA)
- Post amputation and chemotherapy



UPENN, University of Pennsylvania

\* Paolini M., BMC Genomics, 2009

## **ADXS-HER2**



## Phase 1 Study in Canine Osteosarcoma: Safety & Efficacy

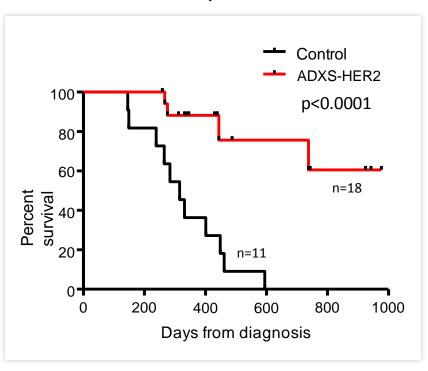
#### # Pet Dogs with Treatment Related Adverse Events

(All toxicities reported are Grade 1)

ADXS-HER2 Dose	2x10 <sup>8</sup>	5x10 <sup>8</sup>	1x10 <sup>9</sup>	3x10 <sup>9</sup>	Total
Number of dogs recruited	N=3	N=3	N=9	N=3	N=18
General Disorders					
Pyrexia (>103)	2	1	5	2	10
Fatigue	1	1	7	2	11
GI Disorders					
Vomiting	2	1	8	1	12
Nausea	2	1	9	2	14
Cardiovascular					
Arrhythmias	0	1	1	1	3
Tachycardia	0	0	1	1	2
Hypotension	0	0	0	0	0
Hematological parameters					
Thrombocytopenia	0	0	5	0	5
Biochemical parameters (increase)					
γ-GT	0	2	0	0	2
Alkaline Phosphatase	1	1	4	1	7
ALT	1	1	1	0	3
AST	1	1	5	1	8
BUN	0	0	0	0	0
CREA	0	0	0	0	0
Cardiac Troponin I	0	0	1	0	1

#### **ADXS-HER2 and Overall Survival**

Median survival: Case-matched control: 316 days ADXS: not yet reached



2 dogs censored from ADXS arm, deaths unrelated to OSA

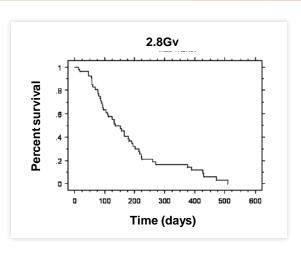
Next Steps: Pending approval USDA for veterinary use; Currently under investigation in combination with RT in OSA

## **ADXS-HER2**

## A D V A X I S

### Combo with Radiation in Untreated Canine Osteosarcoma

Radiation alone



#### **Historical Perspective:**

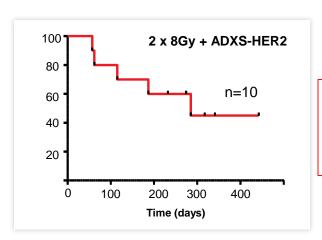
Knapp-Hoch et al. J Am Anim Hosp Assoc. 2009 Jan-Feb;45(1):24-32.

#### Median OS = ~120 days

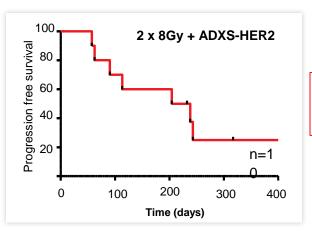
(expected OS range for dogs that cannot undergo amputation and receive only palliative radiation and analgesics is 3 - 5 months)

#### **ADXS-HER2** and Radiation: **N** = 10 pet dogs with untreated primary OSA

Radiation plus ADXS-HER2



Median OS = 285 days



Median TTP = 221 days

# ADXS-HER2 Human Study Phase Ib Dose-Escalation in HER2+ Solid Tumors

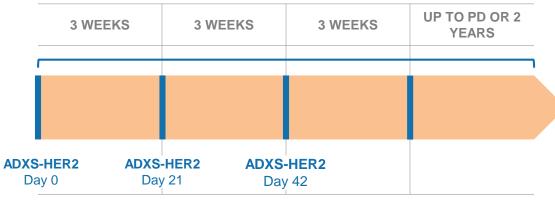


#### **Primary Endpoint:** Safety and RP2 Dose

## ADXS-HER2 Monotherapy

Dose level 1: 1x10<sup>9</sup> cfu q 3 wks Dose level 2: 5x10<sup>9</sup> cfu q 3 wks Dose level 3: 1x10<sup>10</sup> cfu q 3 wks

- N < 18 (Dose finding); N</li>
   < 80 (Expansion phase)</li>
   [Total N ~100]
- HER2-positive solid tumor (>1+ positivity in 1% of cells by IHC)
- Disease progressed or intolerant to standard therapy
- ECOG PS 0-1
- 3+3 Phase I Design



If no DLT, next dose level initiates

#### Next Steps

- Determine recommended Phase 2 dose
- Evaluate signals and set clinical development plan

PD, disease progression; RP2, Recommended phase 2



Our Clinical Trials

ADXS-PSA

# ADXS-PSA: Phase 1/2 Study Monotherapy vs. Combo with Pembrolizumab



- N = 21 (Part A); N = 30 (Part B) [Total N = 51]
- Pretreated metastatic castration-resistant prostate cancer (CRPC)
- No more than 3 prior lines of systemic therapy (<1 chemotherapy)</li>

- mTPI Design (Part A) 

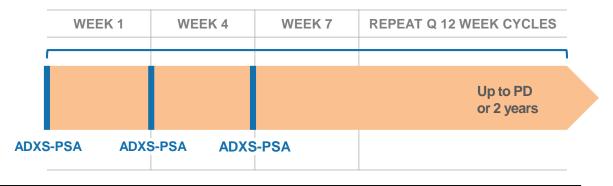
  RP2 Dose
- Part B ADXS-PSA Dose = Part A RP2 DL-1
   + pembrolizumab

#### **PART A**

#### **ADXS-PSA Monotherapy**

Dose level 1: 1x10<sup>9</sup> cfu d1 wk 1,4,7 q12 wks Dose level 2: 5x10<sup>9</sup> cfu d1 wk 1,4,7 q12 wks Dose level 3: 1x10<sup>10</sup> cfu d1 wk 1,4,7 q12 wks

N = 21

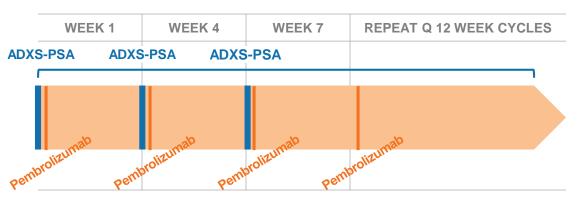


#### PART B

#### ADXS-PSA + Pembrolizumab

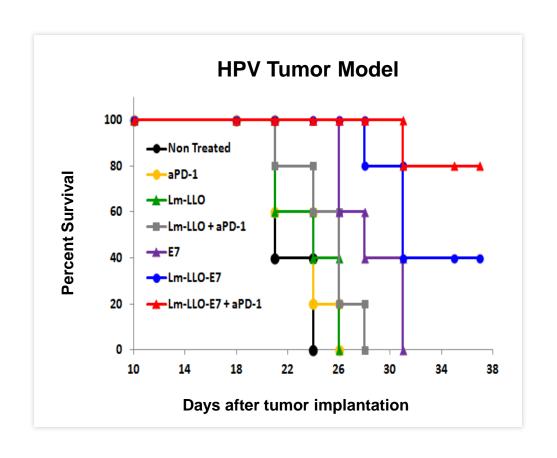
ADXS-PSA Part A Dose –DL1 d1 wk 1,4,7 q12 wks Pembrolizumab 200 mg d1 q 3wks in 12 wk cycles

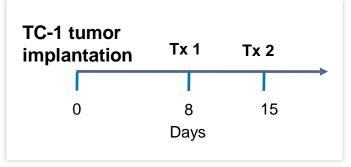
N = 30



# ADXS-PSA: Phase 1/2 Study Preclinical Data—Combination with PD-1







Treatments:	
Lm-LLO-E7:	5x10 <sup>6</sup> cfu
CT-011 mAb:	50 µg

Data published in *Journal for ImmunoTherapy of Cancer* 2013, 1:15 doi:10.1186/2051-1426-1-15

Low dose *Lm*-LLO immunotherapy can be combined with a checkpoint inhibitor



Our Preclinical Projects

**ADXS-NEO** 

PERSONALIZED NEOEPITOPE-BASED IMMUNOTHERAPY

## The Case for Neoepitopes



#### Why does cancer develop "neoepitopes"?

- Tumors develop because of mutations in genes coding for key regulatory and functional proteins
- Expression of mutated proteins causes aberrant cellular functions that result in malignancy
- Malignant cells that can avoid normal mechanisms of immune surveillance are allowed to survive
- Normal peptides are weakly immunogenic central tolerance deletes high avidity clones
- Mutated proteins in the cancer differ from those in normal cells, they can be targets for immunologic treatment
- High avidity T cell clones can be developed that recognize the mutated peptides – Not deleted by the thymus

## The Case for Neoepitopes



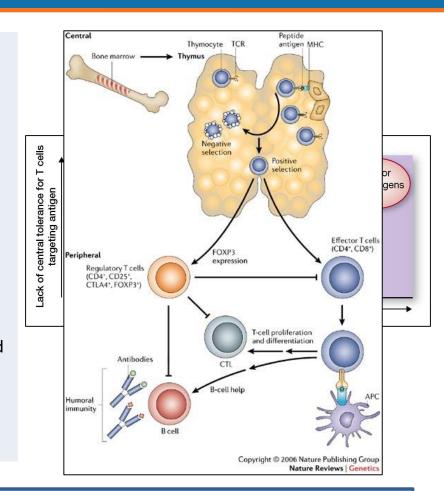
#### Why is this a good method to treat cancer?

- Immunotherapies work by "activating" the patient's immune system to target epitopes in cancer cells
  - > High avidity cytotoxic T cells can be generated against neoepitopes
  - ➤ T cells targeting epitopes caused by mutations can be expanded therapeutically
  - ➤ Checkpoint inhibition appears to work by enabling pre-existing T cells responses against neoantigens to expand and become tumoricidal
  - > Immunizing patients against their own neo-antigens with an attenuated live vector will generate or enhance T cell responses against neoepitopes
- Because the T cell responses are only against the mutated neoepitopes, and there is no systemic blockade of tolerance, there should be no off-target toxicity

## **Neoepitopes in Cancer Treatment**



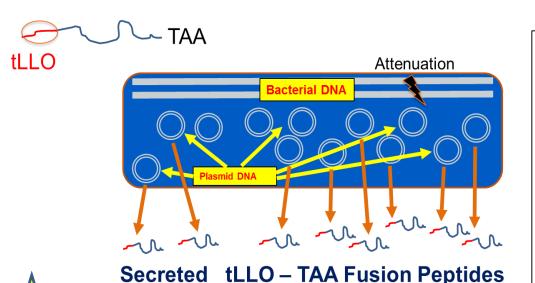
- Effective Immunotherapies work by "enabling" the patient's immune system to amplify T cells that target neoepitopes in cancer cells
  - High avidity cytotoxic T cells can be generated against neoepitopes
  - ➤ T cells targeting epitopes caused by mutations can be expanded therapeutically
  - T cells against non-synonymous tumor-associated antigens are not deleted by central tolerance in the thymus
  - Checkpoint inhibition appears to work by enabling preexisting T cell responses against neoepitopes to expand and become tumoricidal
  - Immunizing patients against their own neo-antigens with an attenuated live vector will generate or enhance T cell responses against neoepitopes



Because the T cell responses are only directed against mutated neoepitopes there should be no off-target toxicity

# Targeting Neoepitopes with *Lm* Technology™ Advantages for Personalized Immunotherapy





Advaxis's *Lm* Technology™ may have advantages for targeting neoepitopes

- Bandwidth—5 constructs can present >250 tumor neoepitopes to T-cells
- 2) CTLs infiltrating the tumor are more effective at killing tumor cells because of decreased Tregs and MDSCs
- 3) Lm is synergistic with checkpoint inhibitors

- tLLO—TAA fusion protein is a synthetic peptide presenting multiple neoepitopes secreted into the cytoplasm of the APC
- 80-100 plasmid copies per bacteria
- Payload for up to >50 neoepitopes per construct—up to 2k+ amino acids
- Multiple constructs can be administered for larger numbers of neoepitopes
- Adjuvants built in (TLRs, PAMP, STING, DAMP, NOD1, NOD2, CpG)
- Treatments can be given repeatedly without neutralizing antibodies
- Generate strong innate and adaptive T cell response, even to lower avidity epitopes
- Decreases Tregs and MDSCs in the tumor microenvironment

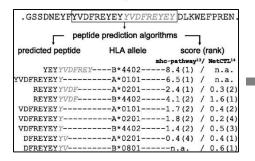
## Project APOLLO Schema How would it work?



#### Academic or Commercial Massively Parallel Sequencing

Sequencing to identify nonsynonomyous mutations

Identify neoepitopes



#### Advaxis Immunotherapies

Advaxis designs vector based on neoepitopes

DNA synthesis – molecular cloning into plasmids



Transfection into personalized vector, QA/QC – OK



Ship to patient's institution

#### Patient's Hospital or Treating Institution

Treat patient with personalized immunotherapy vector based on his/her neoepitopes

Multiple cycles of treatment and combination with RT, PD-1, co-stims possible



Our Collaborations & Milestones

## LM-LLO IMMUNOTHERAPY: A VERSATILE, INNOVATIVE PLATFORM

## Advantages of *Lm* Technology™



## **Efficacy Attributes**

- High expression and secretion of tLLO/ fusion protein (tumor associated antigen [TAA])
- Large payload size for delivering tumor antigens—up to 2,000 amino acids per construct
- Efficacy as monotherapy (includes CR, PR and increased survival)
- No need for preconditioning agents to enhance therapeutic effect
- Potential for synergy with checkpoint inhibitors, including inhibitors of PD-1, PD-L1, IDO, and CTLA4, as well as co-stimulatory molecules, such as OX40 and GITR
- Impacts tumor microenvironment (TME) by disabling Tregs & MDSCs

#### Safety Attributes

- Strong attenuation of axalimogene filolisbac with established safety
- Dosed up to 5x10^9 in humans with potential to go higher
- Predominantly Grade 1 and 2 AEs in 260+ patients treated to date
- No cases of lymphopenia
- ~1% Grade 3 AEs

#### IP Attributes

- Exclusively in-licensed original IP from UPENN where Lm platform was invented
- Any other Lm technologies must avoid infringing on this IP
- 80+ issued and 80+ pending patents worldwide for platform, product candidates, methods, manufacture, process and formulation

## **Novel Combination Therapy Collaborations**











Entered into an R&D Collaboration with

## ADVAXIS

**IMMUNOTHERAPIES™** 

Phase 1/2 study evaluating the safety and efficacy of axalimogene filolisbac in combination with durvalumab (MEDI4736) (anti-PD-1)

**July 2014** 

Phase 1/2 study evaluating the safety and efficacy of ADXS-PSA in combination with KEYTRUDA® (pembrolizumab) (anti-PD-1)

August 2014

Phase 2 study evaluating the safety and efficacy of axalimogene filolisbac as a monotherapy and in combination with INCB24360 (epacadostat) (IDO1)

February 2015

Evaluation of *Lm* Technology™ immunotherapies plus antibodies targeting GITR, OX40, LAG-3 and TIM-3

May 2015

## Strategic, Value-Building Opportunities









Entered into a licensing agreement with

## A D V A X I S

- ADXS-HER2 (animal health)
- Canine osteosarcoma + 3 additional products

- Axalimogene filolisbac
- HPV-associated cervical cancer
- Axalimogene filolisbac
- HPV-associated cancers

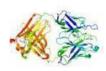
## **Platform Versatility**



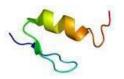
#### **Single Antigen Constructs**



PSCA
Prostate Cancer PreClinical



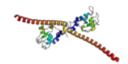
CA9 Renal and Others Pre-Clinical



WT-1 Several (Pan) Pre-Clinical



CEA Ovarian Pre-Clinical



Lm-LLO +

Survivin Lymphoma Pre-Vet

HMW-MAA Lymphoma Pre-Clinical



FAP Breast CA Pre-Clinical

IL13RA2 Solid Tumors Pre-Clinical



P53 Breast CA Pre-Clinical

VEGF-r2 Solid Tumors Pre-Clinical



SCCE-KLK7 Ovarian, others Pre-Clinical

Endoglin (CD-105) Breast CA Pre-Clinical



ISG 15 Bladder Pre-Clinical

Advaxis has developed several product constructs leveraging the company's platform technology

## **Financial Summary**



### **Cash Summary**

- Cash as of April 30, 2015
  - ✓ \$45.9M
- Cash as of July 31, 2015
  - ✓ \$97.1M
- Cash receivables since Jul'15
  - ✓ \$25.0M (gross) Registered Direct (August)
- Capital raised since October '13
  - ✓ ~\$165M
- No Debt

## **Equity Summary**

- Basic Shares Outstanding (as of 9/9/15)
  - ✓ 33.4M
- Warrants and Options
  - ✓ 3.3M and 1.9M (as of 7/31/2015)
- Pro-forma Fully Diluted
  - ✓ 38.6M

## **Leadership Accountability**



	Out of Pocke	Out of Pocket Funds (1)		Company Incentive Awards (1)		
	Gross \$	net shares	vested	unvested		
Daniel J. O'Connor	\$662,903	153,316	115,760	83,333		
David J. Mauro	\$45,550	6,196	32,884	151,333		
Gregory T. Mayes	\$180,737	27,036	36,845	75,000		
Robert G. Petit	\$128,648	28,427	47,132	56,652		
Sara M. Bonstein	\$96,710	26,406	34,530	33,333		

(1) Above figures are as of September 1, 2015

Represents RSU awards & share purchases only; Does not include option and/or warrants.

Management voluntarily purchases restricted stock directly from the Company every two weeks at market price



## ADVAXIS

**IMMUNOTHERAPIES™** 

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