ONCOSEC
ARMINIG THE IMMUNE SYSTEM TO FIGHT CANCER

ONCOSEC™

NASDAQ: ONCS
Forward Looking Statements

Our commentary and responses to your questions may contain forward looking statements, as described in the Private Securities Litigation Reform Act of 1995. These include comments concerning clinical trials and product development programs, evaluation of potential opportunities, the level of corporate expenditures, the assessment of OncoSec’s technology by potential corporate partners, capital market conditions, timing of events, cash consumption and other subjects. Such statements are subject to factors, risks and uncertainties, such as those described in the Company’s periodic SEC filings, that may cause actual results to differ materially from those expressed or implied by such forward looking statements. OncoSec’s investigational drug and device products have not been approved or cleared by the FDA.
OncoSec’s Platform Solution

Addressing the Problem of Tumor-Induced Immune Subversion

To unleash an anti-tumor immune response, OncoSec’s task is to shift the balance so that the immune drivers outweigh the brakes, so the immune system has the upper hand.
OncoSec Company Overview
Advancing a Leading Portfolio of Gene Therapies for Cancer

Why Are We Different?
- Intratumoral immunotherapy: designed to deliver DNA-based therapeutics
- Platform focused on reversing the immuno-suppressive tumor microenvironment
- Capable of delivering multiple immune molecules in a single treatment without strict payload size limit

Company Strengths
- Clinical data demonstrates proof of concept of the technology
- Phase II clinical programs focused on addressing unmet need of T-cell poor tumors
- Rapid preclinical development platform
- Multiple combination gene constructs in preclinical testing

Financial Snapshot
- Publicly listed company on NASDAQ (ONCS)
- Cash runway through Q1 2017 to achieve critical milestones
Core Technology: ImmunoPulse™

Overcoming Tumor Immune Tolerance via Intratumoral Immunotherapy

- Trains immune system to target and attack cancer
- Local delivery targets tumors directly triggering a systemic (abscopal) response with limited systemic exposure
- Ability to deliver a wide-variety of potentially synergistic immune molecules
- Orchestrates coordinated anti-tumor immune effects, including patient-specific neo-antigen “vaccine” responses
- Amplifies anti-tumor T-cell responses capable of converting low TIL to high TIL tumors
- Ideal combination partner for anti-PD1
**ImmunoPulse™ IL-12**

Local Delivery Triggers Systemic Anti-Tumor Immune Response

- Uses DNA-encoded interleukin-12 (IL-12), a potent pro-inflamatory cytokine
- Delivered directly to tumor *in vivo*; stimulates local immune response, and subsequently, systemic effect

1. Injection of plasmid IL-12
2. Intratumoral electroporation delivers pIL-12 into the cells
3. IL-12 expressed and secreted
4. Local inflammation and T cell education
5. Systemic anti-tumor immune response
PRECLINICAL AND CLINICAL PROOF-OF-PRINCIPLE

Local Intratumoral Therapy Leads to Increased TILs & Tumor-Specific Systemic Response
The Unmet Medical Need of Low-TIL Tumors
Driving Immunogenicity to Overcome Anti-PD-1 Non-Response

Adapted from Tumeh-PC. Nature. 2014 Nov 26; 515(7528): PD-1 blockade induces responses by inhibiting adaptive immune resistance
Anti-PD-1 can re-invigorate ‘exhausted’ T cells, allowing them to attack and kill immunogenic tumor cells.

However, checkpoint inhibitors are only realizing response rates of **20-40%**.

### Anti-PD-1 Non-Responders Constitute Majority of Patients

<table>
<thead>
<tr>
<th>Tumor Type</th>
<th>Anti-PD-1/PD-L1 mAB Non-Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melanoma</td>
<td>~ 60 – 80%</td>
</tr>
<tr>
<td>Triple Negative Breast</td>
<td>~70 – 82% ¹</td>
</tr>
<tr>
<td>Renal Cell Carcinoma</td>
<td>~71%</td>
</tr>
<tr>
<td>Lung Carcinoma</td>
<td>~79 – 83%</td>
</tr>
<tr>
<td>Head &amp; Neck</td>
<td>~80% ²</td>
</tr>
<tr>
<td>Bladder</td>
<td>~84% ³</td>
</tr>
<tr>
<td>Gastric</td>
<td>~69% ²</td>
</tr>
</tbody>
</table>

¹ PD-L1 selected patients; 18.5% (5/27) ORR using Merck 22C3 assay and pembrolizumab; 33% (3/9) using Genentech’s PCD4989g assay and MPL3280A
² Patients were preselected by Merck PD-L1 IHC assay
³ 11% in PD-L1 (Roche) negative; 43% in PD-L1 + population
Distant Tumor Effect in B16 Melanoma Tumor Model

- ImmunoPulse™ IL-12 leads to regression of treated tumor
- ImmunoPulse™ IL-12 significantly reduces growth of untreated (contralateral) tumors
- ImmunoPulse™ IL-12 monotherapy ➔ range of ~10-40% CRs
The untreated B16-OVA mice failed to demonstrate a significant expansion of SIINFEKL+ CD8 T cells.

In contrast, B16-OVA-bearing mice, which were treated with ImmunoPulse™ IL-12 demonstrated a significant systemic expansion of a tumor-specific anti-neoantigen CD8+ T cell population.

Tumor-specific CD8s identified both in spleen and TIL.
Phase II Merkel Cell Carcinoma Data

ImmunoPulse™ IL-12 Can Drive Antigen-Specific CD8⁺ T Cells in Patients
Phase II Metastatic Melanoma Data
Drives Local and Systemic Anti-Cancer Immune Response

Best Overall Response Rate*: 31%
Complete Response Rate*: 14%
Patients with regression of at least one non-treated lesion: 50%
Disease Control Rate*: 48%

COMPLETE RESPONSE:

Pre-Treatment

Treated Scalp Lesions - Day 180
ImmunoPulse™ IL-12 Can Increase TILs

Critical Priming of Tumors for Response to Checkpoint Inhibitors

ImmunoPulse™ IL-12 can convert T cell poor tumors to T cell rich tumors, which are more likely to respond to anti-PD-1 therapies.

**Metastatic Melanoma**

**Merkel Cell Carcinoma**

<table>
<thead>
<tr>
<th>Pre-ImmunoPulse IL-12</th>
<th>Post-ImmunoPulse IL-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Low TIL&quot;</td>
<td>&quot;High TIL&quot;</td>
</tr>
</tbody>
</table>

**High Power Image**
(spectral deconvolution)

<table>
<thead>
<tr>
<th>CD8 – Green</th>
<th>Foxp3 – White</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD-L1 – Red</td>
<td>Sox-10 – Blue</td>
</tr>
<tr>
<td>CD68 – Yellow</td>
<td></td>
</tr>
</tbody>
</table>
Rationale for Combination of ImmunoPulse™ IL-12 and Anti-PD-1 Blockade

**Hypothesis:** Activation of the PD-1 checkpoint in distant, untreated tumors blunts the effectiveness of TILs generated by ImmunoPulse™ IL-12.
Beyond ImmunoPulse™ IL-12: Targeting Multiple Facets of Tumor Immune Subversion

① Release of Cancer Cell Antigens
Immunogenic cell death
Tolergenic cell death

② Cancer Antigens Presentation
TNF-α, IL-1, IFN-α, TLR, CD40, IL-10, IL-4, IL-13

③ Priming and Activation
CD28, CD137, OX40, GITR, IL-2, CTLA-4, PD-1/PD-L1

④ Trafficking and T-cell to Tumors
CX3CL1, CXCL9, CXCL10, CCL5

⑤ Infiltration of T-cell into Tumors
LFA1/ICAM1, VEGF, Endothelin B receptor

⑥ Recognition of T-cell into Tumors
T-cell receptor, Reduced pMHC on cancer cells

⑦ Killing of Cancer Cell
T-cell granule content, PD-1/PD-L1, LAG-3, IDO, Arginase, TGF-β, B7.1, VISTA, TIM-3

Stimulatory Factors
Inhibitors

BUILDING A UNIQUE IMMUNO-ONCOLOGY PLATFORM
What Have We Done So Far?

Realizing the Promise of Intratumoral Immunotherapy

- **Positive** multi-center *Phase II clinical data in melanoma*
- **Positive Phase II data in Merkel cell carcinoma**
- Clinical proof-of-concept of platform feasibility
- IL-12 drives *tumor-specific CD-8 and abscopal responses*
- Delivering *multiple* immunomodulatory genes in combination
- **Ideal combination** partner for checkpoint inhibitors and other immunotherapies
A Market Primed for Significant Growth
Addressing a Great Unmet Medical Need in Oncology

- Percentage of cancer immunotherapy treatment regimens in 10 years worldwide
- Projected market value of checkpoint therapies, such as anti-PD-1 treatments
- Patients with solid tumors that will not respond to checkpoint therapies alone each year in the US

60%

$24B

1 Million

US
Core Clinical Pipeline

Aligned to Pursue Combination Approaches

PHASE I PHASE II PHASE III

Metastatic Melanoma

Melanoma Combination Study
IL12 + Anti-PD1 (KEYTRUDA®)

Triple Negative Breast Cancer

Orange = Monotherapy with IL-12 | Green = Combination Therapy
Phase II Metastatic Melanoma Combination Study

RATIONALE
- Tumors need TILs for patients to respond to anti-PD-1 therapies
- Priming tumor microenvironment with IL-12 and promoting T-cell recruitment may enhance response to KEYTRUDA (pembrolizumab)

OBJECTIVES
- Assess safety and efficacy of ImmunoPulse™ IL-12 with KEYTRUDA

PATIENT POPULATION
- ~42 patients with unresectable low TIL metastatic melanoma

COLLABORATORS
- Merck
- UCSF University of California San Francisco
Pilot Triple Negative Breast Cancer (TNBC) Study

RATIONAL
- Response rates to checkpoint therapies in pre-selected TNBC population were only 18 to 33% in preliminary reports
- ImmunoPulse™ IL-12 may drive an inflammatory response in TNBC patients, increasing response to anti-PD-1 therapies

OBJECTIVES
- Evaluate the ability of ImmunoPulse™ IL-12 to increase TNBC tumor immunogenicity

PATIENT POPULATION
- ~10 TNBC patients (ER-Negative PR-Negative HER2-Negative Breast Cancer)

COLLABORATORS
Stanford University
Preclinical Industry Collaborations
Driving Business and Development Efforts to Generate Greater Value

Evaluating efficacy of ImmunoPulse™ and Heat Biologics’ ImPACT platform

Developing biomarker tests to evaluate patient’s immune response to cancer

Evaluating combination of ImmunoPulse™ IL-12 and Plexxikon’s selective CSF-1R inhibitor
COMBINATION THERAPIES WITH PARTNERS

- Combine OncoSec neoantigen-generating immunotherapies with third party checkpoint inhibitors or other immuno-oncology products

COMBINATION THERAPIES IN-HOUSE USING DNA-BASED IMMUNOTHERAPIES

- Keep product development, IP, and downstream profit under one roof; allows for greater strategic control/flexibility
Development Milestones

Key Value Drivers Over the Next 12 Months

1. Announce new key academic or industry collaborations
2. Expand POC Phase II melanoma combo study sites, complete enrollment and present preliminary clinical data
3. Complete TNBC biomarker study as POC in breast cancer, present interim data and finalize development plan
4. Announce novel “multi-gene” combination ImmunoPulse™ candidate
5. Present pre-clinical combination data with Heat Biologics
OncoSec Management Team
Experienced Leadership Team

Punit Dhillon
Chief Executive Officer

Richard Slansky
Chief Finance Officer

Robert H. Pierce, MD
Chief Science Officer

Sheela Mohan-Peterson
Chief Legal & Compliance Officer

David Meininger, PhD MBA
Senior VP, Business Development

Joann Lofgren, MBA
VP, Market Development

Tu Diep
VP, Operations
### Financial Background

**Financial Runway to Achieve Critical Milestones**

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<tbody>
<tr>
<td><strong>NASDAQ</strong></td>
<td><strong>ONCS</strong></td>
</tr>
<tr>
<td><strong>Shares Outstanding</strong></td>
<td><strong>16.9M</strong></td>
</tr>
<tr>
<td><strong>Market Cap</strong></td>
<td><strong>$40M</strong></td>
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<tr>
<td><strong>Cash Equivalents and Short-term Investments</strong></td>
<td><strong>$32M</strong></td>
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<tr>
<td><strong>Cash Runway</strong></td>
<td><strong>Q1 2017</strong></td>
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<tr>
<td><strong>Debt</strong></td>
<td><strong>$0</strong></td>
</tr>
</tbody>
</table>

As of December 1, 2015
THANK YOU

NASDAQ: ONCS

SCAN THE CODE

to download our complete Investor Overview

www.OncoSec.com/ONCS-Investor-Package

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