



Academic Partnerships

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Licensing & External Research
November 2012

Merck's Research Mission: Focus on Priority Disease Areas to Meet Unmet Medical Needs

Principles

- Commit resources to achieve research breadth and depth in priority disease areas
- Prioritize disease areas based on unmet medical need, scientific opportunity, and commercial opportunity
- Develop products that are highly valued by patients, payers, and physicians
- Sustain investment in innovation throughout product lifecycle
- Achieve scientific leadership in priority disease areas



Deliver best-in-class targeted and differentiated products

Merck Will Pursue Early Research-based Partnerships

- Because there is a high risk of failure in drug discovery, multiple programs are critical to increase overall probability of success
- Merck views the creation of alliances with both companies and academia worldwide as critical for continued success
 - Alliances at all stages of discovery and development complement our innovative and therapeutically diverse pipeline
 - Intense competition exists for high-quality, late-stage opportunities
 - Merck's strong internal research capabilities are an advantage when competing for early-stage partnerships

Merck Offers a Transparent and Straightforward Licensing Process

Opportunity Identification



**Opportunity Initiation
(Find and Select)**

Executing the Deal



**Doing the Deal
(Negotiate)**

Alliance Management



**Alliance Management
(Implement)**



High-value Relationships At All Stages Of R&D

Aton
ZOLINZA®

CSL
GARDASIL®

CHOP/Wistar Institute
ROTATEQ®

Schering-Plough
VYTORIN® / ZETIA®

AstraZeneca
INVANZ®

Yamanouchi / J&J
PEPCID®/PEPCID AC®/PEPCID COMPLETE®

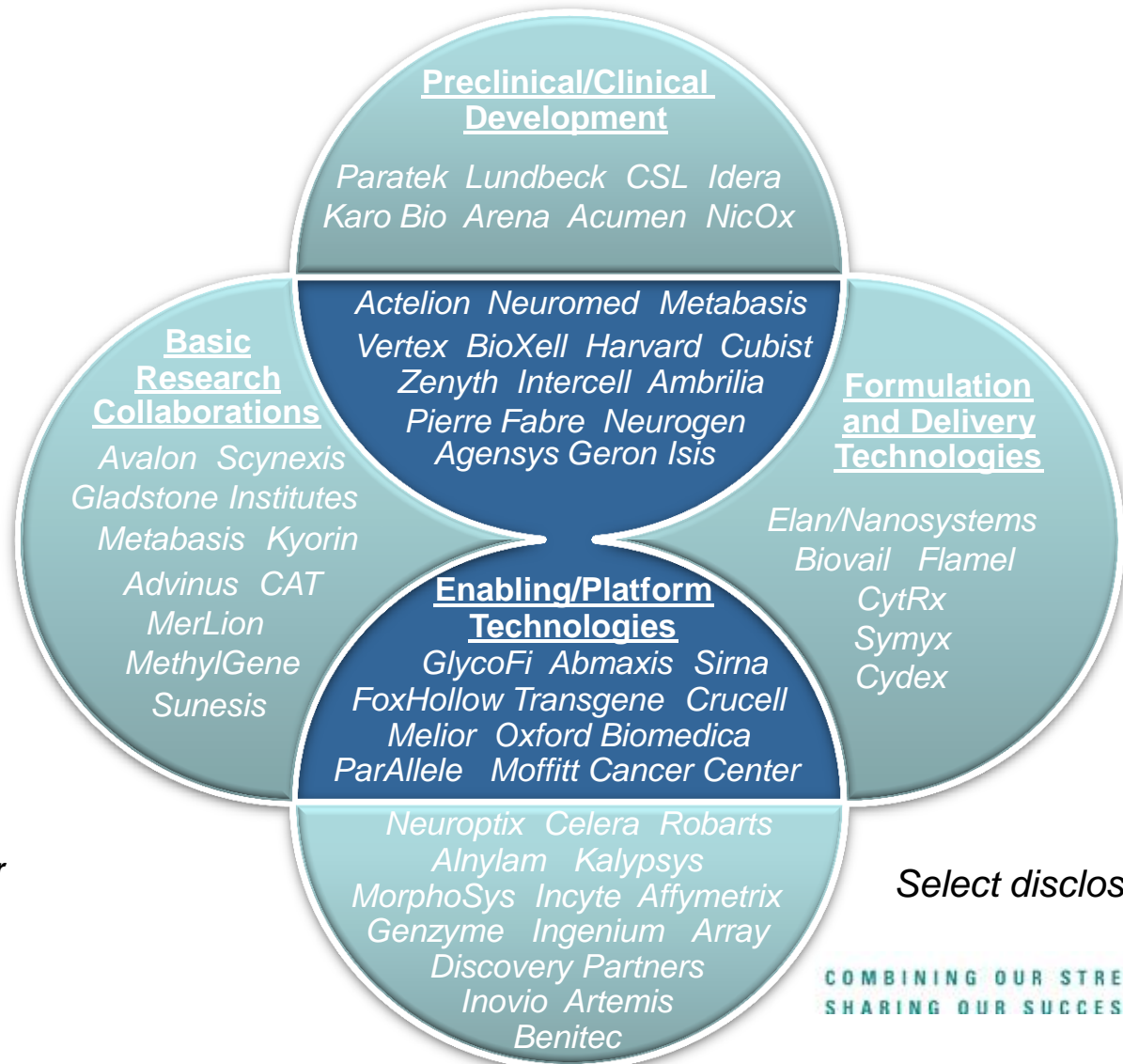
Dupont
COZAAR®/HYZAAR®

Gentili
FOSAMAX®

Kyorin
NOROXIN®

Osaka Univ. / Biken
VARIVAX® / ZOSTAVAX®

Biogen/Chiron/Genentech
U. Cal/U. Wash/Inst. Pasteur
Hep B Vaccine/COMVAX®



Select disclosed deals

Scientific Engagement is Key

Large Pharma needs Innovative Partners

- Novel research aligning with existing areas of focus
 - New disease areas or technologies

Large Pharma can offer Expertise & Experience

- Medical need – Requirements for differentiation
 - Scientific and technical know-how
 - Discovery, Translational, Preclinical
 - Clinical Research – Biomarkers, Outcomes
 - Manufacturing – chemicals, biologics, RNAi
- Global regulatory and reimbursement landscape
 - Competition and market realities

Sourcing and Delivering Innovation for Patients and Shareholders...

Many different ways to leverage our strengths with those of our colleagues (and competitors...)

- Licensing
- Research & Development Partnerships
- Academic Collaborations
- Pre-Competitive Collaborations
- Consortia
- Regional Commercial Deals
- Joint Ventures
- M&A
- Venture Capital Funds

Appealing features of Academic Collaborations



- New targets from academic basic research
- Platform technologies
- Expert insights and consultation
- ‘Ear to the track’ for new opportunities
- Shift academic culture’s ‘center of gravity’ toward translational research
- Promote understanding of the challenges of discovering and developing innovative drugs for unmet medical needs
- Career opportunities/recruitment for trainees

MSD Welcomes Academic Partnerships!

Of the Top 20 Large Pharma/Academic Deals of 2012 highlighted by *Fierce Biotech*, MSD was partnered in four -- the most active large Pharma

- ~30% of the highly significant licensing deals that MSD signed in 2011 were with Academic Institutions
 - MSD is mindful of the university's mission and obligations
 - We will not try to 'force-fit' a structure that conflicts with university policy
 - Open to exploring additional vehicles for "exceptional opportunities"

Academia and Large Pharma Partner to Put New Drugs on the Market

- Pfizer: “Center for Therapeutic Innovation” hubs in Boston, New York City, San Francisco, and San Diego
- GlaxoSmithKline: Academic Discovery Performance Unit works specifically with academics on a portfolio of novel targets
- Eli Lilly: Global 'Innovation Starts Here' Initiative to Foster Innovation and Quality that will focus on collaboration with academic researchers
- Merck: Key Partner for Calibr... A "ReCalibration" of Academic/Pharma Partnering

Academic Institutions - Areas of Particular Interest for Licensing and/or Collaboration

- Novel Targets with strong rationale
- Platform Technologies for Biologics/Vaccines
- In-vivo Models
- siRNA delivery technologies
- Biomarkers / Imaging Technologies
- Translational Research Capabilities
- Sponsored Research in Merck's high-priority areas

Tips for contacting Merck with opportunities

- Understand Merck's strategy and needs
- Provide a clear, concise non-confidential scientific data package for review
- Highlight the advantages of your offering and provide a perspective on its value within the competitive landscape
- Merck's review process is centralized and includes review by the appropriate experts from basic biology, chemistry, preclinical, clinical, marketing and patent

Merck provides a formal review and response for every opportunity

Merck's Areas of Interest – on the web!

www.merck.com/licensing

Merck Licensing - Areas of Interest Page 1 of 2

Where patients come first **MERCK** Patents & Congress | Healthcare Professionals | Worldwide

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Areas of Interest
Our Process
Alliance Management
Submit Your Discovery
News & Events

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YOU'VE DISCOVERED SOMETHING SIGNIFICANT

At Merck, we share your passion for developing novel, breakthrough products. You've discovered something significant, and we are inspired by your innovation. Our philosophy is to bring medical excellence to patients through first-in-class/best-in-class products for unmet medical needs.

We are asking partners for:

- New Chemical Entities (NCEs) and New Molecular Entities (NMEs) as product candidates for development.
- Basic research collaborations
- Technologies that will enhance the productivity of our research laboratories

What we are looking for in a licensing candidate:

We welcome viable compounds in development, targets with proof of concept, molecules with a defined mechanism of action (or a testable hypothesis), and technologies that provide a competitive advantage. We are most interested in compounds that have large market potential for unmet medical needs, and that can be developed rapidly. An attractive compound would have selectivity, potency, a demonstrated mechanism of action, preliminary toxicology data, oral availability, and a good half-life for once-daily administration. We also look for strong intellectual property protection on the target and the molecule.

What we are looking for in a proposal:

When contacting us about your discovery, we ask that you provide a clear, concise, nonconfidential data package for review, and that you highlight the advantages of your discovery and provide a perspective on its value within the competitive landscape. In preparing the package, it may be helpful to consider that our review process is centralized and includes review by the appropriate experts from basic biology, chemistry, preclinical, clinical, marketing, and patent.

We look forward to hearing from you about your discovery. Together we can translate cutting-edge science into breakthrough medicines.

[To learn about our Areas of Interest, click here.](#)
(PDF 329KB)

[Enter Friends Pass](#)

January 2008

EMBRACING PARTNERSHIPS

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REGIONAL SCOUTS

A list of our regional scouts and contact information [or click here.](#)

SUBMIT YOUR DISCOVERY

We are serious about our commitment to strategic alliances. Our goal is to work together with our partners to remain in the forefront of turning scientific breakthroughs into medicines that make a difference.

[Submit your discovery.](#)

SIRNA THERAPEUTICS


Sirna Therapeutics, a wholly owned subsidiary of Merck & Co., Inc., is realizing the potential of RNAi as a completely novel approach to drug discovery and development that may ultimately lead to an entirely new class of therapeutic products to treat human diseases.

[Visit www.sirna.com.](#)


WHAT OUR PARTNERS ARE SAYING

"We are proud to have established this collaboration with Merck because their researchers have helped to define the therapeutic potential of targeting mGluR4 to treat Parkinson's disease. This is another important validation of our leadership in allosteric modulation."

— Vincent Muddi, CEO of Adonis



COMBINING OUR STRENGTHS
SHARING OUR SUCCESSSES



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COMBINING OUR STRENGTHS
SHARING OUR SUCCESSSES

Recent Platform Acquisitions

- RNAi could significantly change the way we go about discovering and developing drugs, and could become a new way to treat patients with unmet medical needs
- GlycoFi, Inc.: Novel, yeast-based proprietary protein optimization technology



- Abmaxis, Inc.: Leader in Discovery and Optimization of Monoclonal Antibodies

- Break-through antibody engineering technology platform
 - AISIM™: Abmaxis in-silico Immunization



Gladstone Institute – Innovative Therapies for Alzheimer’s Disease

- Major collaboration with Dr. Robert Mahley of the J. David Gladstone Institute to develop drugs directed to the ApoE pathway
- Apolipoprotein E4 has been linked to a variety of neurodegenerative diseases including Alzheimer’s
 - ApoE4 expression is a major risk factor for developing AD
 - Blocking ApoE4-induced neuronal damage may lead to disease modification strategies
- Merck and Gladstone will conduct a joint research program to discover modulators of ApoE4 function. Gladstone will receive milestone payments and product-based royalties.



Moffitt Collaboration: Personalized Medicine to Treat Cancer

- Innovative collaboration to improve cancer prevention and treatment by linking molecular technology and rich clinical data to enhance the ability to diagnose and treat patients, and to discover and develop new targeted therapies
- By studying and comparing patients' responses to specific treatments, scientists hope to learn which drugs work best in different patients, enabling them to individualize treatment for patients with various types of cancer
- Involves partnership between patients, community providers, industry and government to personalize and improve cancer care
- Through public-private partnerships like this one, Merck is pursuing rapid advancements in discovery, translation and delivery of new personalized therapies for cancer and other diseases



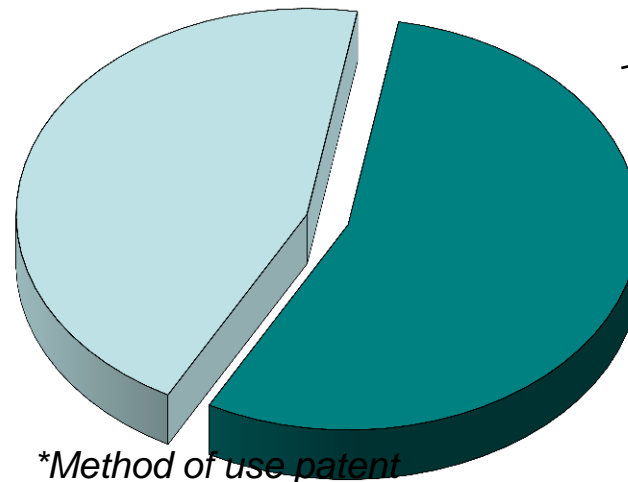
Guiding Principles for External Alliances

- **No floor or ceiling for number of licensed programs and projects**
- **Equal incentives for licensed programs and internal programs**
- **Transactions in all stages of research, development**
- **Flexibility in deal structures**
- **Speed in deal making**
- **Creation of value for each partner**
- **Leverage strengths of each partner**
- **Long-term thinking**

Partnerships are Key to our Success

Approximately 55% of MSD's 2011 human health revenue is attributable to alliance products and patents

- **JANUVIA / JANUMET***
 - **REMICADE**
- **ZETIA / VYTORIN**
- **COZAAR / HYZAAR**
 - **GARDASIL**
 - **TEMODAR**
 - **FOSAMAX**



**Licensed Products
or Patents:
55% of revenue**

Revenue includes 50% of full year JV revenue (Sanofi-Pasteur MSD and J&J/Merck)

Recent Licensing and Business Development Deals Strengthen Franchises, Technologies and Commercial Areas



Biologics

Ambrx
Hanwha
Zymeworks

Merck completed 52 significant transactions in 2011 with biotech, academic and pharma partners dedicated to improving human health.



Cardiovascular

Fuwai Hospital
Numerate
Theravance



Neurosciences & Ophthalmology

Ablynx
Inspire



Vaccines

NanoBio
Serum Institute
Vaxxas



Diabetes & Endocrinology

Ezose
Mochida
Univ of Copenhagen



Oncology

Abbott
BeiGene
Endocyte
Roche Diagnostics



Technologies

Beijing Genomics
Bend Research
Delphi
EnWave



Infectious Diseases

Chimerix
Roche
UNC, Chapel Hill
UC San Francisco
Yamasa



Respiratory & Immunology

Exelixis
Lycera



Emerging Markets

Sun Pharma
Sincere
Supera Farma



MERCK & CO. INC.

Whitehouse Station, N.J., U.S.A.

COMBINING OUR STRENGTHS
SHARING OUR SUCCESSSES

California Institute for Biomedical Research

Calibr is a new independent, not-for-profit organization established to accelerate the translation of basic biomedical research to innovative new medicines to treat disease.

- Calibr is led by Peter G. Schultz, Ph.D., a world-renowned chemist, biotechnology entrepreneur and professor of chemistry at The Scripps Research Institute in San Diego.
- Mission is to shorten timelines from academic discovery to commercial development, facilitate collaborations with academic partners, leverage the expertise/resources of academic labs.
- In addition to MSD funding there will be financial support from federal, foundation and philanthropic funding.

Calibr- Distinct from other Pharma forays into Academic Space



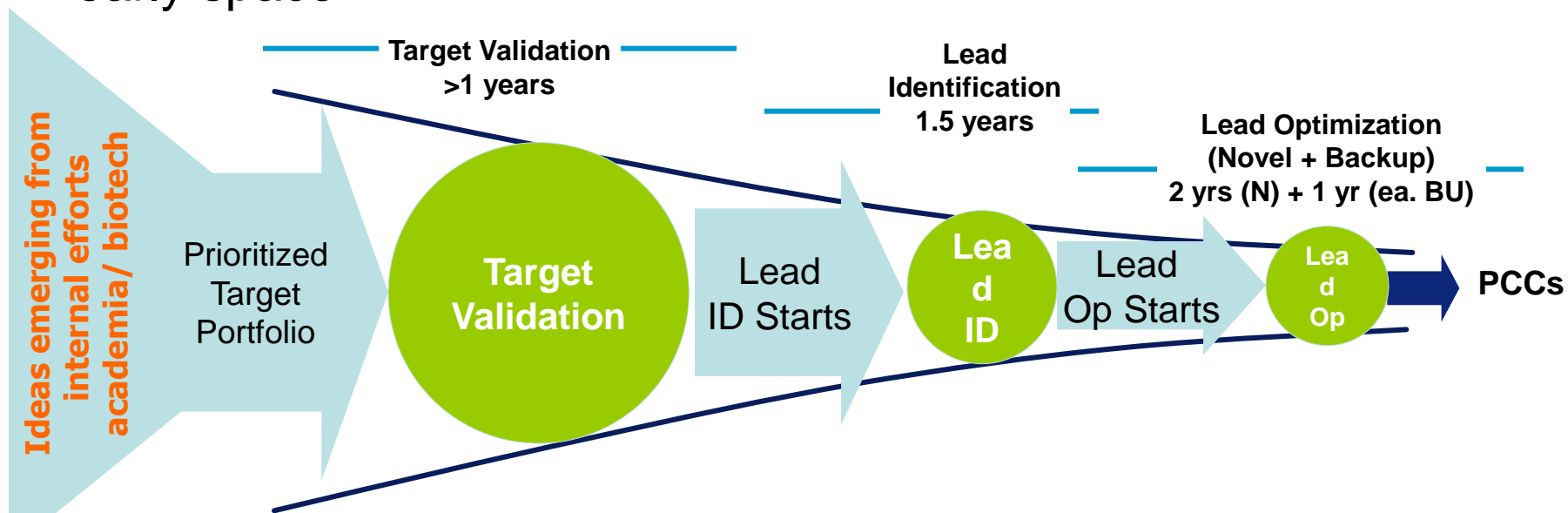
- Sourcing innovation is not geographically restricted
 - Recruit ideas from anywhere
- Attractive to entrepreneurs
 - Provides access to HTS/MedChem
 - Supports and advances basic/preclinical projects
 - An alternative to VC funding
- Operationally efficient
 - Predefined work plans
 - Projects will advance or spin-out and not remain beyond animal POC
 - Both the Institute and entrepreneurs are focused on drug discovery
 - Advancing ‘projects’, not ‘newcos’
 - Experienced, in-house staff

External Research Initiative

MSD's need for Early Space and Academic Collaborations: MINT (Merck/MSD Initiative for New Targets)

- Inadequate number of projects in the target validation space from internal target discovery initiatives and external ideas
 - Industry wide problem
- Clear need to better leverage academic science in the early space

Disease Area Prioritization



You've discovered something significant.
Now discover us!



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Pick “Best-in-Class” over “First-in-Class”

- ▶ Innovation can come in two forms:
 1. First-in-class is expensive and time consuming. Progress is episodic and the path is tortuous.
 2. "Best in class" (or "best for a particular market") improvements can be rapid and systematic - an engineering paradigm.
- ▶ India could position itself as the best-in-class Center of Excellence. Partner with innovator companies to fast-track projects designed to 'best' molecules which first show clinical POC.
- ▶ Use all of the IT/modeling, traditional MedChem, delivery and formulation expertise of India.

Fostering Innovative R&D in India



Question:

How do we accelerate growth in innovative R&D in India?

A few thoughts to consider:

- Innovate innovation – build on India’s unique strengths *and weaknesses* to revolutionize pharma’s R&D efforts
- Fund the phenomenon – provide financial resources to fund novel programs and collaborations
- Choose Best-in-Class over First-in-Class – Build on strengths to provide “better” medicines to patients around the world