Forward-Looking Statements

This presentation includes statements that are, or may be deemed, “forward-looking statements”, within the meaning of Section 27A of the Securities Act of 1933, as amended. All statements, other than statements of historical facts, included in this presentation regarding our strategy, future operations, future financial position, future revenue, projected costs, prospects, plans and objectives of management are forward-looking statements. In some cases, you can identify forward-looking statements by terms such as “may,” “might,” “will,” “objective,” “intend,” “should,” “could,” “can,” “would,” “expect,” “believe,” “anticipate,” “project,” “target,” “design,” “estimate,” “predict,” “opportunity,” “proposition,” “strategy,” “potential,” “plan” or the negative of these terms and similar expressions intended to identify forward-looking statements.

You should not place undue reliance on these forward-looking statements. Forward-looking statements include, but are not limited to, statements about: the timing and success of preclinical studies and clinical trials; the ability to obtain and maintain regulatory approval of our product candidates; the scope, progress, expansion and costs of developing and commercializing our product candidates; our expectations regarding the amount and timing of our expenses and revenue; the sufficiency of our cash resources, plans for the use of our cash resources and needs for additional financing; our ability to adequately manufacture our product candidates; our ability to obtain and maintain intellectual property protection for our product candidates; our expectations regarding competition; the size and growth of the potential markets for our product candidates and the ability to serve those markets; the rate and degree of market acceptance of any of our product candidates; our anticipated growth strategies; the anticipated trends and challenges in our business and the market in which we operate; our ability to establish and maintain development partnerships; our ability to attract or retain key personnel; our expectations regarding federal, state and foreign regulatory requirements; regulatory developments in the United States and foreign countries and other factors that are described in the “Risk Factors” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” sections of our Annual Report on Form 10-K for the year ended December 31, 2018 and our quarterly report on Form 10-Q for the quarter ended June 30, 2019, each of which has been filed with the Securities and Exchange Commission (SEC) and is available on the SEC’s website at www.sec.gov.

In addition, the forward-looking statements included in this presentation represent Inovio’s views as of the date hereof. Inovio anticipates that subsequent events and developments may cause its views to change. However, while Inovio may elect to update these forward-looking statements at some point in the future, the company specifically disclaims any obligation to do so, except as may be required by law. These forward-looking statements should not be relied upon as representing Inovio’s views as of any date subsequent to the date of this presentation.

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Integrated Platform Generating Antigen-Specific Immune Responses In-Vivo

**SynCon®: Synthetic consensus full-length sequence**

(Biologics Component)

- **Select** appropriate tumor or viral associated antigens as disease targets
- **Create** a synthetic DNA consensus sequence for the disease target using sequences from multiple species for cancer or primary isolates of the pathogen
- **Modify** the sequence to increase antigen production
- **Insert** the proprietary sequence into a platform-validated plasmid

**CELLECTRA®: Efficacy-enabling device**

- Plasmid construct delivered via intramuscular or intradermal
- Advanced transfection delivery increases immunotherapy cellular uptake
- Antigen expression activates CD8+ T cell and antibody responses
Inovio’s Immunotherapy Platform Advantages

Clinical Efficacy/Immunogenicity
- Demonstrated clinical efficacy in Phase 2b study
- Lead product in Phase 3 for cervical dysplasia

Versatility & Boosting
- Targets virtually any antigenic sequence; combining multi-antigens into single vial
- Initiated first-in-human study of optimized dMAb™
- No anti-vector response – allows for effective boosting

Safety
- Favorable safety profile tested in over 2,000 patients in over 6,000 administrations
- Carries no potential toxicity from viral vectors

Rapid and Scalable Manufacturing
- “Off-the-shelf” product; no cold-chain storage issues (room temp storage >1 yr.)
- Rapid development from concept to human in 7 months (Zika vaccine)
- Relatively inexpensive to manufacture; produce large quantities
## Pipeline

<table>
<thead>
<tr>
<th>Product</th>
<th>Indication</th>
<th>Preclinical</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Partner</th>
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<tr>
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<td>Vulvar Dysplasia</td>
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<tr>
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<tr>
<td>INO-5151</td>
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<td>MEDI0457</td>
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<td>HPV-Related Cancers</td>
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*Partner Funded* | *Internally Funded*
Development Strategy Overview

• Key Priorities
  • **HPV related diseases** – driving commercial development of VGX-3100 and MEDI0457 (with AstraZeneca)
  • **Fast to market products** – RRP (INO-3107) and GBM (INO-5401)
  • Leverage strategic partnerships and external funding to **develop the platform** and infectious disease indications for stockpiling

• Well-Financed
  • $106M cash/investments at 6/30/19; raised $15M in private financing in August
HPV-Related Diseases
HPV Infection and U.S. Market Perspective

HPV attributable conditions per yr. in U.S.:
- Cervical: 11,866
- HPV-associated H&N: 18,226
- Anal: 6,530
- Vulvar: 3,934

- CIN: ~195,000
- VIN: >25,000
- AIN: >14,000

- Cervical (CIN): 1.1 M to 1.7 M
- 14M genital infections
- ~7M high-risk HPV infections

Years to progression

**Sources:**
Significant Efficacy Data Generated in HPV-Related Diseases

**Cervical Pre-Cancer (VGX-3100)**
- Phase 2b PoC trial for cervical dysplasia demonstrated a complete response in **43 out of 107** patients in regression of high-grade cervical lesions and elimination of HPV infection

**Head & Neck Cancer (MEDI0457)**
- Phase 1 trial for HNSCC, **2 out of 4** patients treated with MEDI0457 and two different PD-1 checkpoint inhibitors experienced a long-term complete response for more than two years
- MEDI0457 (formerly INO-3112) is licensed by AstraZeneca and is currently in a Phase 1b/2a study in combination with its PD-L1 checkpoint (durvalumab)

**RRP (INO-3107)**
- Pilot study for recurrent respiratory papillomatosis (RRP), demonstrated a clinical benefit in **2 out of 2** patients by delaying surgery due to lack of tumor recurrence
- A Phase 2 clinical trial for treating RRP with INO-3107, which includes both HPV6 and HPV11 antigens, is planned
Published Phase 2b Study of VGX-3100 Achieved All Primary and Secondary Endpoints

Phase 2b Endpoints (n=167)

Primary: Regression to CIN1 or Normal 49.5% P=0.017

Secondary: Regression to Normal AND Virological Clearance 40.2% P=0.003

Regression of CIN3 & HPV to normal
Increase and persistent presence of CD8+ cells (24 weeks post-last dose)

T Cell Responses Measured in Blood

*Statistically significant; bars are 95% CI
VGX-3100 has the potential to be:
1) first treatment for HPV infection of the cervix and;
2) first non-invasive treatment for cervical pre-cancer

- Targets HPV 16/18 subtypes; E6/E7 oncogenes
- Treats high-grade squamous intraepithelial lesions (HSIL)

- Phase 3 consists of two studies in parallel:
  - REVEAL 1 (primary) n=198 – Enrollment Closed
  - REVEAL 2 (confirmatory) n=198 – Now Enrolling
  - Randomized (2:1), double-blind, placebo-controlled
  - Dosing: month 0, 1, 3 (as in P2b)
  - Primary endpoint measured in month 9 (as in P2b)
  - REVEAL 1: Study follow-up through week 88 (as in P2b)
  - REVEAL 2: Study follow-up through week 40

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**Primary Endpoint**
Regression of HSIL (CIN2/3) AND clearance of HPV 16/18 in the cervix

**Secondary Endpoints**
Safety/tolerability
Regression of HSIL
Virologic clearance of HPV-16 and/or HPV-18
Non-progression to cancer
Clearance of HPV from non-cervical anatomic locations
In 2Q 2019, Inovio entered into collaboration with QIAGEN to co-develop liquid biopsy based pretreatment test to guide patient selection for VGX-3100:

- Aimed to produce an accurate test that would *increase absolute efficacy of VGX-3100 among HPV-infected women* who have progressed to HSIL/Cervical Pre-Cancer
- Commercialization of a CDx test together with VGX-3100 could *enhance market adoption* of this first-in-class immunotherapy
Recurrent Respiratory Papillomatosis (RRP): A Rare Disease

Areas affected by RRP

- Orphan disease with ~20k total cases within the U.S., where 15k per yr. require surgical procedures
- 1,500 new cases per yr.
- HPV-associated disease; caused by HPV-6 and 11:
  - Growths can lead to life-threatening airway obstructions
  - Occasionally progresses to cancer
- SoC is surgery (repeated/multiple times a yr). Currently, the disease is incurable and can only be treated by surgery to remove the tumors, which temporarily restores the airway
- RRP may occur in adults as well as in children who are thought to have contracted the virus during childbirth

New Target: INO-3107 (formerly INO-3106) Effective Against Recurrent Respiratory Papillomatosis (RRP)

• Phase 1 pilot, single site, clinical study
• Enrolled two adult patients with RRP that were positive for HPV 6
• Four doses of vaccine, three weeks apart on Day 0, Weeks 3, 6, 9
• CELLECTRA-delivered INO-3106 plasmid encoded antigens

• After receiving 4 doses of INO-3106, 2/2 patients went from requiring surgery every six-months to no surgery needed after dosing
• First patient follow-up was 915 days after first dose; 584 days for second
• Plan to rapidly advance development of INO-3107
Immuno-Oncology Programs
MEDI0457 – Partnership with AstraZeneca

MEDI0457 (VGX-3100 + IL-12) (formerly INO-3112)

• Phase 1b/2a open label study for metastatic HPV-related SCCHN with persistent or recurrent disease after chemotherapy treatment
• Combination with durvalumab PD-L1 checkpoint inhibitor
• Primary endpoints: safety, immunological impact, objective response rate, PFS and OS
• ~40 subjects. Completed enrollment in August 2019
• Expanded into two additional Phase 2 studies for HPV-related cancers (sponsored by MD Anderson and Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins)

License agreement and collaboration signed in 2015

$27.5M upfront; ~$250M in milestones plus double-digit tiered royalties
MEDI0457: HNSCC Patient with Complete Remission from Phase 1 Study

Phase 1 study of MEDI0457 in 22 HPV+ H&N cancer patients

- Robust antigen-specific CD8+ killer T cell responses observed in 20/22 - 90.1% of patients (both tumor tissue and peripheral blood)
- 4 progressed over several year period exhibiting recurrence with metastatic disease; treated with PD-1
- 2/4 (50%) show complete response to PD-1 therapy and remained tumor free for 2+ years
- 50% CR rate compares well in metastatic HPV+ H&N:
  - 4% CR rate (8/192) by KEYTRUDA alone
  - 3% CR rate (6/240) by OPDIVO alone
- AstraZeneca conducting Phase 2 studies combining MEDI0457 and durvalumab (PD-L1 inhibitor)
Checkpoint Combination Studies

**REGENERON**

- INO-5401 T cell activating immunotherapy encoding multiple antigens (hTERT, WT1, and PSMA)
- Phase 1b/2 open label study for **newly diagnosed glioblastoma** (GBM)
- Combination with Libtayo® PD-1 checkpoint inhibitor via supply agreement with Regeneron
- **Primary Endpoints**: Safety, tolerability, immunological impact, PFS and OS
- **Trial fully enrolled 52 subjects (4/1/19)**

**PARKER INSTITUTE for CANCER IMMUNOTHERAPY**

- INO-5151, prostate cancer immunotherapy
- Targeting mCRPC in a PICI sponsored platform study
- Combination with immune modulator (CDX-301, FLT3 ligand a dendritic cell mobilizer) plus nivolumab PD-1 checkpoint inhibitor
- Cohort C – multi-arm, multi stage platform design (PORTER Study)
- PICI will design & execute the clinical study
Platform Development Programs
## Platform Development Pipeline

<table>
<thead>
<tr>
<th>Product</th>
<th>Indication</th>
<th>Preclinical</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Partner</th>
<th>Next Milestone</th>
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<td>PENNVAX-GP</td>
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<td>NIAID</td>
<td>Report interim data in 2020</td>
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<td>DARPA</td>
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<td>GE Life Science</td>
<td>PR Ph 1b data 4Q 2019</td>
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<td>GLS-5300</td>
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<td>CEPI</td>
<td>Ph 1 published in Lancet ID Ph 1/2a data in 4Q 2019 Initiate Ph 2 study in Mid East in 2020</td>
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<td>INO-4500</td>
<td>Lassa</td>
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<td>CEPI</td>
<td>Phase 2 field trial in endemic countries of West Africa in 2020</td>
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</tbody>
</table>
## Positive Clinical Data & External Funding Opportunities

<table>
<thead>
<tr>
<th>Product</th>
<th>Indication</th>
<th>Data Reported (to date)</th>
<th>Publication</th>
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</table>
| PENNVAX-GP| HIV        | Phase 1:  
• CD4+ or CD8+ cellular immune response to at least one of the vaccine antigens in **93% (71 of 76)** evaluable subjects  
• Env specific antibody response in **94% (62 of 66)** evaluable subjects                                                                                                                                                                                                                      | **The Journal of Infectious Diseases**  
"Intradermal SynCon® Ebola GP DNA Vaccine is Temperature Stable and Safely Demonstrates Cellular and Humoral Immunogenicity Advantages in Healthy Volunteers"; Mar 2019 |
| INO-4201  | Ebola      | Phase 1:  
• High levels of binding antibodies measured (ELISA) in **95% (170 of 179)** of evaluable subjects                                                                                                                                                                                                                                               | **The Lancet Infectious Diseases**  
"Safety and immunogenicity of an anti-Middle East respiratory syndrome coronavirus DNA vaccine: A phase 1, open-label, single-arm, dose-escalation trial"; July 2019 |
| GLS-5300  | MERS       | Phase 1:  
• High levels of binding antibodies measured (ELISA) in **92% (57 of 62)** of evaluable subjects  
• Antibody and/or T cell response against MERS in **98% (61 of 62)** of evaluable subjects                                                                                                                                                                                                                                 | **New England Journal of Medicine**  
“Safety and Immunogenicity of Anti-Zika Virus DNA Vaccine”; Oct 2017                                                                                      |
| GLS-5700  | Zika       | Phase 1:  
• High levels of binding antibodies measured (ELISA) in **100% (39 of 39)** of evaluable subjects                                                                                                                                                                                                                                              |                                                                                                                                                              |
Financials & Management
Strong Balance Sheet to Support Critical Milestones

**Milestones**

**VGX-3100**
- Mar 2019: Initiate REVEAL 2 Phase 3 trial (confirmatory)
- Jun 2019: Complete enrollment REVEAL 1 Phase 3 trial (primary)
- 4Q 2019: Report interim data from Phase 2 VIN/AIN clinical trial

**MEDI0457**
- Aug 2019: Complete enrollment of Phase 2 study in HNSCC
- 2020: Phase 2 completion of MEDI0457 study in HNSCC

**INO-5401**
- Apr 2019: Complete enrollment of Phase 1/2 GBM clinical trial
- 4Q 2019: Report PFS6 data from Phase 1/2 GBM clinical trial

**Platform Development**
- Jan 2019: First clinical trial involving dMAb™
- Jul 2019: Publish Phase 1 MERS data in *the Lancet Infectious Diseases*
- 2Q 2019: Initiate Phase 1 Lassa fever clinical trial with CEPI
- 4Q 2019: Report (interim) data from Zika and MERS clinical trials

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$106.0 M$
Cash and short-term investments

$15.0 M*$
New convertible note investments

98.6 M
Common stock shares outstanding

As of June 30, 2019
*As of August 1, 2019
Executive Team and Board of Directors

J. Joseph Kim, Ph.D., President & CEO
- Decades of biotechnology/pharma management
- Merck: hepatitis A and B vaccines manufacturing; HIV vaccine (Ad5) R&D

Peter Kies, CFO
- Ernst & Young
- Experience with growth companies

Jacqueline Shea, Ph.D., COO
- Former CEO of Aeras
- Held mgmt. positions at Emergent BioSolutions, and Microscience Ltd.

Laurent Humeau, Ph.D., CSO
- Extensive R&D leadership experience in vaccine, cell and gene therapy developments in private biotech and mid-cap companies
- Led Translational Research, Human Therapeutics Division for Intrexon

Board of Directors

Simon X. Benito, Chairman of the Board, Former SVP Merck Vaccine Division

Angel Cabrera, Ph.D., President, George Mason University

Morton Collins, Ph.D., General Partner, Battelle Ventures

J. Joseph Kim, Ph.D., President & CEO, Inovio Pharmaceuticals

Ann. C. Miller, M.D., Former Head of Sanofi Oncology Global Marketing

David B. Weiner, Ph.D., Executive VP, Director, Vaccine Center, The Wistar Institute

Wendy L. Yarno, Ph.D., Former Executive VP and Chief Marketing Officer, Merck

Lota S. Zoth, Former CFO, MedImmune
Inovio Value Proposition

Validated Immunotherapy Platform

• Platform has demonstrated **Phase 2b clinical efficacy** of lead asset VGX-3100
• Well-protected with over 1,000 issued and pending patents
• **Over 2,000 patients safety data** and demonstration of high levels of T cell and antibody immune responses
• **Over $170M in non-dilutive funding** since 2009:
  - CEPI
  - Bill & Melinda Gates Foundation
  - DARPA
  - NIH
• **Partnerships** with major pharma and organizations:
  - AstraZeneca
  - REGENERON
  - Parker Institute for Cancer Immunotherapy

Multiple Near-term Pipeline Catalysts

• **Phase 3 for lead asset VGX-3100** treating high-grade cervical dysplasia – BLA submission expected in 2021
• **Phase 2 checkpoint-combination programs** Glioblastoma and HPV-Related Cancers– interim data to be reported in 2019
• Multiple externally-funded vaccine programs
• Initiated first-in-human study of optimized dMAb™