Pharma-Academia Collaborations: Avoiding the Random Walk

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Patent Award Ceremony
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Georgetown University
Great Science ≠ Commercial Success

Do we have new insights into unmet needs?

Are they “actionable”?
Reality: Stochastic >> Deterministic Success

• The Innovation market is not particularly efficient

• Selection of ideas is generally based on gut rather than formula

• In any case, development bandwidth is tiny

• You need to be successful, randomly!
The Cycle of Openness

Time (non-linear)

Commercial Enthusiasm for New Ideas

Human Genome Project
Targeted Therapy
CombiChem
SBDD
MAbs
Etc.

Immune Therapy for cancer
Gene Therapy
Bob’s huMAb Team disbanded
Multiple Failures
Costs Rising
siRNA

huMAbs
GF

Baby needs a new RO1

?? (Aptamers?)

Immune Therapy for cancer
Gene Therapy / Dx
Regen Med
siRNA, miRNA
Epigenetics
“Precocious Novelty”

“Antibodies aren’t Drugs & Never Will Be.”

Dr. William Duncan, Head, RWJ Pharmaceutical Research Inst, 1993

- >200 scientists & technicians laid off (I survived, thanks for asking)
- Closure & destruction of our $27M pilot plant
- A full decade delay in development of one of my drug candidates (Teplizumab)
- Set stage for $4.5B purchase of Centocor in 1999 (which worked out quite well)

When selling, customer perception IS reality!
The Main Task of an Innovator is to Explain:
Why is Your Product Special?
While Keeping This Balance:

Unique Details

IP Protection
Big Pharma’s Challenge: The Strategy Straight-Jacket
Exception:
The “Above the Fold WSJ Shunt”

Shiny, Pretty,
I Want it!

Senior Management
Therefore, PR Is Good!
(Especially if you held non-restricted EntreMed stock)

HOPE IN THE LAB: A special report.; A Cautious Awe Greets Drugs That Eradicate Tumors in Mice

By GINA KOLATA
Published: May 3, 1998

Within a year, if all goes well, the first cancer patient will be injected with two new drugs that can eradicate any type of cancer, with no obvious side effects and no drug resistance -- in mice.

Some cancer researchers say the drugs are the most exciting treatment that they have ever seen. But then they temper their enthusiasm with caution, noting that the history of cancer treatments is full of high expectations followed by dashed hopes when drugs with remarkable effects in animals are tested in people.

Still, the National Cancer Institute has made the drugs its top priority, said Dr. Richard D. Klausner, the director. Dr. Klausner called them "the single most exciting thing on the horizon" for the treatment of cancer.

"I am putting nothing on higher priority than getting this into clinical trials," Dr. Klausner said. The mouse studies are "remarkable and wonderful," he said, and "very compelling." But he pointed out that the studies were in mice and so, when it comes to humans, he said he wanted to emphasize "the if's."
Reality: “The Curious Case of Too Early IP”

Idea → “PoC” → License → Promotion of Champion

IP Burial Ground → Diligence Letter → 2 years or so... → Project Hibernation
Product Cycles
(Good for Tech, Bad for Pharm / Biotech)

- MainFrames: 700/700 & S/360 (IBM Late 60s)
- PC 5100: IBM 1975
- PC 5160: IBM 1983
- PC 3270: IBM 1985
- PC Convertible: IBM 1986
- PC Personal System/2: IBM 1994
- PC NetVista: IBM 2000
- PC ThinkCenter: IBM 2004
- PC ThinkPad: IBM 2005
- iPod Nano: Apple, 2005
- iPod Touch: Apple, 2007
- iPod Shuffle: Apple, 2007
- iPod: Apple, 2001
- iPhone(s): Apple, 2007
- iPAD(s): Apple, 2010

- Risperidone (Risperdal): J&J, 1993
- Paliperidone (Invega Sustena): J&J, 2009
Innovation Engineering
(but Medicine ≠ Engineering)

Pharma
“Design Lock”

Adapted from Central Office of Design

(From: Matt Jones, @dTblog, 2009)
True for 170 Years, Important to Remember Today

To whatever degree we might imagine our knowledge of the properties of the several ingredients of a living body to be extended and perfected, it is certain that no mere summing up of the separate actions of those elements will ever amount to the action of the living body itself.

John Stuart Mill (A System of Logic, Bk.III, Ch.6, §1)
c.1843
Pivot
There is a “U” in Tech Transfer
(But, this is a Team Sport!)

• It is your responsibility to know potential customers
  • What companies are at your scientific meetings?
  • Have you spoken with their scientists?

• Consider if your approach is clinically feasible / relevant
  • Acceptable dosing schedules & forms?
  • Recent big $ failure of a similar approach?
  • Protectable / infringing (OK, at least understand what this means)?

• By the way, Biomarkers / NP are often a tough sell
  • Does your data have any statistical significance?
  • Positive / negative predictive value?
  • Any hope of IP?

  • GU’s OTC has a great web site, check it out!
Know What Your Customer Buys
(TT can help!)

Big Pharma / Device

Walmart Supercentre

Specialty Pharma

Novel targets, lead series with CoM, Phase 2/3 clinical compounds with CoM
Reformulations, 505 B 2, use patents, smaller markets, combinations

Start-up

Everything else, quick to PoC, CE-mark, etc. preferred

As left, but also NCEs, Foundation-supported work targeting orphans

Specialty Pharma-Orphan
At Merck, we share your passion for developing breakthrough vaccines and medicines that advance human health. We are inspired by your discoveries and we want to work with you to bring your innovation from bench to bedside.

**Favorable Licensing Candidates**
We're interested in:
- Novel patented compounds
- Targets with proof of concept
- Molecules with a defined mechanism of action or testable hypothesis'
- Technologies with patent protection that provide a competitive advantage

**Late-stage Opportunities:** We will continue to pursue external licensing and partnership opportunities for differentiated products in all disease areas in late-stage development (Phase III-ready and later).

**Areas of Interest**
Roll over and click on icons for more information

[http://www.merck.com/licensing/areas-of-interest/home.html](http://www.merck.com/licensing/areas-of-interest/home.html)
Define Your “Lowest Commercializable Unit”
Critical!!!!!

Help Your Customer Understand The Pathway to Market

Define a “Quick & Actionable” Clinical Trial (or whatever development) Pathway
Pivot
Turns Out, Many Diseases have Shared Biology's Drug Candidate

> 10 years, $1B (“home run”)

Rapid Progressing Surrogate #1
Validation & Multiple New Markets (“base hits”: “a pipeline in a product”)
Rapid Progressing Surrogate #2

Major Unmet Need

Time
Chronic Kidney Disease: “Shared Biology’s”

**Diabetic Nephropathy (DN)**
- Autocrine / Paracrine expression of uPAR
- Activation of $\alpha V\beta 3$
- Podocyte “effacement”
- Proteinuria
- Podocyte apoptosis

**FSGS**
- Endocrine secretion of uPAR
- Activation of $\alpha V\beta 3$
- Podocyte “effacement”
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Kidney Failure
Chronic Kidney Disease: “Shared Biology’s”

Diabetic Nephropathy
Autocrine/Paracrine expression of uPAR
Activation of αβ3
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Kidney Failure

FSGS
Endocrine secretion of uPAR
Activation of αβ3
Podocyte “effacement”
Proteinuria
Podocyte apoptosis

“DIRTY”
“CLEAN”
DIRTY
(Diabetic Nephropathy)

Numerous co-morbidities
• Dislipidemias
• Hyperglycemia
• Clotting disorders
• Neuropathies
• Vasculopathies
• Often poly-pharmacy

BUT, the true model
• Accurately reflects “tolerability”
• Population variability
• Efficacy

CLEAN
(FSGS)

Limited co-morbidities
• Rapid read-out (proteinuria)
• Relatively healthy population
• Easy staging (eg. post-transplant)
• Accelerated approval process

BUT, a small direct market
• No drug interaction info
• No insight into tolerability
• No “proven” efficacy
Pivot
Silos of Excellence

Good for Grain

Bad for Science
“From Each According to His Abilities…”

Sanford-Burnham Medical Research Institute
HTS

Basic Research / Clinical Trials / BME

Vet School / ADME / Formulations
Pivot
Finally, I have Bad News & Good News:
Two Possible Futures
The Empire Strikes Back

Summary: **H.R.9 — 115th Congress (2015-2016)**
Innovation Act - (Sec. 3) Directs a party alleging ... relating to patents to include in the court pleadings, unless ...not reasonably accessible, specified details concerning:

- **each claim of each patent** allegedly infringed, including **each accused process, machine, manufacture, or composition** of matter alleged to infringe the claim; and yada, yada, yada.

- Basically, you need to know how many infringements can dance on the head of a pin.

- Further (and this gets nasty) Universities are non-practicing entities (AKA Trolls).

- Even better, if your spin-outs sues and loses, the University might be liable for costs.

- Brought to you by Google & Friends, and their associated lobbyists

- Yes, your University should be reaching out to lobby against this!
Return of The (Academic) Jedi

H.R.3116 - MODDERN Cures Act of 2013 (to be reintroduced)
113th Congress (2013-2014)
BILL
Cosponsors: 25

“...Establishes a dormant therapy designation for medicine that addresses unmet medical needs. Gives such medicine 15 years of data exclusivity under which no drug can be approved by relying on the approval or licensure of the dormant therapy...”

Translation: known compounds w/o patent protection can be commercialized!

Rational Drug Discovery: Based on Knowledge, not Novelty!

This bill needs your help, contact your Congressman!
Discussion?

fig. 1A
Why Not Me?
Why Not Me?
It’s Not Just About Great Science
Why Not Me?
It’s About Marketing & Execution