



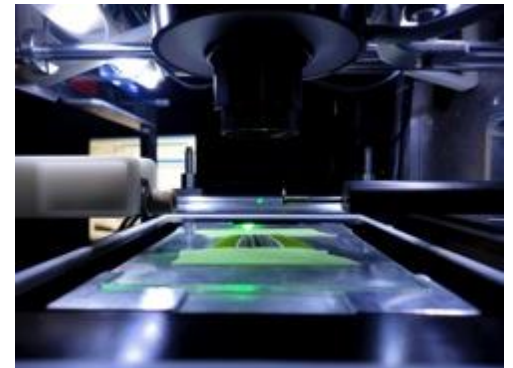
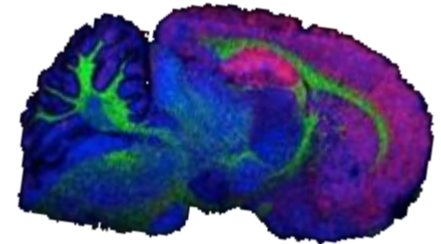
# protea<sup>®</sup>

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Morgantown, West Virginia

West Virginia Biosciences Association

April 21 2015

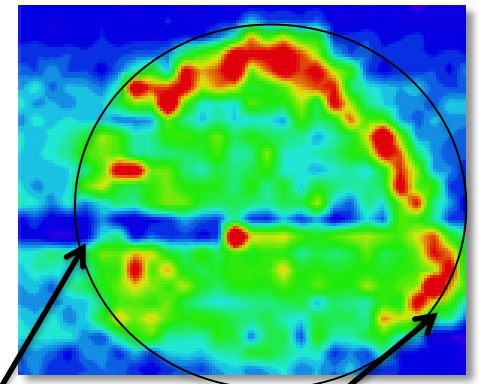


# Our business: molecular information

We improve the quality, timeliness, and comprehensiveness of molecular information – critical to the management of all life science research and diagnostic medicine

Better molecular information improves research productivity and treatment outcomes

We identify molecules produced by cells directly, more than ten times faster than current methods.

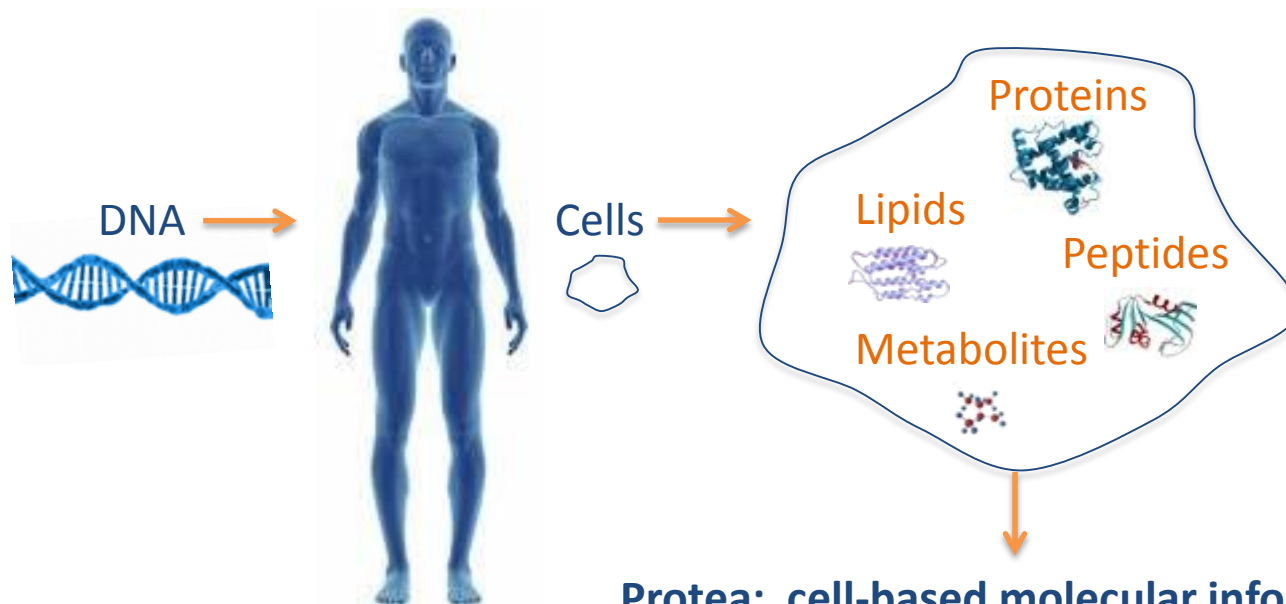


*LAESI molecular image  
of a molecule  
expressed on the  
perimeter of a live  
bacterial colony*

# The need for cell-based molecular information

Understanding the interplay of the molecules produced by cells is key to:

- Understanding the molecular basis of diseases
- Improved patient outcomes
- Improved R&D Productivity (“Fail early, fail cheap”)
- New Basic Discoveries



# **Protea: A revolutionary life sciences franchise**

**Protea is the commercial leader in the field of mass spec imaging**

**Developed and launched proprietary, disruptive technology platform that identifies hundreds of molecules in seconds to minutes.**

**Validated technology – 10 issued patents, >40 peer-reviewed publications**

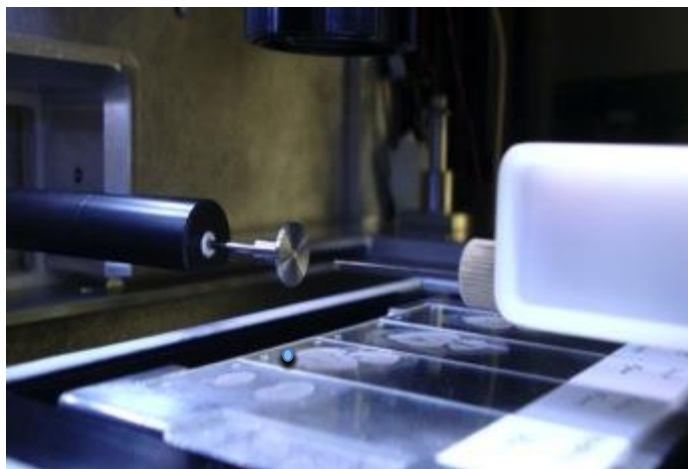
**Commenced offering the first commercial services for mass spectrometry imaging**

# Our Management Team

Name & Title	Background
<b>Stephen Turner</b> Founder, CEO	<ul style="list-style-type: none"><li>• Founded OncorMed (Gene Logic) that developed genomic breast cancer panels</li><li>• Founded Quorum Sciences (Sold to Vertex)</li><li>• Founded Bethesda Research Laboratories (BRL) (Life Technologies)</li></ul>
<b>Stanley Hostler</b> Co-Founder & Director	<ul style="list-style-type: none"><li>• Prominent West Virginia Attorney, Founder of HISTA Program,</li><li>• WVU and MBRCC supporter</li></ul>
<b>Greg Kilby, PhD.</b> Vice Pres., Operations	<ul style="list-style-type: none"><li>• Director, North American Applications Laboratories, Thermo Fisher</li><li>• Manager, Applications Laboratory, Agilent &amp; Pfizer R&amp;D</li></ul>
<b>Matthew Powell, Ph.D.</b> Chief Science Officer Vice President, R&D	<ul style="list-style-type: none"><li>• Ph.D. from West Virginia University</li><li>• Developed and holds patents on technology</li></ul>
<b>Steve O'Loughlin</b> VP, Corp. Finance & Development	<ul style="list-style-type: none"><li>• Business Development, Caliber I.D. (fka Lucid, Inc.)</li><li>• Healthcare Investment Banking, Jesup &amp; Lamont</li></ul>
<b>David Halverson</b> Director, Business Development	<ul style="list-style-type: none"><li>• Exec. Director, Key Accounts for MPI Research</li><li>• Head, U.S. Sales, Huntingdon Life Sciences</li><li>• Dir. North America Bus. Dev., Quintiles</li></ul>

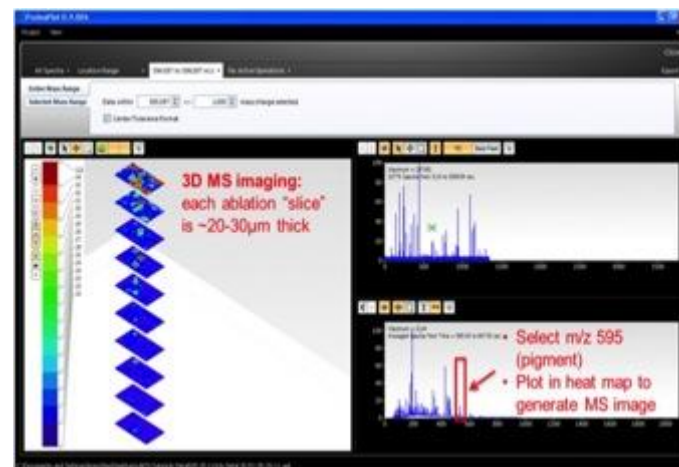
# LAESI: A revolutionary molecular information platform

## Front End - Instrument



- Analyzes biological samples with no sample prep
- Molecules are immediately sent into mass spectrometer for analysis
- Patents extend through 2026

## Back End – Software/Data Analytics



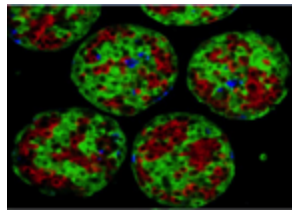
- Analyzes data to create images of molecules and their location
- Generates 2D or 3D images of 1000+ of molecules per analysis
- Developed in house, fully supported by Protea

# LAESI: A revolutionary molecular information platform

- ✓ **Universal** - Analyzes virtually all biological sample types *including living cells*
- ✓ **Powerful** – 1000+ of distinct molecules per analysis
- ✓ **Speed** – Data capture in seconds to minutes
- ✓ **Comprehensive** – Detects proteins, peptides, lipids & small molecules simultaneously
- ✓ **Big Data** – Several gigabytes of data from a single sample
- ✓ **Versatile** - 2D & 3D imaging capabilities
- ✓ **Ease** - No sample preparation required



Tissue  
Samples



3D Engineered  
Tissues



Living Cell/  
Bacterial Colonies



Plants/  
Natural Products



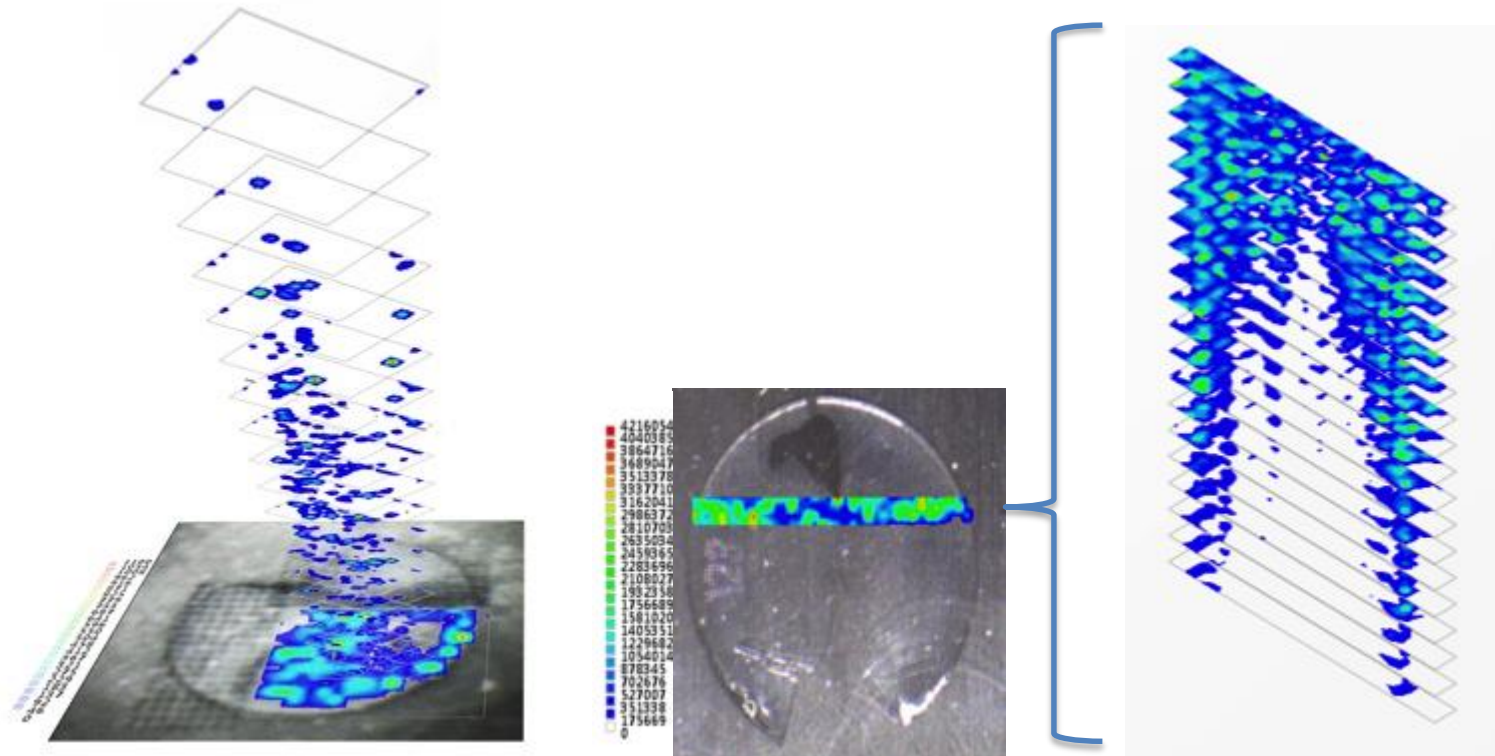
Medical Devices/  
Biomaterials



# LAESI 3D molecular imaging

*Generating molecular data from complex samples*

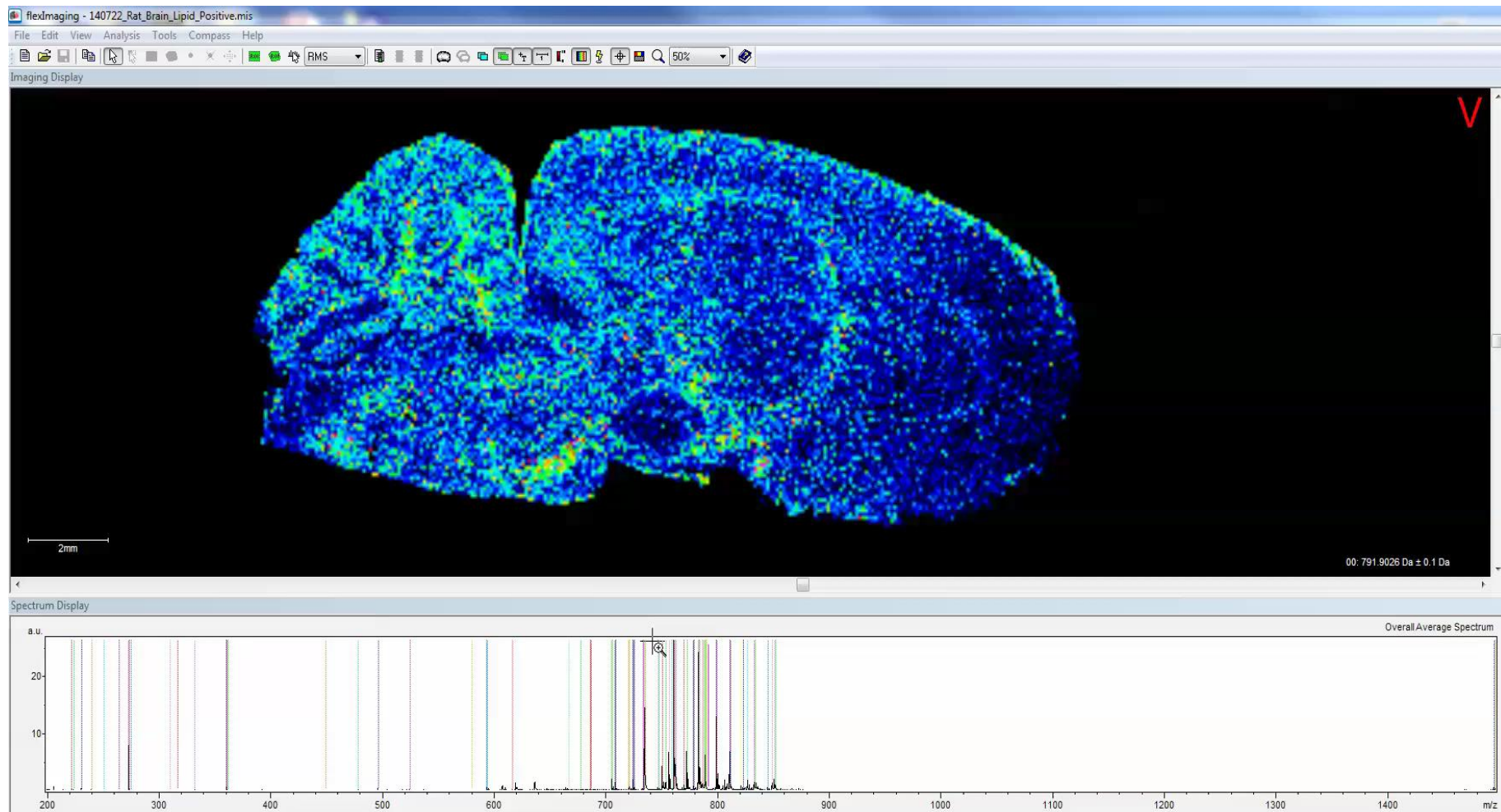
- Direct 3D image of molecules from a contact lens
- Laser “drills” into samples directly, no sample prep
- No other technology can provide this solution



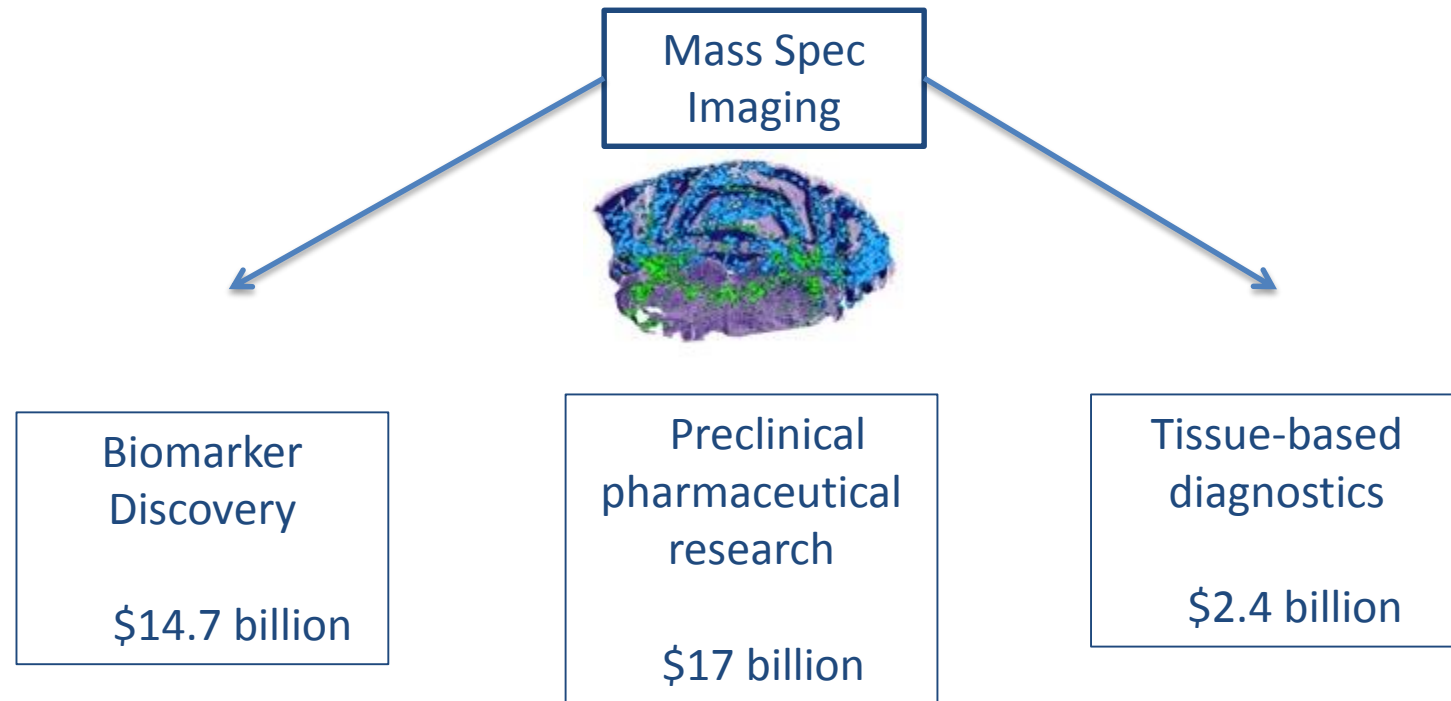
Source: The Company



# LAESI: A revolutionary molecular information platform



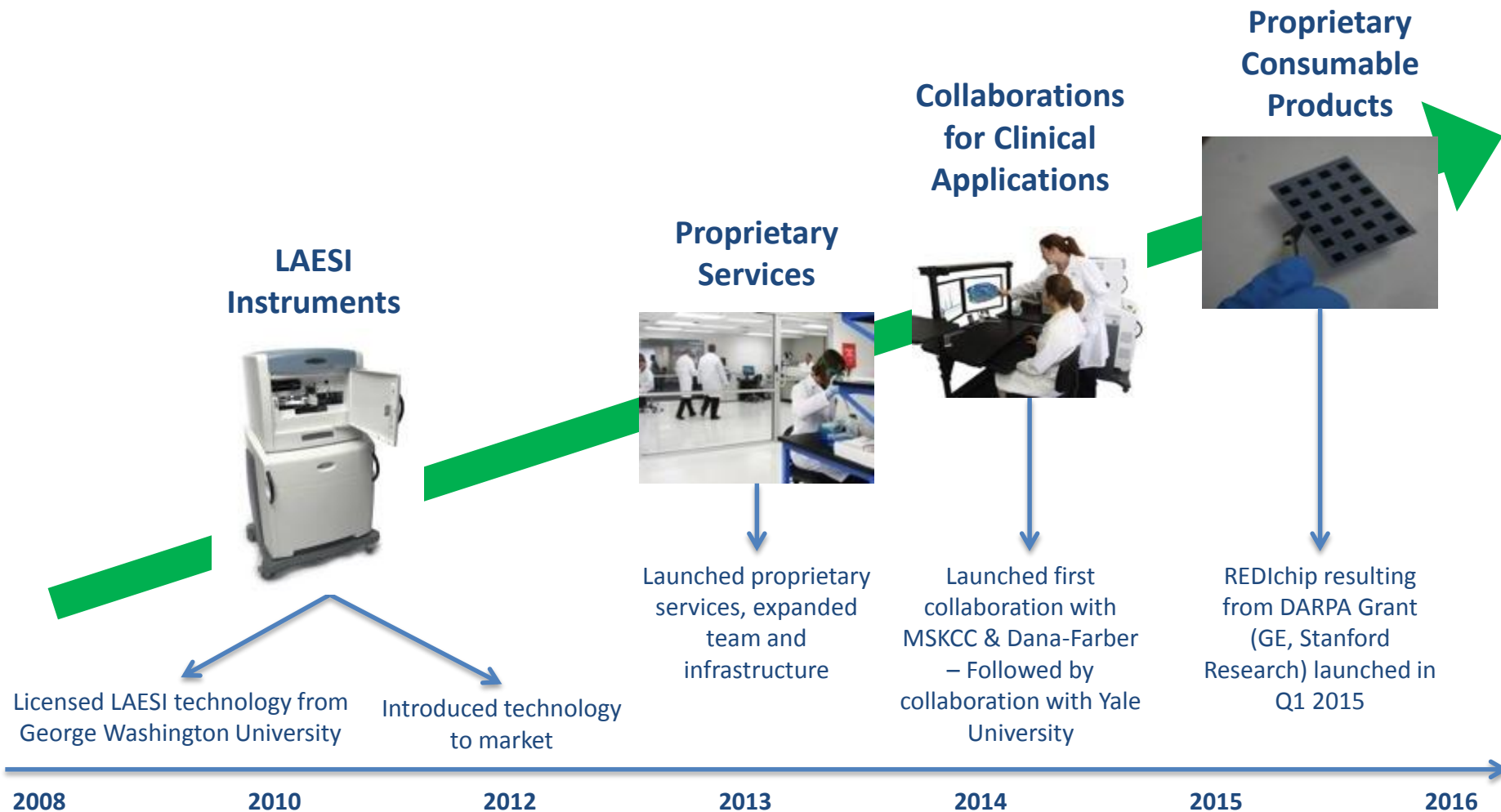
# Protea addresses large markets where new capabilities are needed



Source: <http://www.marketsandmarkets.com/Market-Reports/tissue-diagnostics-market-1063949.html>

Source: <http://www.marketsandmarkets.com/PressReleases/molecular-diagnostic.asp>

# A History of Value Creation



# Technology Validation and Market Adoption

## Awards



## Collaborators



## Customers



# Key Business Objectives



Advance technology into clinical medicine

Rapidly expand addressable markets

Remain commercial technology leader through continued innovation – LAESI 2.0

# Market Expansion

Protea technology now routinely used in multi billion markets

Increased  
Publications &  
Conferences

Highly Visible  
Early Adopters

Entering New  
Markets

**AACR** American Association  
for Cancer Research

**SOT** | Society of  
Toxicology

**aaps**<sup>®</sup>  
American Association of  
Pharmaceutical Scientists



• Wrigley



**AgBio**



**MedTech**



**Antimicrobial R&D**

**protea**

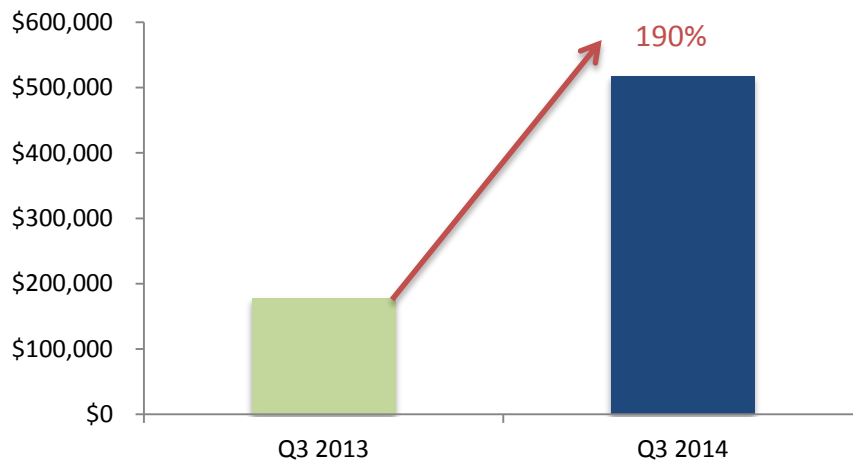
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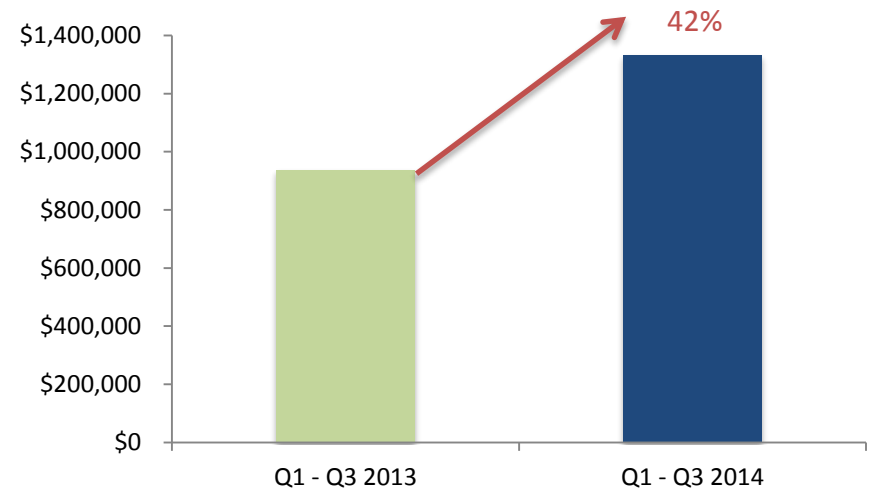
# Experiencing strong growth in our key business segments



## Most Recent Quarterly Performance



## Year to Date Performance



Source: Company SEC filings and internal calculations



# Corporate Development: Collaboration with MSKCC and DFCI



Dr. Andre Moriera  
Pathologist  
MSKCC



Dr. Robert Downey  
Surgeon  
MSKCC



Dr. Franziska Michor  
Biostatistician  
Dana-Farber



**Protea Enters Into Collaborative Research Agreement With the Memorial Sloan-Kettering Cancer Center and the Dana-Farber Cancer Institute**

LAESI(R) Technology to be Used to Profile Cancer Cells to Improve Diagnosis and Treatment Selection



Memorial Sloan-Kettering  
Cancer Center

*The Best Cancer Care. Anywhere.*



DANA-FARBER  
CANCER INSTITUTE



# Collaboration with Insphero AG

Lipid profiles of Insphero 3D Microtissues, generated by Protea, using proprietary LAESI mass spec imaging technology

Top right – note lipid not present in necrotic core – only seen in biologically active part of tumor microtissue

m/z 861.7

m/z 623.2

m/z 804.3

m/z 517.1

m/z 540.1

# Unmatched Capabilities



- Disruptive technology meeting researchers' need for better data.
- Groundbreaking collaborations with leading institutions
- Expanding list of industries adopting Protea technologies

Based in Morgantown, West Virginia



Preclinical  
R&D

Biomarker  
Discovery/Diagnostics/C  
linical

AgBio/MedTech/Others

# Protea: A molecular information franchise



*Protea's mass spectrometry imaging laboratory*



- **Market leader – growing revenue and customer base**
- **Proprietary molecular imaging platform – rapid, fully-automated**
- **Innovative business model for near and long term revenue growth**
- **Developing an entire new class of tests for cancer diagnosis**

- **Be yourself**

- Be yourself
- **Believe in what you are saying**

- Be yourself
- Believe in what you are saying
- **Brevity – less is more**



- Be yourself
- Believe in what you are saying
- Brevity – less is more
- **A two way street – listen**

- Be yourself
- Believe in what you are saying
- Brevity – less is more
- A two way street – listen
- **Evolve your presentation**

- Be yourself
- Believe in what you are saying
- Brevity – less is more
- A two way street – listen
- Evolve your presentation
- **Have fun**