May 20th, 11:15 AM

InVitroMetrix QCM-Based Cell Biosensor: Research tool to accelerate pharmaceutical drug discovery success

Abiche H. Dewilde
University of Massachusetts Lowell, abiche_dewilde@uml.edu

Follow this and additional works at: http://escholarship.umassmed.edu/cts_retreat

Part of the Chemicals and Drugs Commons, Investigative Techniques Commons, Medicinal and Pharmaceutical Chemistry Commons, and the Pharmaceutics and Drug Design Commons

This work is licensed under a Creative Commons Attribution-Noncommercial-Share Alike 3.0 License.

http://escholarship.umassmed.edu/cts_retreat/2016/program/11

This material is brought to you by eScholarship@UMMS. It has been accepted for inclusion in UMass Center for Clinical and Translational Science Research Retreat by an authorized administrator of eScholarship@UMMS. For more information, please contact Lisa.Palmer@umassmed.edu.
InVitroMetrix

QCM-Based Cell Biosensor

Research tool to accelerate pharmaceutical drug discovery success

Abiche H. Dewilde Ph.D.
UMass Lowell
Disclosure

• Grant/Research Support: Army Research Labs
• Major Shareholder: InVitroMetrix
  – President of InVitroMetrix
The research

- We wanted to measure in real time the changes that were happening with cells
  - Nanocanary

**Analytes**
- Drugs
- Vitamin
- Pollutant
- Chemical

**Bio-Element**
- Cell
- Enzyme
- Antibody
- Microbe

**Sensed Property**
- Mass
- Viscoelasticity
- Temperature

**Transducer**
- Piezoelectric
- Optical
- Thermal
- MEMS

Quantifiable signal

Piezoelectric: Quartz Crystal Microbalance (QCM)
Optical: Surface Plasmon Resonance (SPR)
Whole Cell Quartz Crystal Microbalance

Living whole cell biosensor

Measurable changes in cellular biomechanics: attachment, mass redistribution, viscoelasticity
The problem

The chemist tool
Prototypes V1
Prototypes V1 and V2

PROBLEM= ONLY ONE WELL
Prototype V3

PROBLEM = WEAK CONNECTIONS
Prototype V4

INNOVATION = CAN WE HAVE 12 WELLS?
The solution- Invitro-Q™

Integrated system

Data acquisition system 6”x4”

Invitro-Q™ x12

Cell culture wells

Network

Personal Computer, Cloud, Smartphone

Calibrated to each other and to standard
Commercialization Research

• LOCK DOWN YOUR IP
• Competitive edge
The competition

- Micro Analysis Systems - Biacore (SPR)
  - Problem: single component systems
Commercialization Research

• LOCK DOWN YOUR IP
• Competitive edge= We can do whole cells
• Market size= Can we be profitable
• Customer needs= TALK TO THE USERS
• Value proposition
  – The User= 12 wells
  – **Who will buy it**=> Savings to company?
    • INVESTORS: they want to see this
Value Proposition
Drug discovery and orphan drugs

• Cell assays are more successful at identifying first in class small molecule drugs
• Orphan drug repurposing $10M/2-3yrs ➔$100K/4-6mo

1 Drug discovery today http://dx.doi.org/10.1016/j.drudis.2013.07.001
Commercialization Research

• Competitive edge
• Market size
• Customer needs
• Value proposition
• Go to market strategy

– FORM THE COMPANY
Formation

- Legal paperwork
  - Entity, EIN, DUNS, SAM, NSF/NIH, Bank Accounts
- The Team
  - Diverse team with different expertise
- Find a research location
- Ask/convince Scientific Advisors to join
- Find wonderful mentors
- **GET THE MONEY**
- **Get the prototype into people’s hands**
Up Next

• Move to our new lab
• Finalize the product
• Validation
• Release first product
• Start researching next designs- SBIR/NSF
• More Money!
Thank you

Abiche H. Dewilde Ph.D.
abiched@invitrometrix.com
Invitrometrix.com