Changing the Shape of Medical Research and Practice

Keith Murphy
Chief Executive Officer
FORWARD LOOKING STATEMENTS

The Company cautions you that the statements included in this presentation that are not a description of historical facts are forward-looking statements. Any forward-looking statements are based on our current expectations, but are subject to a number of risks and uncertainties. The factors that could cause our actual future results to differ materially from our current expectations include, but are not limited to, risks and uncertainties relating to the Company's ability to develop, market and sell products based on its technology; the expected benefits and efficacy of the Company's products and technology; the availability of substantial additional funding to support the Company's operations; the Company's ability to enter into successful collaboration arrangements; the validity of the Company's intellectual property rights and the ability to protect those rights; and the Company's ability to achieve its business, research, product development, regulatory approval, marketing and distribution plans and strategies. These and other factors are identified and described in more detail in our filings with the SEC, including the preliminary prospectus supplement related to this offering and our annual report on Form 10-K filed with the SEC on June 10, 2014. You should not place undue reliance on forward-looking statements, which speak only as of the date of this presentation. Except as required by applicable law, we do not intend to update any of the forward-looking statements to conform these statements to reflect actual results, later events or circumstances or to reflect the occurrence of unanticipated events.

NYSE MKT: ONVO

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Organovo NovoGen MMX Bioprinting Platform
## Opportunity Matrix

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3D Liver in Detail – Timelines for Tox Product

- **Scientific proof of concept**
  - April 2013 ✔

- **Functional Validation**
  - Testing against known drugs
  - December 2013 ✔

- **Delivery to KOLs**
  - Alpha and beta testing
  - April 2014 ✔ (January ‘14)

- **Product launch**
  - Before the end of 2014 ✔ (November ‘14)
  - Announced contracts for early customers April 2014
Reporting Progress on Liver

- Best tracking tool will be 10-Q and 10-K revenues
- Early quarters may not track linearly
- Revenue in next two quarters from pre-launch contracts
- As we progress, may include market penetration info
  - For example, $n$ of top 25 pharma companies
- Need to hit mid-single digit millions per year before assessing progress will be feasible
Shape of Revenue Curve
Pharmaceutical (Rx) vs. Research Service/Product
Opportunity in Multiple Channels for Tissues

- **Toxicology Market**
  - 2017 Toxicology Market: $10B*

- **Contract Research Model**
  - Widely preferred by pharma clients
  - $7B preclinical contract research market

- **Human Preclinical Testing™**


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Addressable Liver Toxicology Market

- 6,500 prevalent programs in pharma each year
- Programs across all therapeutic areas need liver toxicology testing
- Estimate each program needs project run every 9 months
- Project is 5-10 compounds at several concentrations
- Project pricing $100,000-$400,000 (median $150-200k)
- Pricing supported by current successful beta contracts
Addressable Kidney Toxicology Market

- 6,500 prevalent programs in pharma each year
- Programs across all therapeutic areas need kidney toxicology testing
- Estimate each program needs project run every 9 months
- Project is 5-10 compounds at several concentrations
- Project pricing superior to liver; no existing options
- Projections of $200-600k per contract, $250k median
Additional Opportunity with Expansion of Tissue Portfolio

- Skin for cosmetic toxicology testing
  - Higher toxicology testing revenue than pharma
  - Cosmetic testing 46% share of market

- Established research collaboration with market leader
- Additional resources going to R&D and Commercial activities
Addressable Markets for In Vitro Tissue

<table>
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<tr>
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<th>Liver Toxicology</th>
<th>Kidney Toxicology</th>
<th>Skin (Cosmetic)</th>
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<tbody>
<tr>
<td>Customer opportunity</td>
<td>6,500</td>
<td>6,500</td>
<td>tbd</td>
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<tr>
<td>Contracts/year</td>
<td>1.3</td>
<td>1.3</td>
<td>tbd</td>
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<tr>
<td>Average contract</td>
<td>$150,000*</td>
<td>$250,000</td>
<td>tbd</td>
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<tr>
<td>TAM</td>
<td>$1.3B</td>
<td>$2.1B</td>
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* Validated by existing contract activity
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3D Liver in Detail – Business Models

- Toxicology
  - Product and service revenue
  - 3D Liver well-based tissue
  - Living cell-based assay

- Disease models
  - Partner model
  - Hepatitis C / infectivity
  - Liver fibrosis

Standard Corning Transwell™ Plates
ONVO 3D Liver tissues have native tissue-like features

Defined compartments of Hepatocytes (H) and non-parenchymal (NP) cells

Tight junctions between healthy hepatocytes

Close association of hepatocytes and stellate cells

Well-formed micro-vascular structures with lumens
Bioprinted 3D human liver tissues are stable and metabolically active out to 40 days.

Mature bioprinted liver tissue

3D Human Liver Tissues also appropriately produce fibrinogen and transferrin.

Production of liver-specific protein ALBUMIN

<table>
<thead>
<tr>
<th>Day</th>
<th>Albumin (ng/ml per million cell input/day)</th>
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<tr>
<td>Day 7</td>
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<td>Day 14</td>
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<td>Day 21</td>
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<td>Day 28</td>
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<td>Day 42</td>
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Treatment with Diclofenac at 14 days yields dose-dependent induction of CYP3A4 and dose-dependent toxicity as detected by elevated lactate dehydrogenase (LDH).

Treatment with acetaminophen (APAP) at 7 days yields dose-dependent toxicity associated with cell death and necrosis.
Goal: Deliver More Accurate Toxicity Profile

Proof of Concept Experiment: Organovo 3D Human Liver Tissue
7d, daily dosing
With known DILI drug (X) and close analogue
DILI = Drug-induced liver injury

- Biochemical Markers
- Gene Expression
- Cytokines
- Histology

N=10 per group

* = p≤ 0.05
** = p≤ 0.01
*** = p≤ 0.001
**** = p≤ 0.0001
One way ANOVA
Grubbs outlier analysis

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ONVO 3D Liver detects injury across multiple cell donors

- 3D liver tissues with hepatocytes from 3 different donors were exposed to compounds daily for seven days

- Toxic compound X continues to exhibit effects across multiple donors

ATP Response

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<th>% ATP Relative to Vehicle</th>
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LDH Response

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Proper metabolism of midolazam (formation of hydroxymidazolam)

CYP3A4 Activity sustained out to four week timepoint

Veh = vehicle only (control)
+Rif = with rifampicin

N=3
O N=3
M One way ANOVA
* Multicomparsions
** p<0.05
*** p<0.01
**** p<0.001
Partnering to leverage the bioprinting platform

- **NIH Partnerships with NEI and NCATS**
  - National Eye Institute – building eye tissue
  - National Center for Advancement of Translational Sciences – Drug Discovery
  
  NCATS Mission: enhance development and testing of therapeutics

- **MJFF** – tissue development for drug discovery research

- **Multiple journal publications; vascularization of tissues**
Organovo Has Long Term Opportunity in Tissue Therapy

- **Tissue opportunities**
  - Direct surgical therapy for patients
  - Simple tissues in animal testing
  - Larger tissues through partnership

Yale University
School of Medicine
The Importance of Sufficient Capital

- $54M on hand at Sept 30, 2014
- Limited use of ATM during Fiscal Q2 2015
- Use of funds will be to drive liver disease model R&D and kidney tissue R&D
- Will continue to seek right opportunities to capitalize our efforts properly
- Platform nature of 3D Bioprinting allows us to grow into new areas to grow overall enterprise value
Organovo Targeted Milestones and Potential Results – Next 24-36 months

- Development and launch of 3D Liver
  - Scientific proof of concept - April 2013 ✔
  - Functional Validation - December 2013 ✔
  - Delivery to KOLs - Alpha and beta testing ✔ (Announced January 2014, original target April)
  - Product launch – before the end of December 2014 ✔ (November 2014)

- Breast cancer model initial data December 2013 ✔

- Detail on additional tissue product/service launches
- Potential for multiple additional pharma partnerships
- Scientific updates on disease models – Kidney, Liver
- Therapeutic tissue proof of concept and path to clinical
Organovo’s Bioprinting Technology:

- Our goal is to accelerate breakthrough research
  - Better recreation of “human biology in a petri dish”
  - Better than animal models
  - Better than cells alone

- Has broad applications for unmet needs
  - Pharma Drug Discovery (Near term)
  - Toxicology Testing (Near term)
  - Transplant tissues (Longer term)
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Cancer Opportunity is Strong

▪ OHSU Partnership
  ▪ Cancer research top investigators (Gleevec, FISH)
  ▪ Allows Organovo to move upstream in discovery efforts
  ▪ Scientific publications contemplated
  ▪ Multiple solid tumor types under investigation
  ▪ Breast cancer initial model already established
  ▪ Extremely active Business Development pipeline in oncology
3D human breast tumor models have been bioprinted with defined multi-cellular composition and architecture

Mantle of connective tissue

Core of cancer cells

Figure 2. Left, schematic of bioprinted neotissues. A nodule of human breast cancer cells is surrounded by a stromal compartment composed of endothelial cells, fibroblasts, and adipocytes. Right, bioprinted neotissues immediately after printing. Cancer cells are labeled with blue dye.

King et al., ASCB (December 2013)
3D Bioprinted tumors can reveal penetration, distribution, and effects of anti-tumor agents

- Small, hydrophilic compounds like methotrexate (C) and fluorescent dyes (B) penetrate deep into the tissues
- As expected, larger more lipophilic compounds like paclitaxel concentrate in the outer regions of the tissue (D)

Clear differential outcomes are noted in 3D Bioprinted tumors vs. 2D cultures

King et al., AACR (April 2014)
3D Bioprinted tumors can be generated from patient tumor cells

Patient pancreatic ductal adenocarcinoma (PDAC)-derived cells and pancreatic stellate cells were bioprinted into 3D structures (A, B) reminiscent of the parent tumor (C) and maintained \textit{in vitro} for 10 days. Cancer cells are labeled with CK8/18 (Green) and surrounding fibroblasts with Vimentin (Red).

*presented by Dr. Rosalie Sears (OHSU), AACR (2014)
Executive Management

KEITH MURPHY, CEO & President
- 20+ years of experience in biotechnology
- Amgen, 10 years, Global Operations Leader, Prolia/Xgeva
- Alkermes, drug delivery technology background
- UCLA, School of Business
- MIT, Chemical Engineering

BARRY MICHAELS, CFO & Secretary
- 30+ years of financial and general management experience in medical device and biotechnology
- CFO of three private and three publicly traded companies
- Finalist, San Diego CFO of the Year for 2012

SHARON PRESNELL, Ph.D., CHIEF TECHNOLOGY OFFICER & EVP, R&D
- 15+ years of leadership experience in product-focused R&D
- SVP of R&D Tengion, Inc.
- 6 years R&D Leadership at Becton Dickinson
- Asst. Professor, U. of North Carolina, Chapel Hill
Executive Management

ERIC MICHAEL DAVID, M.D., J.D., CHIEF STRATEGY OFFICER
- 15+ years of experience in biopharma
- Associate Partner, McKinsey & Company
- Life Science Pipeline and R&D Strategy Consulting
- Adjunct Faculty, Rockefeller University

MIKE RENARD, EXEC VP COMMERCIAL OPS
- Proven revenue generating product wins in research and diagnostics instrumentation and consumables
- 25+ years in life sciences
- Experience building and launching products at Beckman Coulter and Sanofi
Board of Directors

KEITH MURPHY (Chairman)
- Organovo Chief Executive Officer

JAMES GLOVER (Audit Chair)
Former roles:
- CFO, Beckman Coulter
- CFO, Anadys Pharmaceuticals
- Director and Audit Chair, Varian (acquired by Agilent, $1.5B)

ROBERT BALTERA
Former roles:
- CEO, Amira Pharmaceuticals (acquired by BMS, up to $475M)
- VP Finance, Amgen
Board of Directors

RICHARD HEYMAN
- CEO, Seragon Pharmaceuticals (to be acquired by Genentech, up to $1.75B)

Former roles:
- CEO, Aragon Pharmaceuticals (J&J acquired for up to $1B)
- VP Research, Ligand Pharma

TAMAR HOWSON

Former roles:
- Director: Warner Chilcott, Idenix (both acquired in 2013-2014)
- SVP of Corporate Development, Bristol-Meyers Squibb
- SVP of Corporate Development, SmithKline Beecham
- Head of SROne (GSK Venture arm)

KIRK MALLOY
- SVP & General Manager of Life Sciences, Illumina
- Runs Illumina’s largest business unit
- 12 year run with Illumina including product portfolio planning responsibilities

Former roles:
- 18 years in life sciences including Director at Biosite Inc.
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