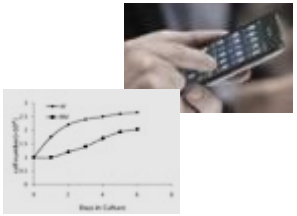
THRIVE BIOSCIENCE

Analytics. Automation. Better Biology.

CellAssist
Cell Culture Assistant



Alpaca
Cell Culture System

Thrive Bioscience -- Automating Cell Culture & Stem Cell Culture

Part One: Introduction to Thrive

Part Two: Financing Your Company through Angels

June 26, 2018

Thomas Farb-Horch,
CEO & Co-Founder

"Top 30 Life Science Startups To Watch In The U.S." -- *Biospace*

Thomas Farb-Horch Thrive Bioscience, Inc. 11 Audubon Road Wakefield, MA 01880 USA
tom@thrivebio.com mobile: +1 978-201-9081

Thomas Forest Farb Background

- Tom has been on both the management and investing side:
  - Founder of over 12 companies in tech and life sciences.
  - Former General Partner at two venture capital and private equity firms, one based in Boston and one based in Shanghai.
- He has been involved in the founding or early management of leading companies in artificial intelligence such as HNC Software, in healthcare analytics, such as Health Dialog, and in diagnostics, such as Cytyc and Exact Sciences.
- He has raised over $150 million in angel and venture capital in over 25 rounds.
- He has been a Member of Board of the Directors or the Board of Trustee of over 15 organizations, including five public companies.
- Currently he is the Co-Founder and CEO of Thrive Bioscience, Inc. in Wakefield, MA, which is automating widely performed cell culture and stem cell culture.

Part One:
Introduction to Thrive Bioscience

Thrive Bioscience -- Automating Cell Culture & Stem Cell Culture

- **Cell culture is at center of biomedical research and cell therapeutics** *($18.6B per year market)*
- **Today, conducted similarly to 65 years ago & with significant pain points still unsolved**
- **Instrument sales start end of 2018 / projected revenues of $100M+ in 2022** *(with software & consumables revenues equal to 45% of instrument revenues in 2022)*
- **Collaborations with *Broad Institute of MIT & Harvard* and *Harvard Stem Cell Institute***
- **Portfolio of 43 patent applications of which seven issued & very limited direct competition**
- **Raised $17.2M of financing from angel groups, executives & family offices**

1952

Tuskegee Institute -- HeLa cell line factory

1952 - 2017

2018 +

Automation. Analytics. Better Biology.

Thrive CellAssist Cell Culture Assistant

Thrive Alpaca Cell Culture System

Commercially Experienced Founders & Board Members

CEO, Co-Founder -- Thomas Farb-Horch

Senior management positions:

- VP, Cytyc (cytology labs / acquired by Hologic)
- Pres, Indevus (pharma / acquired by Endo)

Board Member / Founder:

- Exact Sciences (colon cancer screening / NASD: EXAS)
- HNC Software (neural nets / acquired by Fair Isaac)

CSO, Co-Founder -- Alan-Philippe Blanchard, Ph.D. (Caltech)

- Founder of Rosetta Inpharmatics (acquired by Merck)
- Co-CSO, Agencourt Genomics (acquired by ABI/Life)
- Research Fellow, Life/ThermoFisher; Scientific Fellow, Applied Biosystems
- VP R&D, Manteia Predictive Medicine, Switzerland (spun out of Serono, acquired by Illumina)
- Senior Fellow, Leroy Hood Laboratory, U of Washington

Chair of Board -- Guy Broadbent

- President, Thermo Fisher Scientific, Laboratory Products Division
- CEO, XcellereX (bioreactors; acquired by GE Life Sciences)
- Board Member at Sample6, Gallus BioPharmaceuticals, Blue Sky Biotech

Michael Finney (Ph.D., MIT, Biology)

- Former CSO / Co-Founder, MJ Research (acquired by Bio-Rad) & CEO, Vaxart
- Board Member at Innerscope Research, Sage Science (Chairman), Orion Genomics, Vaxart

Brock Reeve (MPhil, Yale; MBA, Harvard)

- Executive Director, Harvard Stem Cell Institute, Harvard University
- Managing Director & COO of Life Science Insights, an IDC company

Selected Members of the Advisory Board

Stephen Fantone, Ph.D. (Optics)
- Founder & CEO of Optikos Corporation
- Director, American Optical Society
- MIT, U of Rochester (Ph.D.)

Mariano Garcia-Blanco, M.D., Ph.D. (Biology)
- Professor & Chair, Biochemistry & Molecular Biology, U of Texas Medical Branch
- Professor, Duke-NUS Med School, Singapore
- Yale (MD & Ph.D.)

Carl W. Hoffman (Software)
- Co-Founder & CEO of Basis Technology Corp.
- Ex-VP of Asia, Amazon.com
- Member of Research Staff, MIT Laboratory for Computer Science

Jerry Karabelas, Ph.D. (Drug Development./VC)
- Partner of Care Capital, LLC
- Ex-CEO of Novartis
- Massachusetts College of Pharmacy (Ph.D.)

Anna Kushnir, Ph.D. (Government Grants/Policy)
- VP, Life Sciences of Strategic Mkting Innovations
- Harvard Medical (Ph.D.)

Taka Kiyoizumi, M.D., Ph.D., M.B.A (Therapeutics)
- Executive Manager, Japan Forum for Innovation (UCSD)
- Ex-CEO of MediciNova & Tanabe Research Labs US

Stan Lapidus (Diagnostics/Instruments/Imaging)
- Founder & Ex-CEO of Cytyc & Exact Labs
- Cooper Union

Dan Marshak, Ph.D. (Instrumentation, Stem Cells)
- Ex-CSO of PerkinElmer
- Ex-VP of R&D & CTO of Cambrex Corp
- Harvard, Rockefeller (Ph.D.)

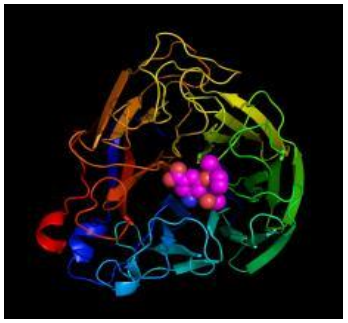
Bobby Sandage, Ph.D. (Therapeutics)
- CEO of Euclises Pharmaceuticals
- General Ptner, Cultivation Capital Life Sciences Fund
- Ex-EVP of Indevus Pharmaceuticals
- Purdue (Ph.D.)

Sadashi Suzuki, L.L.B., MBA (Sales & Marketing.)
- VP Japan, SE Asia & Pacific, Cepheid
- President, Bio-Rad Laboratories, K.K.
- General Manager - Japan, Affymetrix
- Waseda (L.L.B.); Northwestern (MBA)

Q: Why Need Thrive? A: There Are Major Problems in Research!

Problem #1: Drug Development Has High Costs & High Failure Rates

(Only 2% - 5% of programs lead to an approval)



Problem #2: Pre-clinical Research is Not Reproducible

(studies from Amgen, Bayer, NIH and others -- 51% to 89% of pre-clinical research not reproducible; $28 billion or more cost per year!)

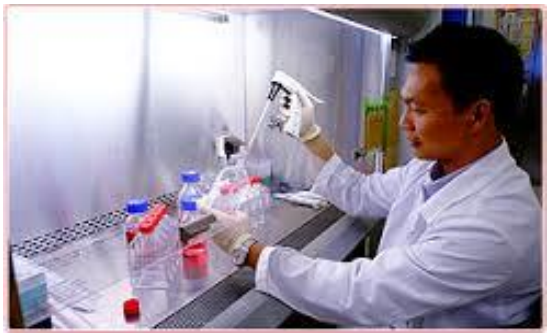
Problem #3: Cell Culture is Not Reproducible

(about half of causes of irreproducibility relate to cell culture, directly and indirectly)

Source: The Economics of Reproducibility in Preclinical Research
by Leonard P. Freedman , Iain M. Cockburn, Timothy S. Simcoe Published: June 9, 2015, PLOS Biology

Poorly Controlled, Manual Process without Data

What is cell culture? Re-creating cells' environments in order to grow them *in vitro*



Limited environmental controls

Contamination

Lacks data

Lack of reproducibility

Limited monitoring

Difficult to scale

Subjective decisions

Limited process controls

"Cells need carefully tuned environments to survive and maintain their *in vivo* properties… and today's incubators do not include the features necessary to create these environments."

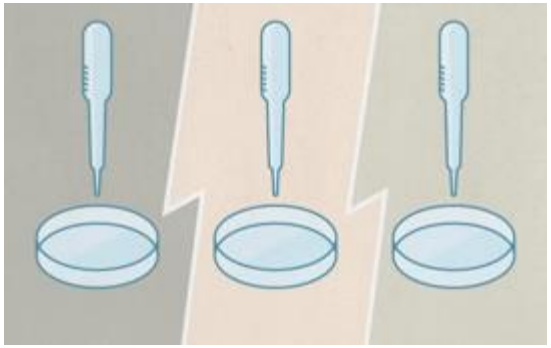
-- Drug Discovery World, Summer 2016

Current Cell Culture Leads to Inconsistent Results

- **Cells have drifted genomically from the original cells**
- **Cells suffer from mislabeling & contamination *(15% to 36% of cells)***
- **Cells behave differently across samples, labs and time**
- **Cells are increasingly distant from the "disease model" -- patients!**

Researchers Are Studying the Cells They CAN Culture, Not The Cells They SHOULD Be Studying!

Company Mission:
Provide instruments & software tools for consistently growing healthy cells with accompanying data & analytics.



Thrive Significantly Improves:

- **Reproducibility**
  - ***Consistent Experiments***
- **Sterility**
  - ***Reduced Contamination***
- **Scalability**
  - ***More Experiments***
- **Documentation**
  - ***Everything Recorded***
- **Analytics**
  - ***Better Data and Images***

Thrive's Cell Culture Systems -- CellAssist & Alpaca

Thrive's two systems use common image processing, analytics, optics & sensors

CellAssist Cell Culture Assistant:

- *Bench-top solution improves existing, manual cell culture*
- *Reduces errors from human judgment with image processing & analytics*

Available late 2018 (Early Access Program)

Alpaca Cell Culture System:

- *Stand-alone solution replaces & fully automates cell culture*
- *Reduces errors from human judgment and implementation with robotics*

Available late 2019 (Early Access Program)

Payback, Capabilities & Benefits

Capabilities	Benefits
Closed, Controlled Environment	• Reduces contamination, cell stress & genomic drift
Automation of Protocols	• Executes experiments consistently across labs
Onboard Sensors	• Actively monitors & corrects growth conditions
Intelligent Image Analysis	• Reduces subjectivity & provides consistent decisions
Images, Data & Documentation	• Documents processes with images

Cell Culture -- An Important, Ignored Problem

Example Statements from 1,000 Labs Market Research Conducted by Thrive

" We have a complete lack of tools to help us in this increasingly important task of cell culture. "

-- University Principal Investigator

" Cell culture may be the only remaining island of outdated manual processes surrounded by an ocean of automation. "

-- Research Institute Lab Director

Part Two:
Financing Your Company Through Angels

Picking the Right Investor

The right investor depends on:

- Stage of the business
- Size of investment required
- Type and size of risks
- Time lines for payback
- Additional resources they can bring
- Non-financial motivations

Sources of Financing Time Frames

Activity:	Idea & Team	Prototype	Beta Test	Launch	Sales Expansion	Profitability
Founders						
Angels: Friends & Family						
Angels: Ex-Colleagues, Entrepreneurs						
Angels: Domain Experts & Industry Executives						
Angels: Wealthy Individuals						
Angel Groups						
Family Offices						
Strategic Partners -- Service Providers, Vendors, Distributors						
Venture Capital & Corporate Venture Capital						
Financing:	**Pre-Seed ====>**	**Seed =======>**	**Series A ====>**	**Series B ====>**	**Series C ====>**	**Growth Equity =>**

Thrive:

Founders	**100%**	**9%**	**2%**	**4%**
Angels		**53%**	**47%**	**4%**
Angel Groups		**15%**	**19%**	**36%**
Family Offices		**13%**	**23%**	**47%**
Strategics		**10%**	**9%**	**9%**
Total:	**100%**	**100%**	**100%**	**100%**

Angel Investors – Pros & Cons

Pros

- Amounts are a good fit for an early round
- Accessible as individuals or as angel groups
- Due diligence is usually fast
- Often are value added investors

Cons

- Raising enough funds in small pieces is difficult
- Often do not make "follow-up" investments.
- Some do not have a clear idea of their own tolerance for risk
- Institutional investors generally do NOT like having a lot of small investors
- Some of these negatives are mitigated through angel groups

Individual Angel Investors – Types

THE BEST:

- **Understands the risks, understands early stage investing, understands the company/industry and adds value to the business**
- **Domain Angel**
- **Previous-Colleague Angel**
- **Fellow-Entrepreneur Angel**
- **The Super Angel (sophisticated & large amounts across many rounds)**

THE WORST:

- **Friends & Family Angel**
- **"Dumb Money" Angel**
- **Looking for a business to get involved in (unless you want another partner)**

Angel Groups -- Pros & Cons

PROS:

- **Many are experienced, pre-qualified investors**
- **Members are often opinion leaders and provide assistance**
- **Some of the groups have tremendous credibility**

CONS:

- **If you get a "No" you want it from one person, not 100**
- **Long lead times / bureaucratic – many have forgotten how to be entrepreneurs**
- **Extremely difficult without a strong, committed internal advocate (herding fish)**
- **Many of the members are there for the social aspects or their own networking**
- **Best if have a very "capital efficient" business – fear of dilution**

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Contact:

Thomas Farb-Horch, President

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Thrive Bioscience, Inc. 11 Audubon Road Wakefield, MA 01880 USA