

# Global Perspective on Biotech Innovation

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# What is BIO

- World's Largest Biotechnology Organization
  - About 1000 members, from start ups to large MNCs
  - **Most** are small companies
  - Members from 35 countries
  - Host BIO International Convention annually – c. 16,000 participants. June 19-22, San Diego
- Covers all three sectors or biotech: Biopharma, Agriculture, industrial/environmental. Common elements:
  - All three use same technologies
  - All involved in addressing some of the most important issues confronting mankind

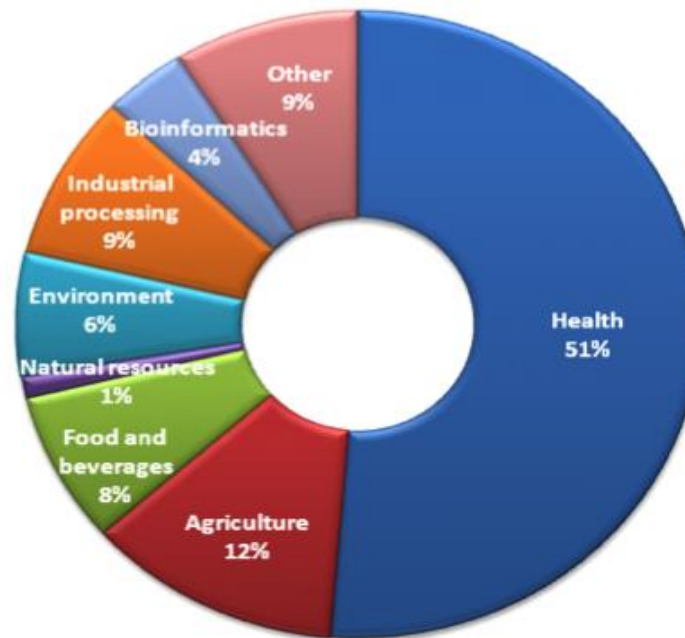
# BIO's Mission

## ■ **Serve as Voice of Global Innovative Biotech Sector**

- Advance the use of biotechnology to solve world's most pressing problems: Health, Hunger, Sustainable Environment
- Define and advance policies best practices that promote global biotech innovation (regulatory, IP, financial)
- Promote partnerships among parties engaged in biotech research and commercialization (the biotech "ecosystem")

# Compositon of Biotech by # of Firms

**Percentage of Biotechnology Firms by Application**

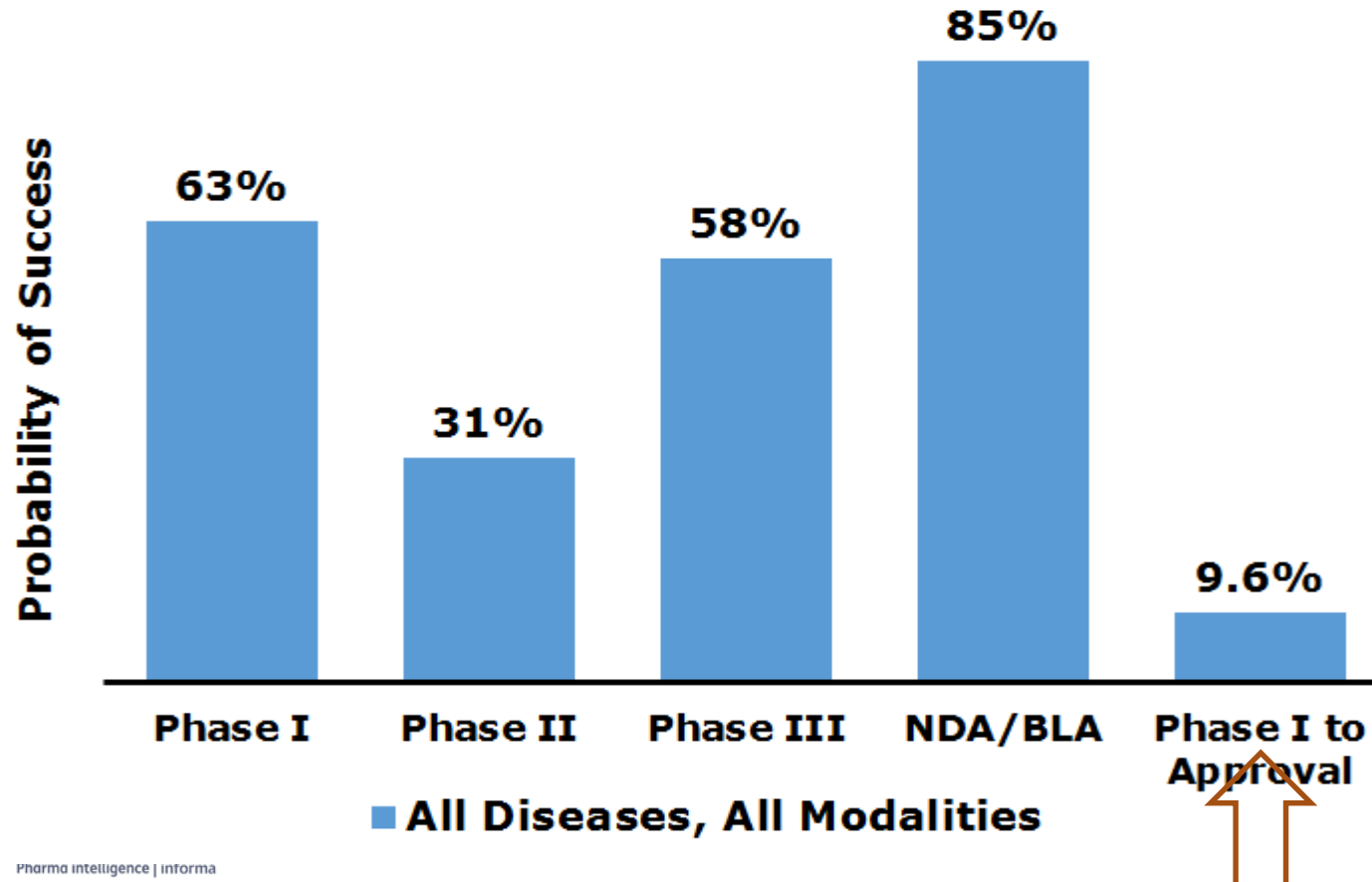


# Promise of Biotech in Human Health Sector: What's in the Pipeline?

Selected Diseases	Medicines in Development*
Cancers	1,813
Cardiovascular disorders	599
Diabetes	475
HIV/AIDS	159
Immunological disorders	1,120
Infectious diseases	1,256
Mental health disorders	511
Neurological disorders	1,329

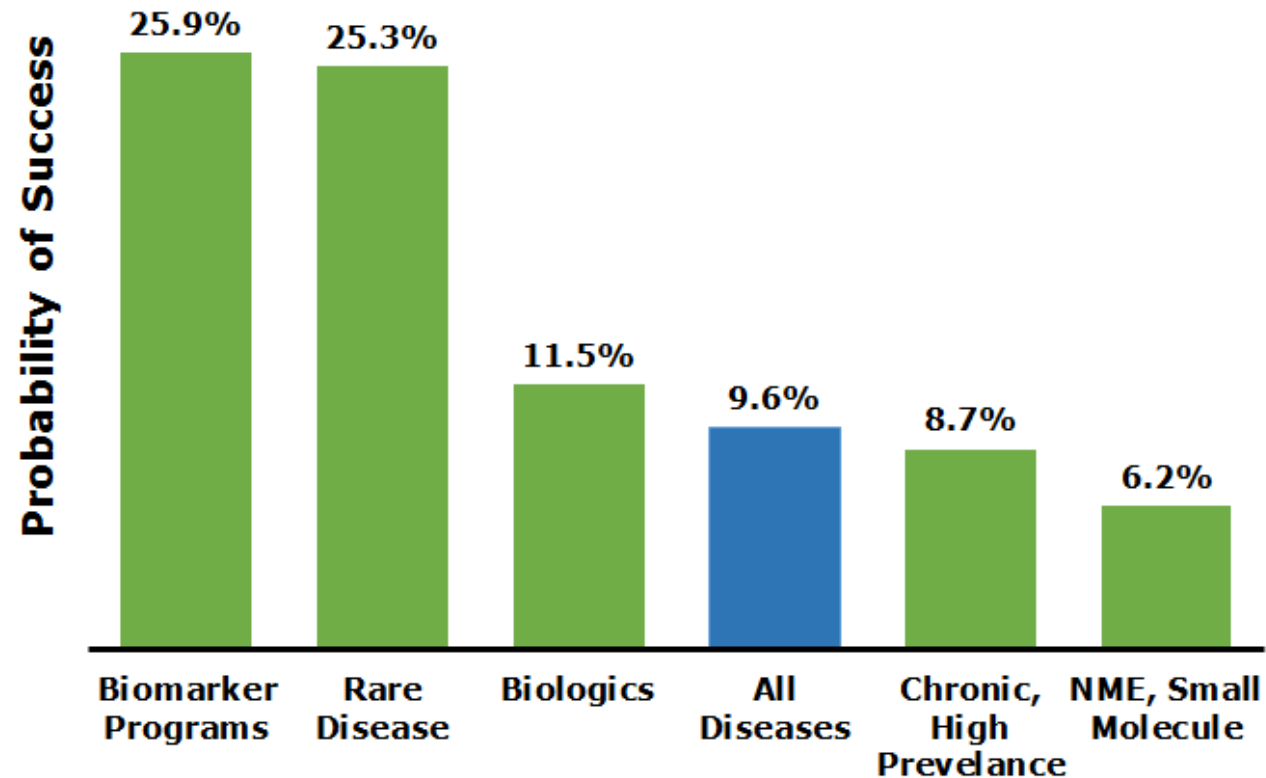
Adis R&D Insight Database. Accessed March 2016.

# Riskiness of Research A Fact of Life

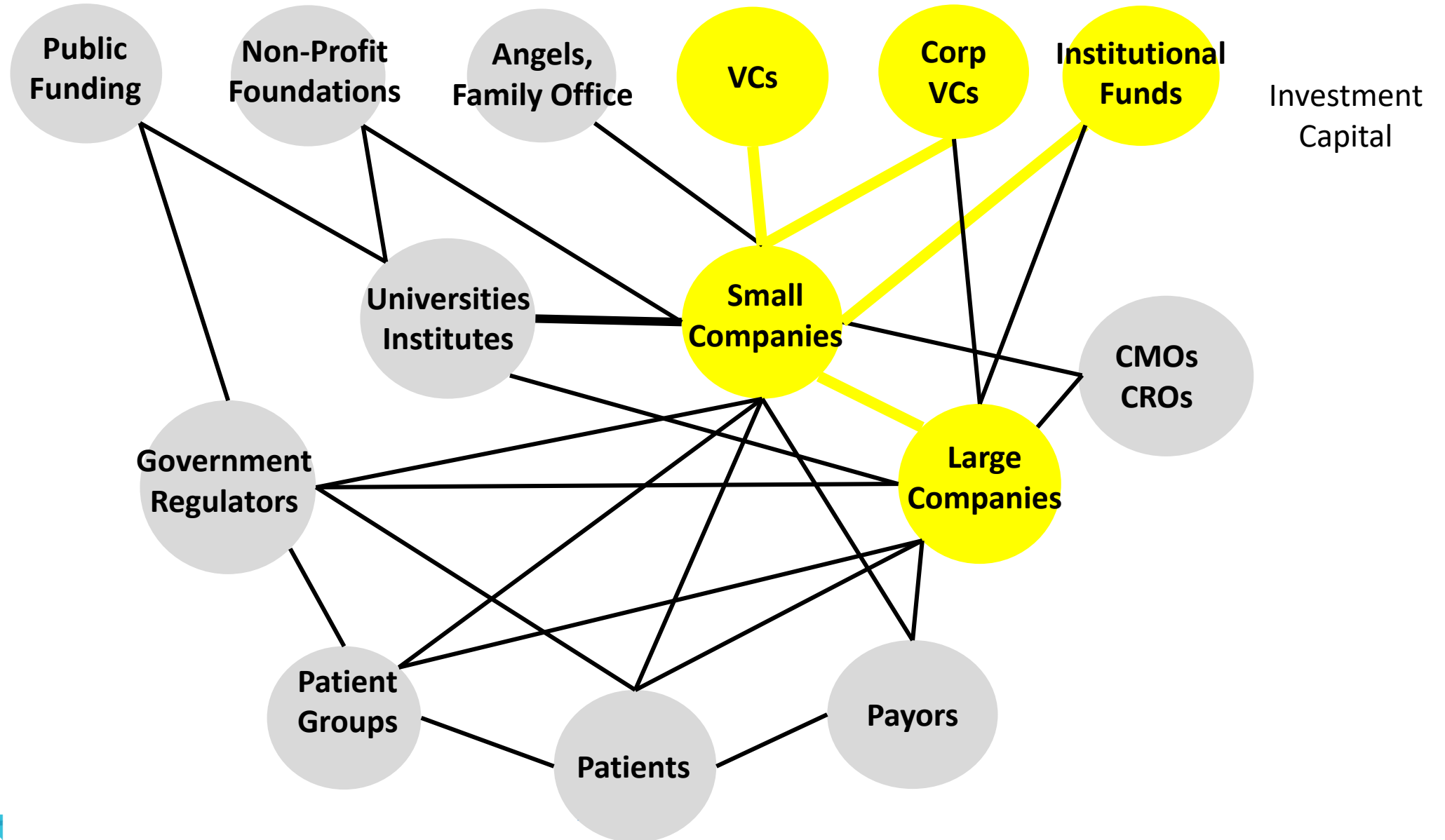


# But: success likelier using newer Technology

## Likelihood of Approval from Phase I



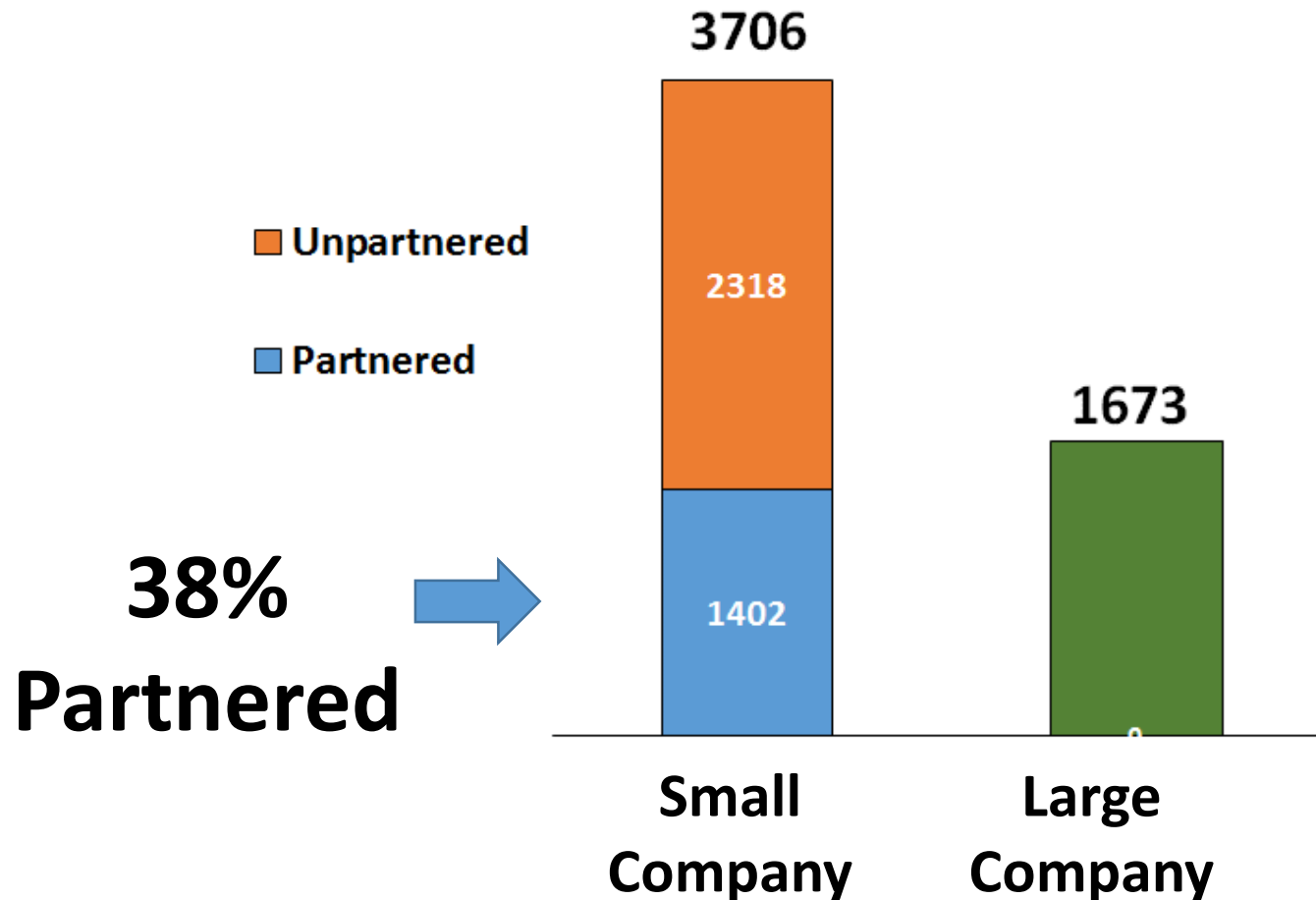
# Result of Risk: BioPharma Ecosystem



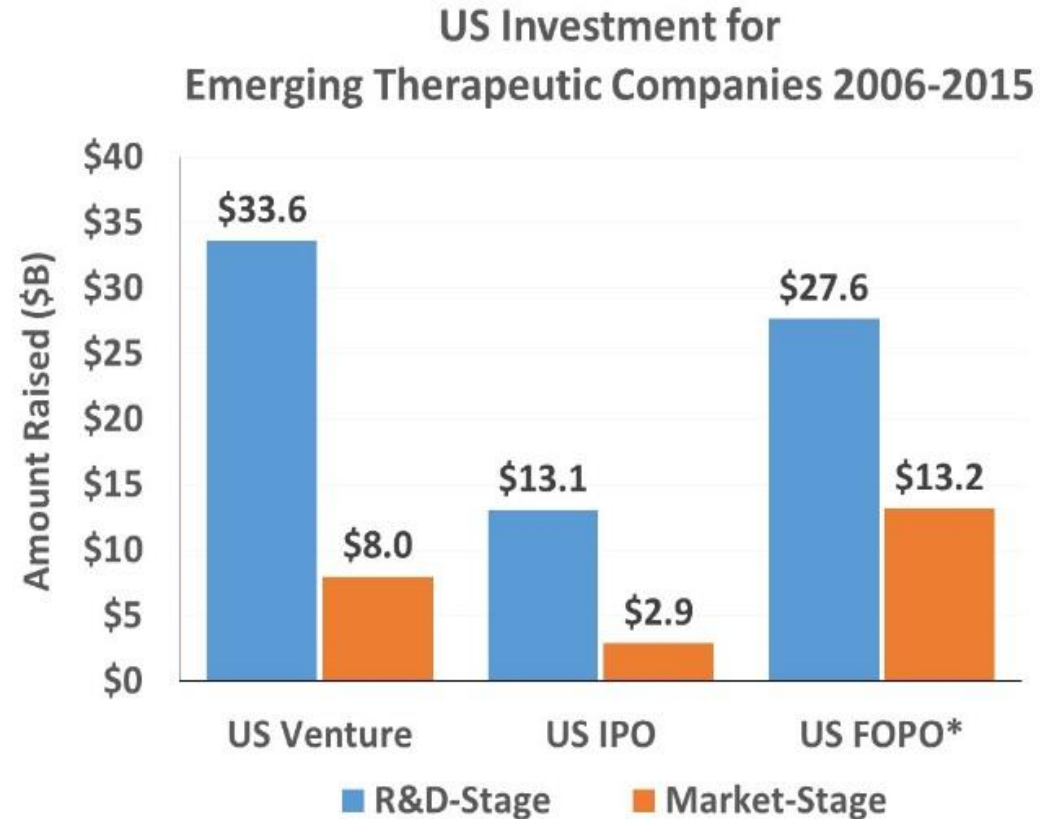


# Global BioPharma Pipeline

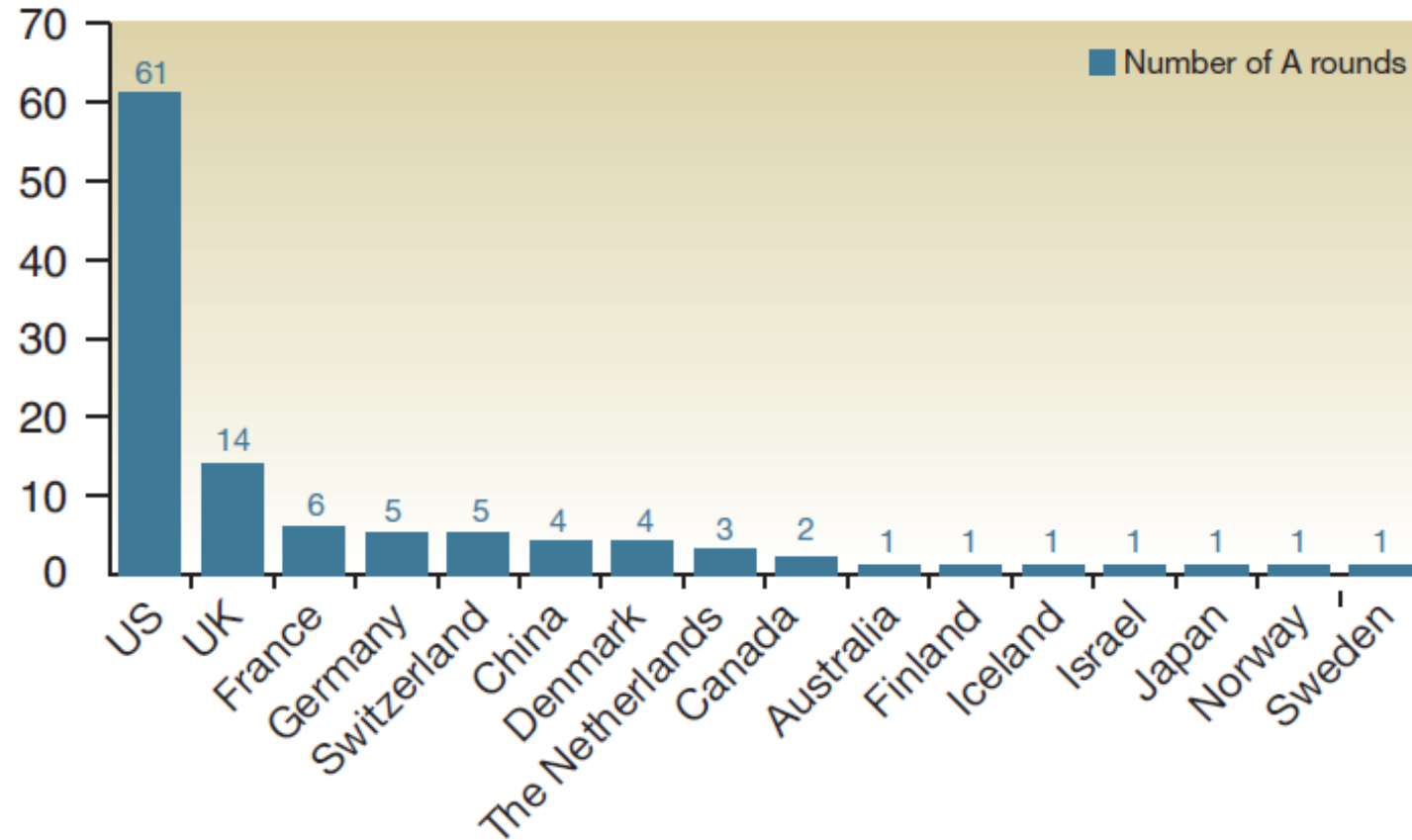
- 5,393 clinical programs
- 70% from small companies



# US Investment into Biotech 2006-2015



# # of Series A Venture Capital Backed Companies

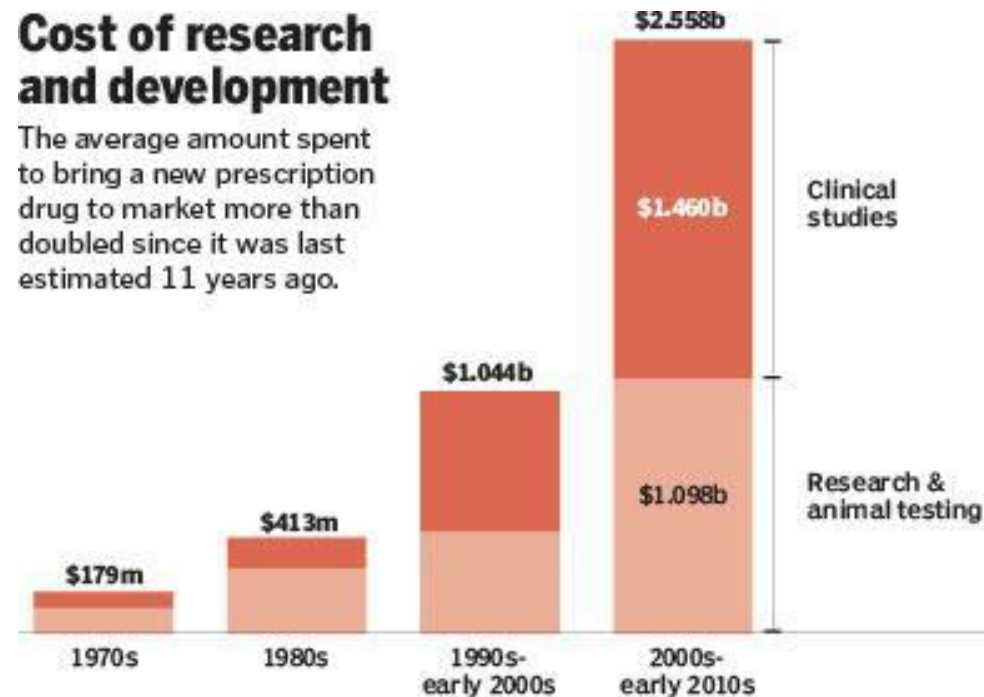


**Figure 1** Number of startups by country in 2014. Source: BCIQ: BioCentury Online Intelligence.

# Cost of Innovation

## Cost of research and development

The average amount spent to bring a new prescription drug to market more than doubled since it was last estimated 11 years ago.



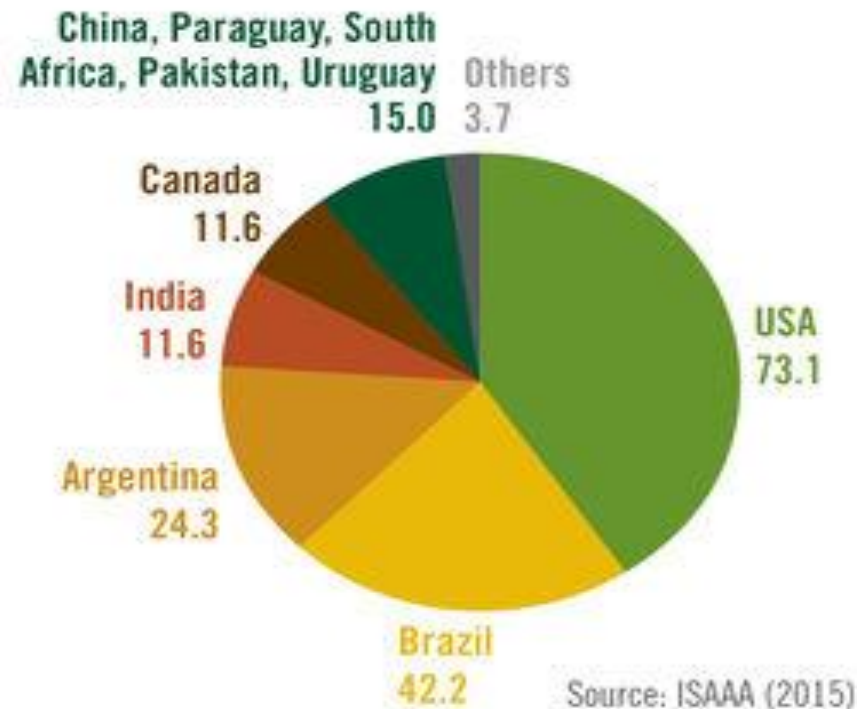
NOTE: All figures are inflation adjusted to 2013 dollars

SOURCE: Tufts Center for the Study of Drug Development

DAVID BUTLER/GLOBE STAFF

# Agricultural Biotech: Global View

## Global area of genetically modified crops



# Global Trends in Biotech Sector

- ❖ Increase in collaboration: to pool R&D capability, address risk
  - Result: Emergence of a “global ecosystem” – see it at BIO Convention
- ❖ Barriers between biotech sectors breaking down: more cross sectoral companies and countries
- ❖ New tech: gene editing, CRISPR – will further break down barriers between sectors, and spread applications. Relatively inexpensive and easy to use
- ❖ Governments globally putting together plans to get into game (e.g., China)
- ❑ **Implication for Colombia: Greater coordination, transversal strategy and nature of new business will require more global networking**

# Building a competitive biotech sector: A global race

- Building strong biotech/biomedical sector = strategic priority for many economies. Many have created a blueprint for biotech innovation



Studies have been done on success factors. Some broad Recommendations for Colombia

# Case study: Spanish Biotech Sector

- ❖ “Align scientific, technological, business and political expectations in order for humankind to benefit from advances of R&D” – Cristina Garmendia, former Minister of Science
- ❖ Sanifit (recently received 40 million euros in Series C Venture capital financing) started off as a university spin-off
- ❖ Ysios Capital (largest VC in Spain) – Barcelona is a hub because it has “top business schools, entrepreneurship, top hospitals...”
- ❖ Correlation between patents and R&D investment from national and international investors
- ❖ CNB (National Biotechnology Center): two major goals:
  - ❖ Top quality research
  - ❖ Entrepreneurship/technology transfer/spinoffs



# Colombia

## ❖ Potential:

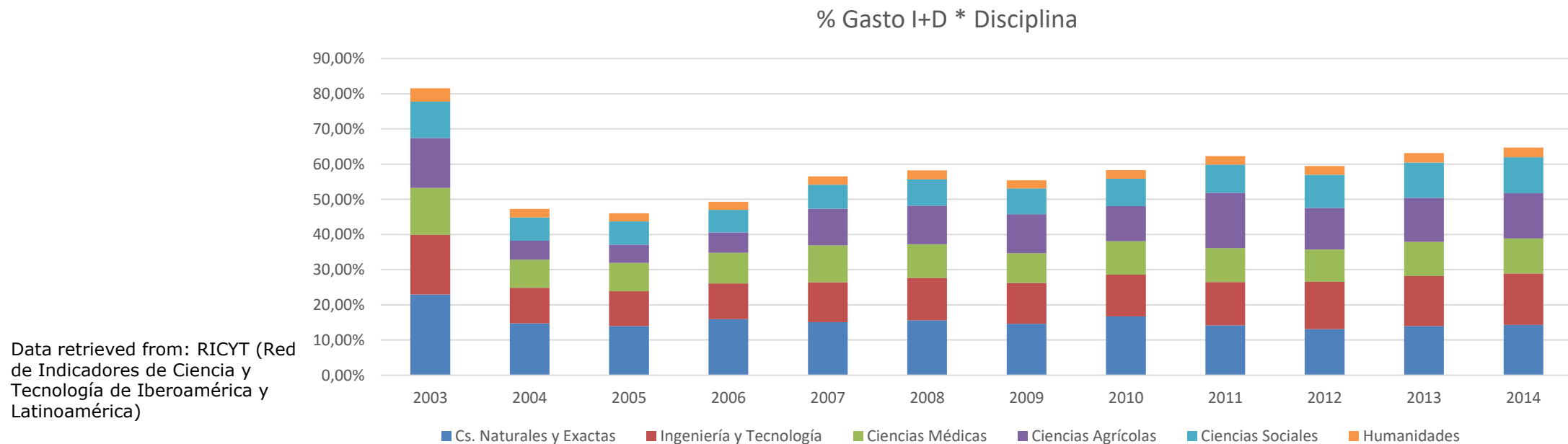
- 1) hosts 10% of the living species known in the 0.7% of the surface of the earth
- 2) policy frameworks for bio commerce (National Program for Sustainable Bio-Commerce 2014-2024) and biotechnology (CONPES 3697) that affirm the strategic nature of the sector
- 3) Increasing growth and population (food security, healthcare, sustainable use of biodiversity, market productivity)

## ❖ Challenges:

- Score better in biotechnology innovation drivers: human capital, R&D infrastructures, IP rights environment, regulatory stability, technology transfer frameworks.
- Assessment of the outcomes: academic publications, cross-sectoral coordination (enterprises, researchers and state), workforce, science and technology expenditure per capita.
- Giving biotechnology a higher weight in the science, technology and innovation policy frameworks
- Map the potential of commercial development of biotech through the economic complexity tools

# Colombia

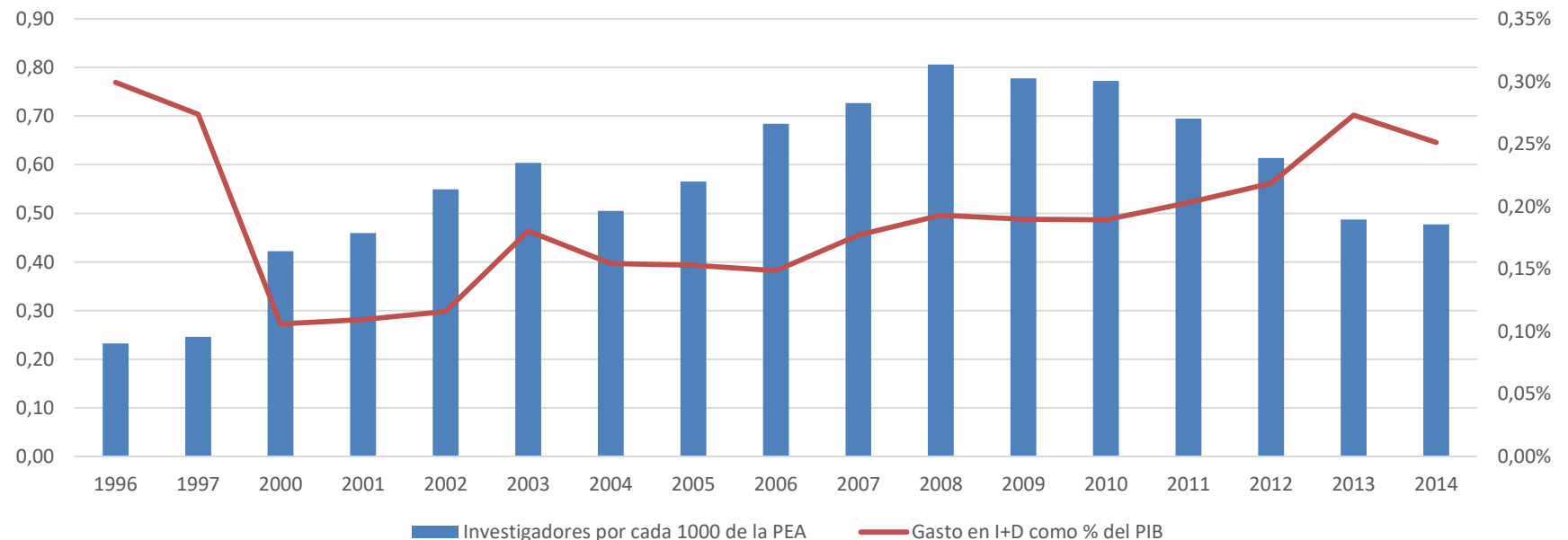
- ❖ Biotechnology commercial development requires high levels of innovation in complementary fields like medicine, biology and agricultural sciences. (It remains barely equal disregarding the implementation of the policy frameworks (2011 and 2014, and after the creation of the Fund for STI)



# Colombia

- ❖ Colombia needs to improve its STI human and infrastructure resources, and increase its % of GDP R&D expenditure.
- ❖ Only the 2% of research groups dedicates to biotechnology, and from 2003 to 2012 only 14 accepted patents out of 42 requests.

Investigadores por cada 1000 de la PEA y gasto en I+D como % del PIB



Data retrieved from: RICYT (Red de Indicadores de Ciencia y Tecnología de Iberoamérica y Latinoamérica)

# Broad Policy Recommendations

- ❖ Develop a national multisector biotech development plan: “All of Government” approach critical
- ❖ Encourage entrepreneurship and technology transfer
- ❖ Strategy should have an outward, global (as opposed to inward looking) perspective. Need to be positioned for global competition and collaboration
- ❖ Need state of the art regulatory regime – adopt global best practices
- ❖ Ensure enforceable IP rights, following global best practices. Without it, investment (venture capital, private equity) will be a challenge
- ❖ Adopt public communications campaign to build understanding of the new technology and its promise. Fight ignorance and fear.

# Gracias

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