September 2, 2015

Insights from the ASCB-KGI Bioscience Management Course
Outline

• What are non-academic jobs?

• American Society for Cell Biology – Keck Graduate Institute (ASCB-KGI) 2-week course on bioscience management

• Resources
Employment of Young Biomedical PhDs

- Unemployed: 6%
- Tenure Track Research: 7%
- Out of Research: 17%
- Govt or Industry Research: 27%
- Postdoc Research: 43%

USA Today April 2, 2013, NIH, NSF
Concerns About Leaving Academia

- Cannot go back
- Selling out
- Loss of passion to do science for science’s sake
- Concerns about ownership of work
- Job security
- Won’t be qualified enough
- Don’t know what’s out there
- Won’t be the expert
- Many other fears…
Jobs for Scientists

- Tenure track or tenured
- Government/ NPO
- Staff Researcher
- IP/Tech Transfer
- Teaching
- Consulting
- Industry

Adapted from SciPhD
Areas to Consider

numerous possibilities

Research & Development

Legal

Operations

Business Affairs

Communications

Adapted from SciPhD
Stefano Bertuzzi
Executive Director of ASCB

“There are many career options for biomedical Ph.D.s, nearly all equally valuable to society, but the problem is that our training system was designed when need, supply and demand were very different.”
American Society for Cell Biology – Keck Graduate Institute (ASCB-KGI)

- 2-week course on bioscience management in CA
- Award for tuition, lodging, meals, and traveling expenses
- 40 students out of 591 applicants from all over the world
- Simple application process, with an April deadline
Goals of ASCB-KGI

• Academic training in bioscience management
• Gain experience in teamwork through working on an industry-oriented project
• Professional and career development
Classes and Case Studies

• The academic portion will be taught using MBA-style

• 3 hour sessions, lecture and “case-based” split

• Case is a discussion of a bioscience management related problem facing an organization or person
Team Project

- Problem-solving through a hypothesis-based approach
- Secondary research to drive to critical insights
- Analysis of the economic potential of a product
- Interdisciplinary teamwork environments found in industry
- Oral presentations about strategic recommendations
Opportunity Analysis: Bladder Cancer Diagnostic Biomarkers

Friday July 24th, 2015
Agenda

- **Project Objectives**
  - To conduct an opportunity analysis of a new bladder cancer (BCa) diagnostic biomarker

- **Executive Summary**
  - Problem
  - Methods
  - Solution

- **Background**
  - Bladder cancer pathophysiology, prevalence, and cost
  - Limitations of current treatments and diagnostics

- **Analysis**
  - Determine a biomarker that provides attractive investment returns through:
    - Assessment of a validation method
    - Calculation of the market opportunity
What factors should be considered?

Sample Issue Tree

- Market Entry – New Product
  - External
    - Market
      - Growth
      - Size
      - Penetration
    - Competitor
      - Market Share
      - Product Comparison
  - Internal
    - Revenue
    - Cost
      - Cannibalization
      - Additional Sale
Urinary Biomarkers Analysis

20+ studied biomarkers including:

- Epigenetic changes
- Point mutations
- RNA
- miRNA
- Protein

3 promising biomarkers

Addressed a majority of value guidelines

Current Gold Standards

<table>
<thead>
<tr>
<th>Name</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cytology</td>
<td>44</td>
<td>96</td>
</tr>
<tr>
<td>Cystoscopy</td>
<td>78</td>
<td>92</td>
</tr>
<tr>
<td>Cytology + Cystoscopy</td>
<td>90</td>
<td>90</td>
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</table>
## Validation Guidelines

<table>
<thead>
<tr>
<th></th>
<th>DD23</th>
<th>CYFRA 21-1</th>
<th>IncRNA-UCA1</th>
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</thead>
<tbody>
<tr>
<td>Total number of patients</td>
<td>389</td>
<td>2,495</td>
<td>1,064</td>
</tr>
<tr>
<td>Number of patients with Bladder cancer</td>
<td>316</td>
<td>1,262</td>
<td>692</td>
</tr>
<tr>
<td>Detection Sensitivity</td>
<td>80.5%</td>
<td>82%</td>
<td>84%</td>
</tr>
<tr>
<td>Detection Specificity</td>
<td>59.7%</td>
<td>80%</td>
<td>88%</td>
</tr>
<tr>
<td>False positive rate</td>
<td>40.30%</td>
<td>40%</td>
<td>12%</td>
</tr>
<tr>
<td>Sensitivity in combination with cytology</td>
<td>85.10%</td>
<td>N/A</td>
<td>97%</td>
</tr>
<tr>
<td>Ease of assay procedure</td>
<td>medium</td>
<td>easy to hard</td>
<td>easy</td>
</tr>
<tr>
<td>Cost</td>
<td>$100-200</td>
<td>$100-200</td>
<td>$8</td>
</tr>
</tbody>
</table>

See Appendix for References
There is a large market opportunity in addressing follow-up costs by improving biopsy and cystoscopy procedures with a market of $500M annually.

## Adoption Incentive

<table>
<thead>
<tr>
<th>SCENARIOS</th>
<th>Cystoscopy replacement Savings ($)</th>
<th>False Biopsy Savings ($)</th>
<th>Payor Savings ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FULL MARKET</td>
<td>125 M</td>
<td>27 M</td>
<td>152 M</td>
</tr>
<tr>
<td>3/4 OF MARKET</td>
<td>94 M</td>
<td>20 M</td>
<td>114 M</td>
</tr>
<tr>
<td>1/2 OF MARKET</td>
<td>62 M</td>
<td>13 M</td>
<td>75 M</td>
</tr>
<tr>
<td>1/4 OF MARKET</td>
<td>31 M</td>
<td>6 M</td>
<td>37 M</td>
</tr>
</tbody>
</table>

For ¾ market penetration total payor savings = $114 M would incentivize adoption
PhD Thesis Lifecycle

Vision

Networking

Research

Writing

Presentation

Defense
Business LifeCycle
Panel Discussions

- Human Resources
- R&D
- Clinical and Regulatory Affairs
- Legal / IP
- Management Consulting
Professional Development

• Workshops
  – Introduction to Industry Careers
  – Project Management

• Seminars
  – Shannon Turley at Genentech

• Networking
How to Network

- Get out of your comfort zones
- Practice, practice, practice
- Trust is the key to networking
- Be visible, credible, and profitable
- Diversify
- Maintain your relationships
- Follow-up with people
- Business cards
- Give back
Wash U has the highest representation at the boot camp.

Everything at the course is available in St. Louis.
Popular Mechanics names STL as #1 start-up city

Seed Capital
Workspace
Mentorship
Growth Capital
Benefits to Our Alumni

122 BALSA alumni to date, entering diverse career paths

Academic – 36%
DBBS avg – 51%

Industry – 23%
DBBS avg – 23%

Finance/business – 21%
DBBS avg – 4%

Consulting – 12%

Other – 8%
Impact on the National Level

**Science Careers** From the journal *Science*

*Issues & Perspectives*

**In Person: Consulting for Career Enhancement**

**nature biotechnology**

The missing piece to changing the university culture

**THE CHRONICLE OF HIGHER EDUCATION**

Young Science Scholars Try Out Consulting As a Professional Plan B
What you can do right now

Research & Development
- Clinical studies
- Science

Legal
- Patent law classes
- Office of Technology Management

Operations
- KGI Certificate and Postdoc
- Professional Masters in Bioscience Management
- Project Management Certificate

Business Affairs
- BALSA
- BEC
- IDEA LABS

Communications
- Blogs
- News article
- Science writing internship
- ProSPER

Adapted from SciPhD
Leadership Skills for Successful Scientists

- Authority
- Communication
- Consensual
- Conservative
- Control
- Cooperation
- Delegation
- Dominant
- Empathy
- Excitement
- Feedback

- Innovative
- Management Focus
- Outgoing
- Persuasive
- Production
- Restraint
- Self
- Strategic
- Structuring
- Tactical
- Technical
Job Description: Scientist II: Respiratory, Inflammation, Autoimmunity

Description
MedImmune has a new opportunity for a scientist in the Respiratory, Inflammation, and Autoimmunity group within the Translational Strategy group in the Department of Translational Sciences. This position can be filled at the Scientist I or Scientist II level. The research focus for this position will be in respiratory diseases, including asthma and COPD, but may extend into other inflammation and autoimmunity disease indications as needed. The successful candidate will work with a team of scientists in the development of translational science strategies to define the link between drug target pathways and disease mechanisms. The candidate will take a lead role in the delivery of supporting scientific data to guide patient stratification, proof-of-principle assessments, including the evaluation of predictive and pharmacodynamic markers that can be evaluated clinically, and provide clinical trial support for drug candidates in early development. The successful candidate will also be integrally involved in the outsourcing of analyses, evaluation of novel translational technologies and in the establishment of external collaborations to support project-related translational objectives.

Requirements
This position can be filled at the Scientist I or Scientist II level. For the Scientist I, we require a MS with 8 - 10 years of overall experience or a Ph.D. with 0 - 3 years of overall experience. For the Scientist II level, we require a MS with 10 - 13 years of overall experience or a Ph.D. with 3 - 7 years of overall experience.

In addition we require the following experience:

- Research experience in respiratory or inflammatory diseases.
- A record of scientific innovation, robust experimental design and interpretation of data that has resulted in project advancement and scientific publication.
- Experience in the development and implementation of new methods, technologies, and processes.
- Previous experience interrogating human disease samples for evidence of target pathway expression/activation.
- Ability to multi-task to meet aggressive goals under tight timelines.
- Experience working on complex projects and the ability to work well in a cross-functional, team-oriented environment.
- Ability to integrate work seamlessly from lab-based hands-on research, to computer based data analysis and project team participation.
- Strong problem solving skills.
- Outstanding verbal, written, and interpersonal communication skills.
- Experience presenting results and plans at team meetings as well as at external conferences.
- Ability to work independently with minimal day-to-day supervision.

Adapted from SciPhD
Organization matters in your résumé

Bad

Good

Source: TheLadders
Benefits to Students

Transferable Skills

Hands-on Experience

Increased Network

Career Preparation

Start-up Culture
Recommendations

Know yourself
- Take personality tests
- Discuss your goals to friends and mentors

Seek out opportunities
- Get valuable experiences by volunteering

Network
- Increase the diversity and depth of your network
- Be nice and give back

Start now
- Cultivating your network and experiences take time

Have 1, 5, 10 year plans, and work towards them