Public-Private Partnership Model for Economic Development

• Overview of Academic Technology Transfer
• Impact and Challenges of Tech Transfer
• CET Public-Private Partnership
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Role of Vanderbilt’s Center for Tech Transfer and Commercialization (CTTC)

• Serve the Vanderbilt community by assisting Vanderbilt inventors in *bringing their innovations to practical application for the benefit of the public*
CTTC Mission

To provide professional commercialization services to the Vanderbilt community, thus optimizing the flow of innovation to the marketplace and generating revenue that supports future research activities, while having a positive impact on society.
Function of Tech Transfer

- Serves as a conduit for the transfer of promising academic technologies to industry
- Contributes to regional economic development by licensing locally and supporting new venture creation
- Encouraging greater collaboration between academia and industry
Operational Responsibilities

Evaluate technologies for:

- Patentability/protectability
- Market potential
- Clinical merit/need in marketplace
- Potential for further development
Operational Responsibilities

Determine most effective commercialization route

- License out
- Create new venture
- Incubate internally
Operational Responsibilities

Negotiate development agreements

- Licenses
- Venture funding
- R&D agreements
Varying Goals for Tech Transfer

• Revenue Generation
• Faculty Service
• Regional economic development / job creation
• Societal benefit
• Partnership development / cultural enrichment
Why Commercialize Technology

• Improve quality of life for citizens and patients
• Increase research opportunities via collaborations and strategic partnerships
• Generate revenue for inventors and for Vanderbilt to support future research
• Create jobs and economic growth opportunities via start up companies
• Helps with recruitment and retention of faculty
• Increase reputation/brand
• Invigoration – for the experience
Societal Benefit from Tech Transfer

- Saccharin
- Vitamin D milk
- Insulin
- Electron microscope
- Magnetic memory
- Rocket fuel
- LCDs
- PET/CT scanner
- Fluoride toothpaste
- MRI scanner
- Electron microscope
- Saccharin
- Pap smear
- Emtriva
- Pacemakers
- Vitamin D milk
- Taxol
- Gatorade
- Penicillin
- Polio vaccine
- Magnetic memory
- Restasis
- MRI scanner
- Pediatric/vaccine
- Engine fuel
- Gatorade
- Neupogen
- Cysplatin
- MRI scanner
- Pediatric/vaccine
- Engine fuel
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5,435 licenses executed
6,363 U.S. patents issued
914 new startups
965 new commercial products
$28 billion net product sales

914 startups were formed
702 of them had their primary place of business in the licensing institution's home state
4,688 startups were in operation at the end of FY2014
$28 billion of net product sales were generated last year
965 new commercial products were created by companies licensing university technology
### Top Ten Academic Revenue Producers

Data several years old

<table>
<thead>
<tr>
<th>Institution</th>
<th>Product</th>
<th>Gross Income</th>
<th>Institution</th>
<th>Product</th>
<th>Gross Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Hope / UCLA</td>
<td>Human insulin</td>
<td>$200M</td>
<td>NYU</td>
<td>Remicade (inflammation)</td>
<td>$142M</td>
</tr>
<tr>
<td>Northwestern</td>
<td>Lyrica (neuropathic pain)</td>
<td>$192M</td>
<td>Princeton</td>
<td>Nanoparticle drug delivery platform</td>
<td>$115M</td>
</tr>
<tr>
<td>Cal System*</td>
<td>mAB production methods; Hep B vaccine</td>
<td>$182M</td>
<td>Mass Gen. Hospital</td>
<td>Imaging systems for GI procedures</td>
<td>$93M</td>
</tr>
<tr>
<td>MSK</td>
<td>Neulasta (blood cell growth factor)</td>
<td>$173M</td>
<td>MIT</td>
<td>Drug formulation methodologies</td>
<td>$76M</td>
</tr>
<tr>
<td>Columbia</td>
<td>Chimeric antibodies</td>
<td>$146M</td>
<td>Univ of Washington</td>
<td>Gardasil (HPV vaccine)</td>
<td>$67M</td>
</tr>
</tbody>
</table>
Academic Product Deficiencies

University technologies are often:

– Non-enabled (inadequately described)
– Unproven (not reduced to practice)
– Unpatentable (anticipated, obvious)
– Unprotectable (too narrow, use undetectable)
– Unmarketable (market too small, too crowded)
– Unlicensable (heavily dominated)
Academic Commercialization Success Rate

- ~15% of disclosed inventions are licensed
- < 50% of licensed inventions generate any revenue at all
- 5-10% of those that generate any revenue, product more than $1M throughout term
Academic Commercialization Success Rate

• Therefore <1% of disclosed technologies are likely to have a substantive impact

Tough Odds Indeed
Logical Conclusions

• It is dangerous to rely on academic technology transfer to fill budget gaps or research support gaps
• Tech Transfer Offices need to be as creative as possible in getting technologies to the market
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CET Background

• Cumberland Emerging Technologies (CET)
• Formed circa 2003 as a partnership between:
  – Cumberland Pharmceuticals Inc*
  – Vanderbilt University
  – Tennessee Technology Development Corp.
• Funded by TN Department of Econ Dev.

*Only public pharma company in TN
CET Mission

MISSION

To bridge the development gap and bring biomedical technologies from research and development laboratories to the marketplace.

STRATEGY

- Build Attractive Portfolio of innovative projects
- Establish Partner Agreements for project pipeline
- Assemble Outstanding Team of Board, Management & Advisors
- Develop Laboratory facilities to support project & companies
- Seek Grant & Other Funding to catalyze projects
CET Components

• SBIR / STTR proposal assistance
  – Grant writing
  – R&D contribution

• Incubator – CET Life Sciences Center
CET SBIR/STTR Collaborations

- Vanderbilt
- UT-K
- UT-HSC
- Wash U
- Ole Miss
CET Incubator

- 14,000 sq ft.
- 6 current tenants
- 9 graduates
CET Outcomes

- 44 SBIR/STTR applications filed (Phase I&II)
- 9 awards received (~20% funding rate)
- Nearly $2M in awards received
- 4 applications in process (2 PI and 2 PII)
- 4 agreements in negotiation
CET Outcomes

• One product out-license to CPI and in Phase II clinical trials

• 3 products in late stage pre-clinical trials
  – One in formulation in preparation for PI clinical
Benefits to Vanderbilt & Other Partners

• Increased faculty engagement
• Increased support for research
• Increased investment in development
• Outlet for challenging technologies
  – In need of proof of concept or other development
• Modest job creation
THANK YOU

Alan Bentley
Alan.Bentley@Vanderbilt.edu
www.Vanderbilt.edu/CTTC