

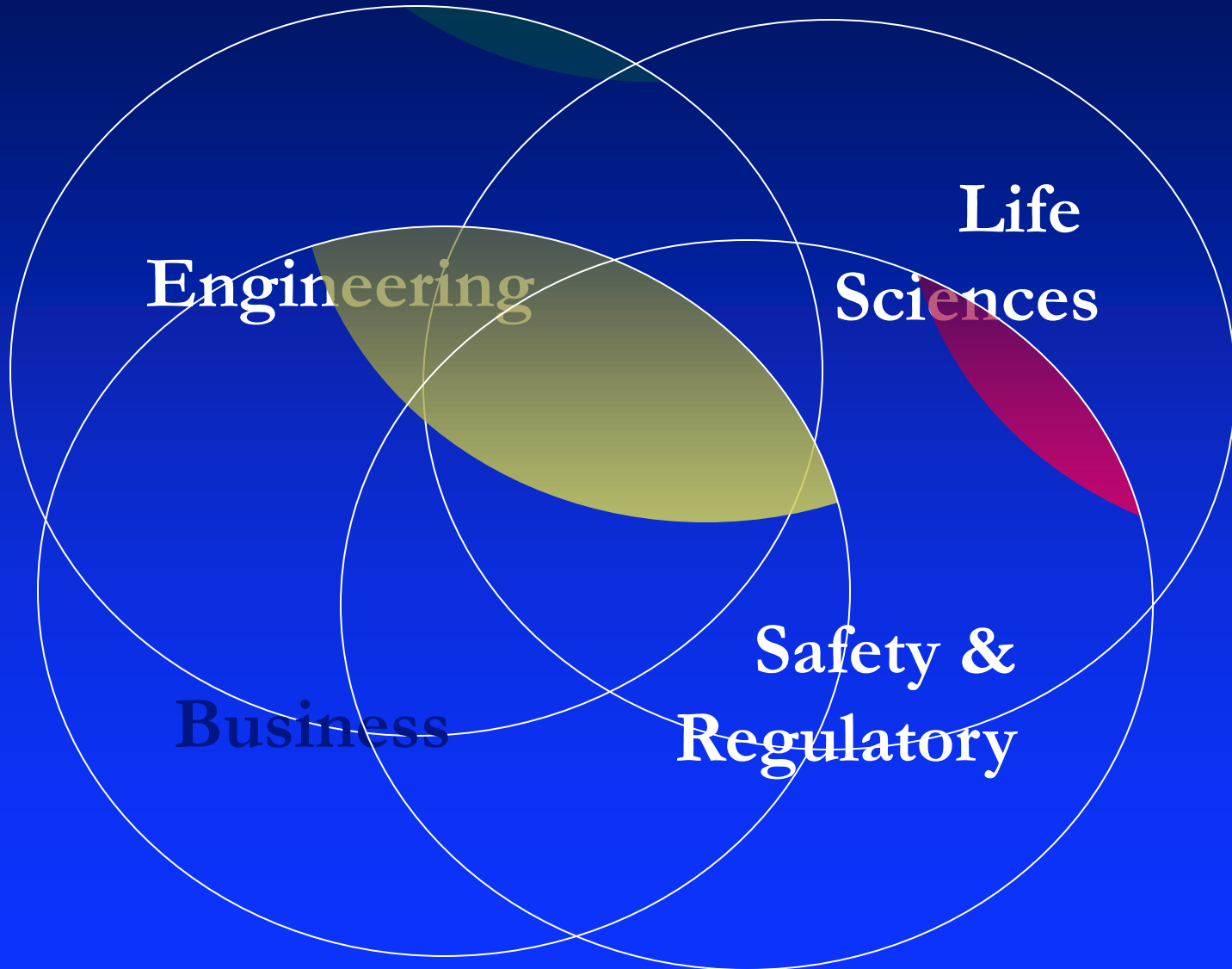
# **Nanomedicine and NanoDiagnostics: Innovation, Regulation, and Investment**

**Mostafa Analoui, PhD**

**Head of Healthcare and Life Sciences  
The Livingston Group, New York, NY**

**Nano-Manufacturing Summit 2011, and the  
10th Annual NanoBusiness Conference  
Boston, MA  
September 26, 2011**

# Nanobiotechnology: Domain of Challenges



# Nano Investment: From Excitement to Reality



**Before 1990s**



**1990-2000**

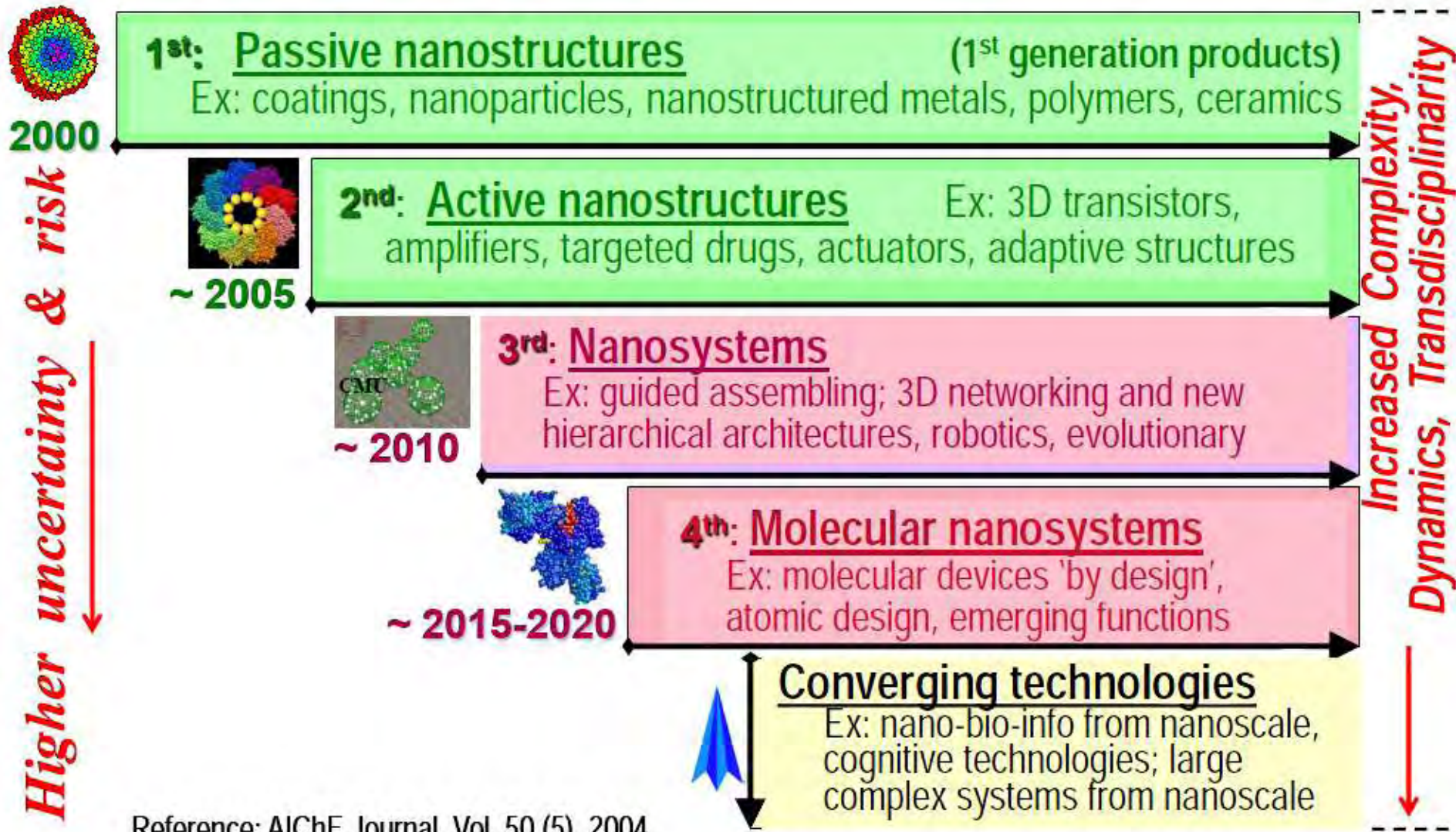


**2000-2010**



**2010-2020**

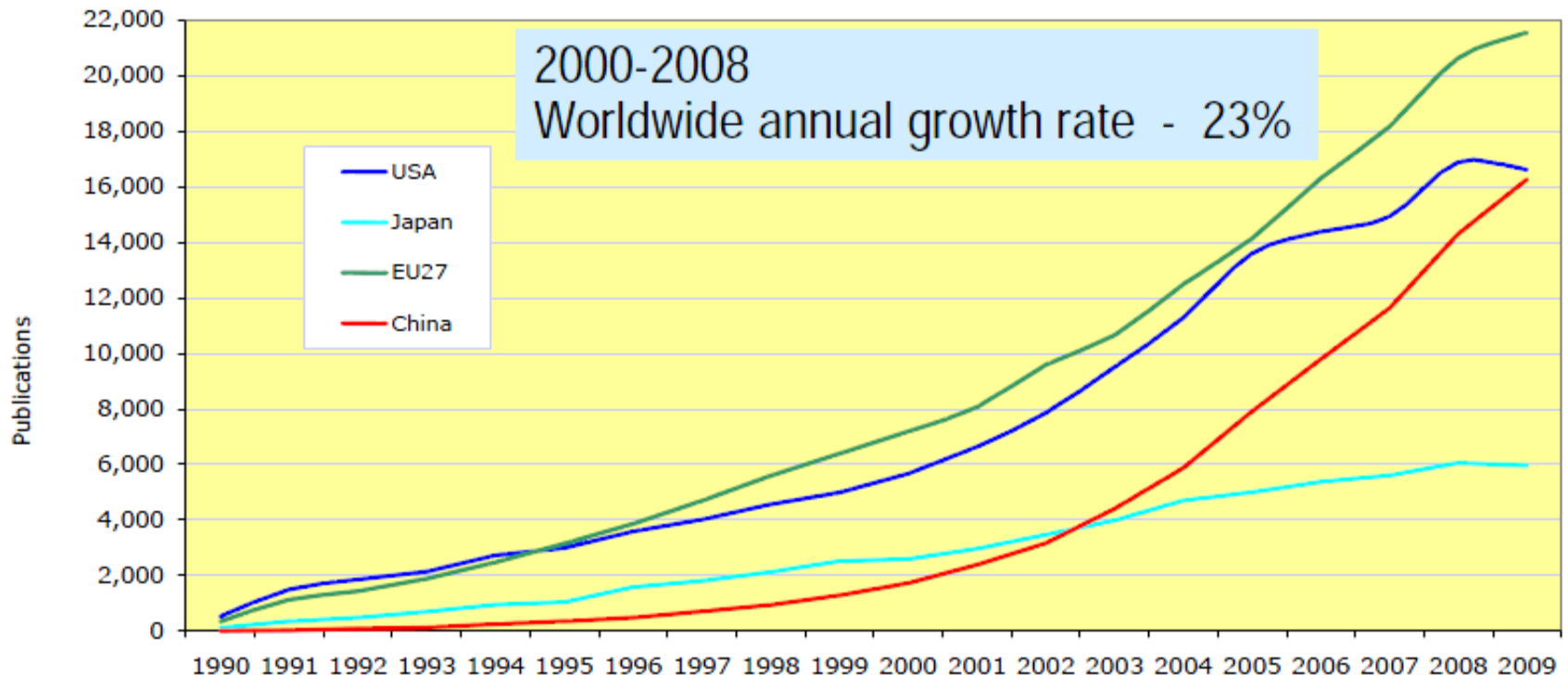
# Future is not the way it used to be\*



# Publication Race: Quality Matters

## Nanotechnology publications in the Science Citation Index (SCI) 1990 - 2009

*Data was generated from online search in Web of Science using "Title-abstract" search in SCI database for nanotechnology by keywords (Chen, Dang and Roco, 2010)*

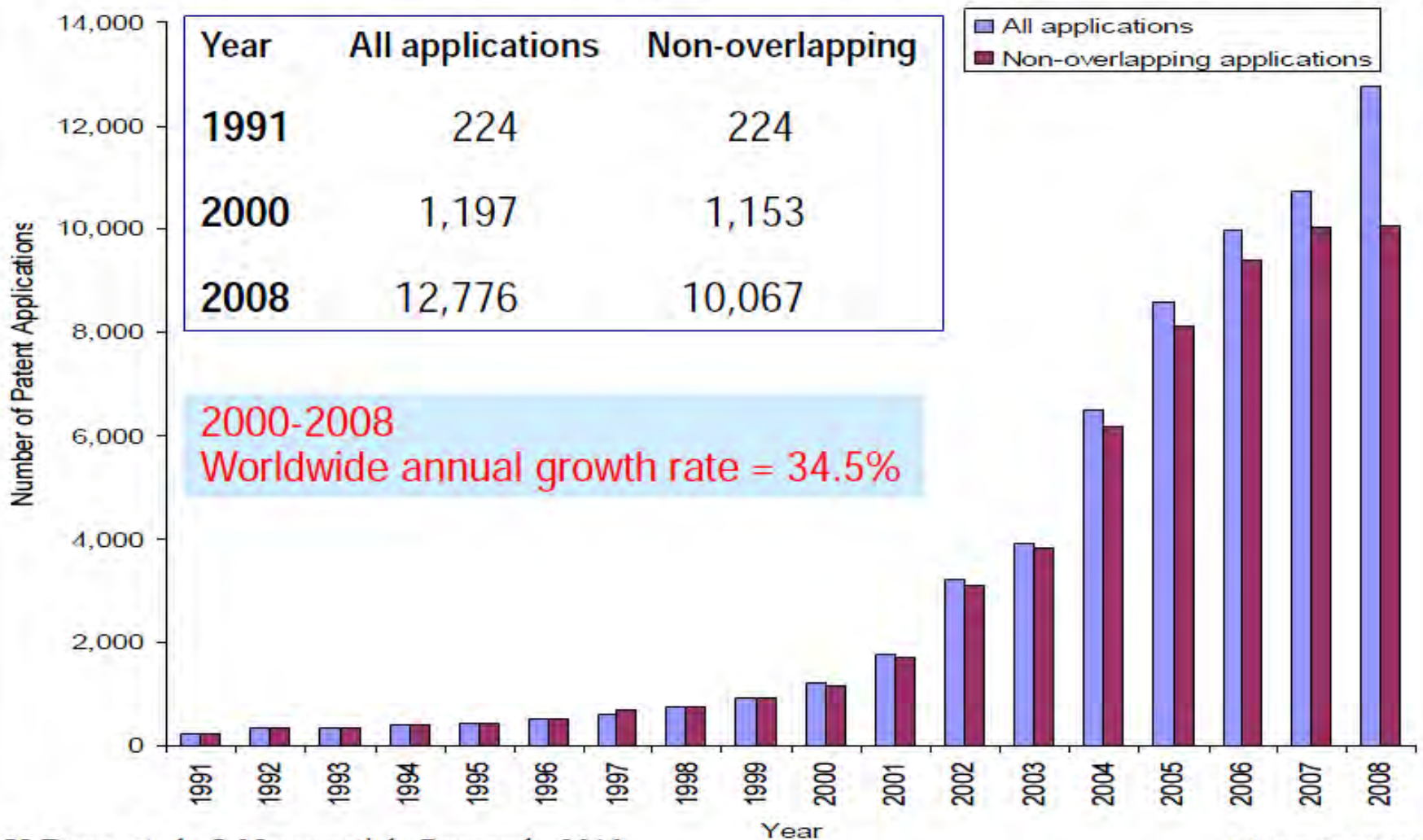


**Rapid, uneven growth per countries**



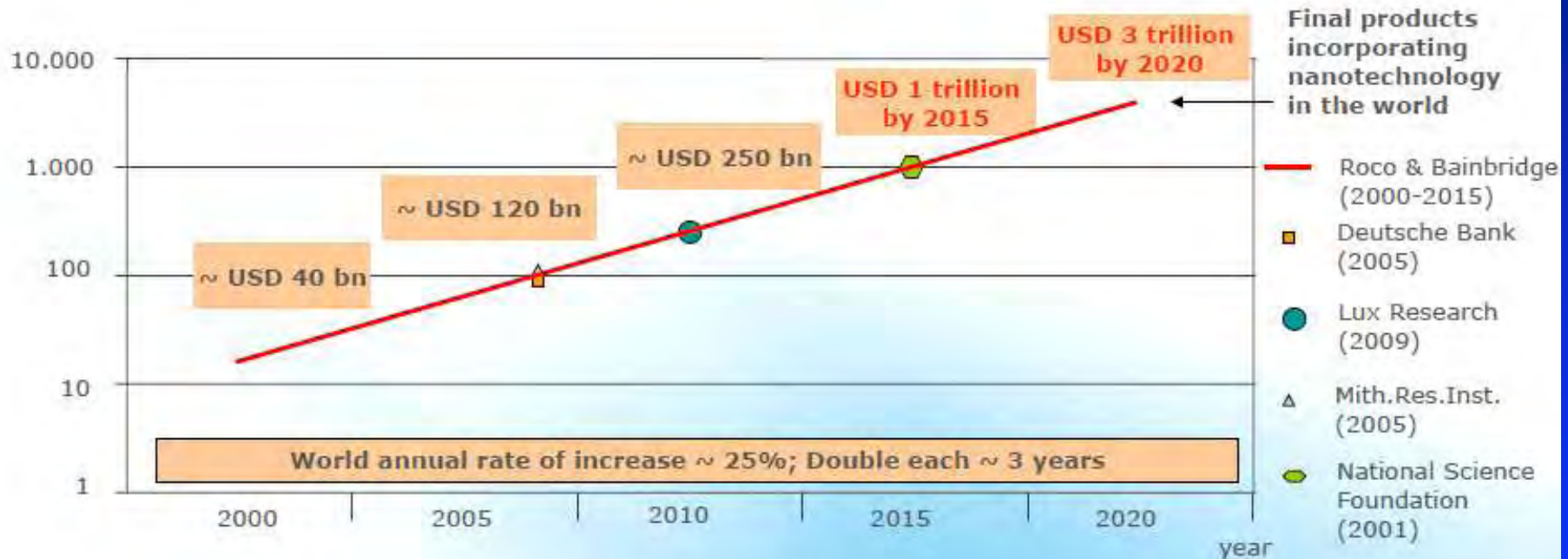
# Nano IP Real Estate Rush

WORDWIDE NUMBER OF NANOTECHNOLOGY PATENT APPLICATIONS



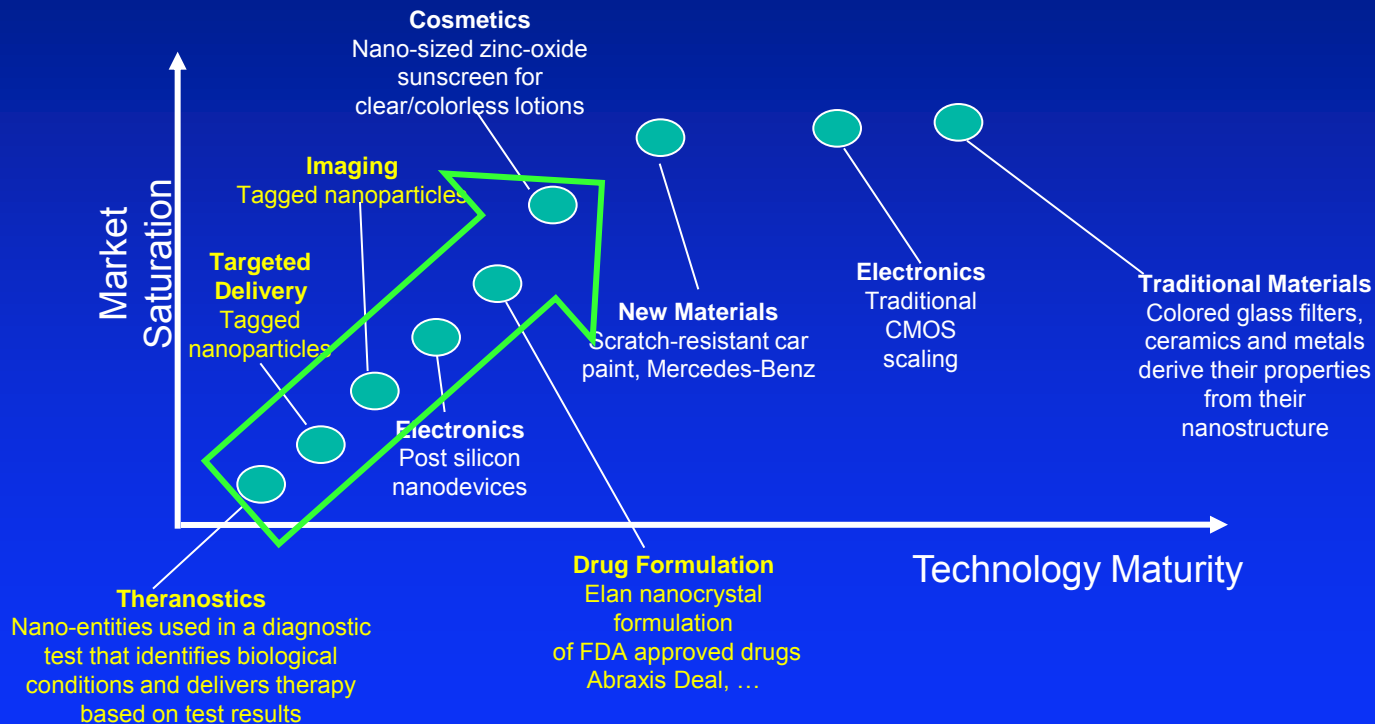
# Nanotechnology Market Forecast

MARKET INCORPORATING NANOTECHNOLOGY (billion USD)



Source: Journal of Nanoparticle Research 2011, Mihail C. Roco

# Market Saturation and Maturity: Healthcare Market is Posed to Explode





# Global Market Projection

## GLOBAL NANOMEDICINE MARKET, THROUGH 2014 (\$ BILLIONS)

	2006	2007	2008	2009	2014	CAGR%, 2009-2014
Global pharmaceuticals	275.0	298.4	323.7	351.3	533.1	8.7
Total nanomedicine market	39.6	44.8	51.1	57.9	108.4	13.4
Total nanopharmaceuticals sales	36.5	41.3	47.1	53.4	100.6	13.5
Nano diagnostic sales	3.1	3.5	4.0	4.5	7.8	11.6
Nanopharmaceuticals as % of all pharmaceuticals	13.2	13.8	14.5	15.2	18.9	

Source: BCC Research

# Celgene strikes \$2.9B deal to acquire Abraxis

June 2010



## Abraxane



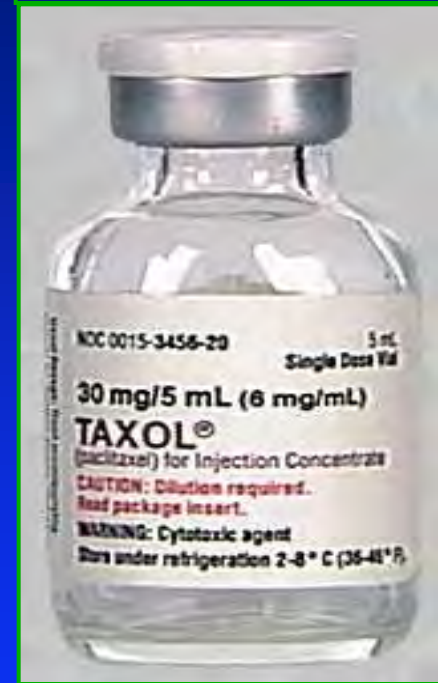
Abraxane is a Cremophor-free Formulation of Paclitaxel

Received FDA Approval January, 2005 for metastatic breast cancer

Reconstituted Paclitaxel 5 mg/ml  
Albumin ~45 mg/ml  
No Solvents

2009 Sale: \$350M

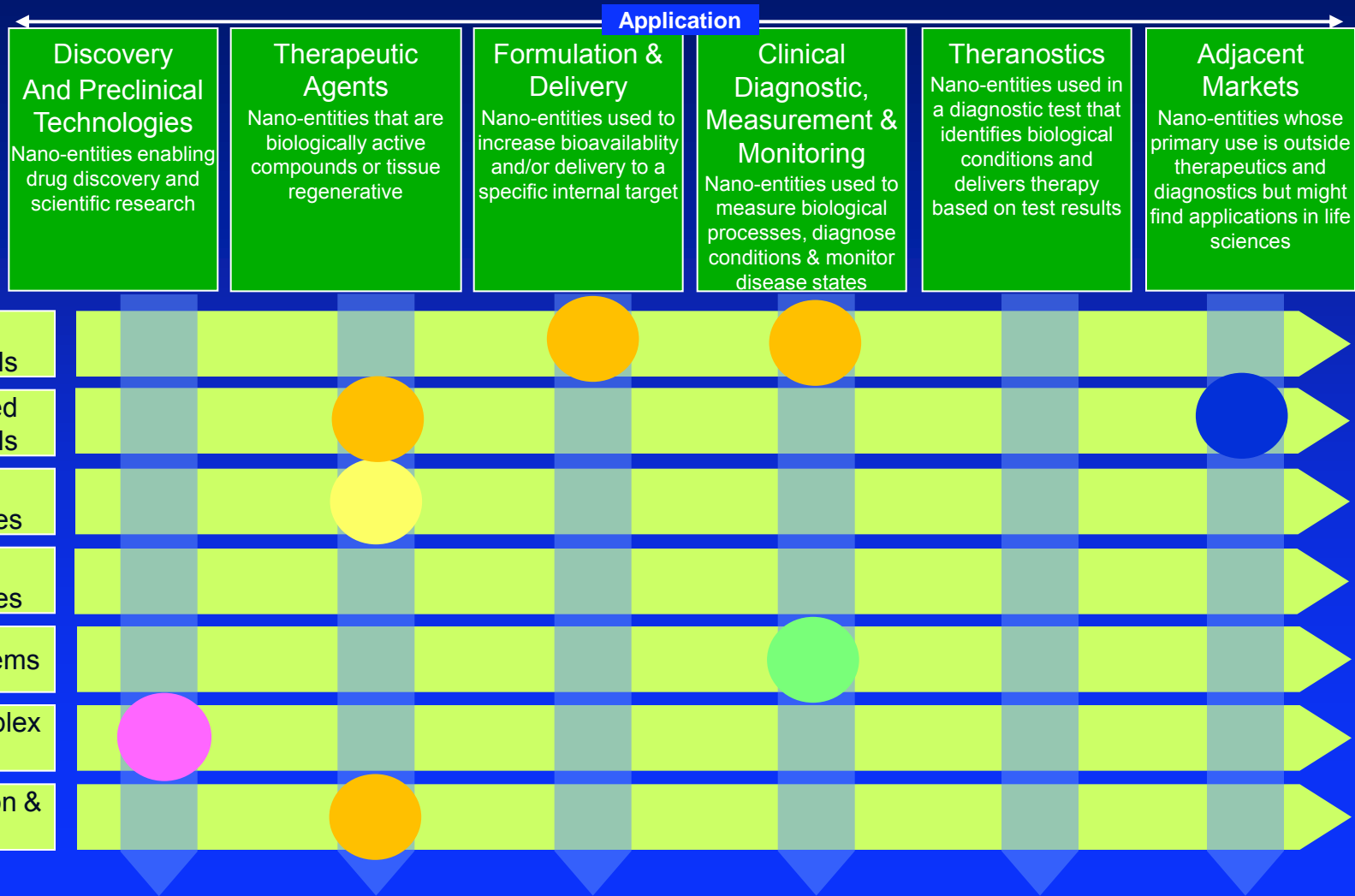
## Taxol



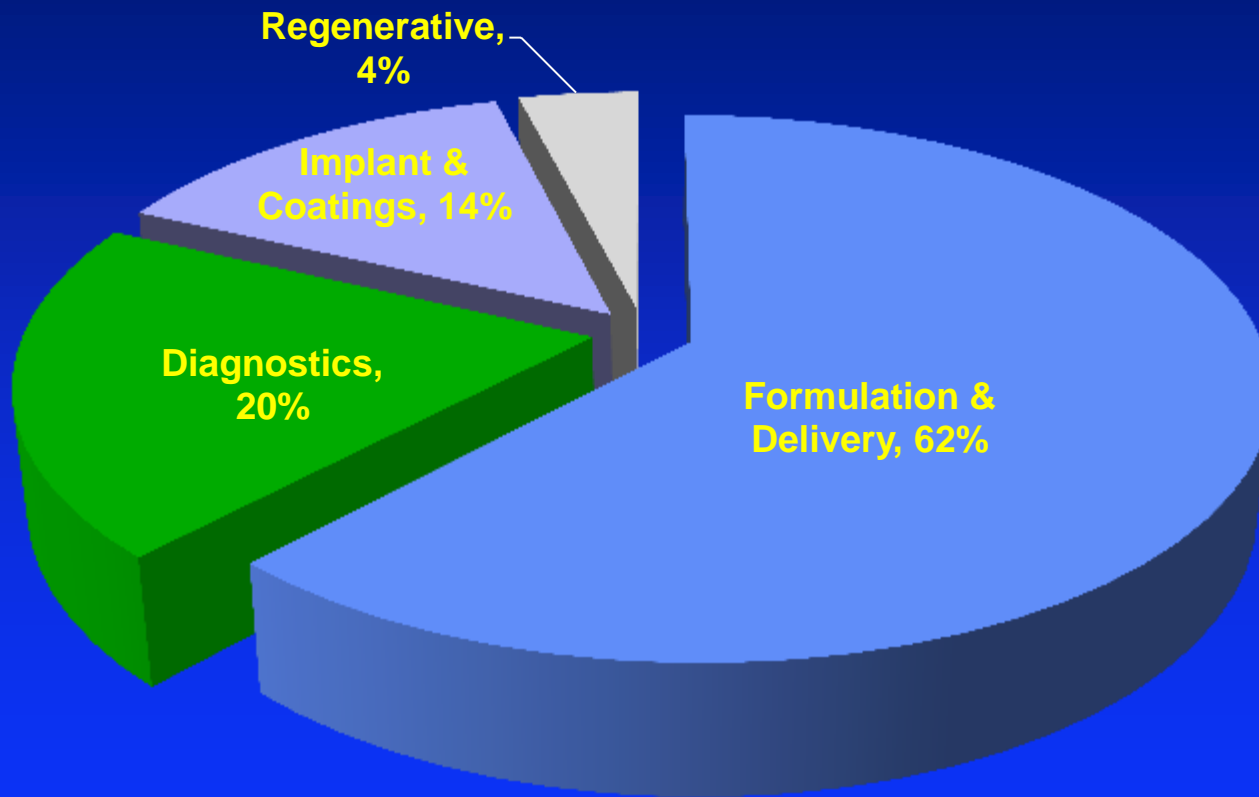
Supplied As Paclitaxel 6 mg/ml  
Cremophor 537 mg/ml  
Ethanol 396 mg/ml

# Science-Market Push-Pull

## Technology-to-Application Map



# NanoBio: R&D Activities by Applications, Jan 2007-Nov 2009





**Early Phase**

**Seed**

**Novel Dx/BM**

**IPO**

**Genomics**

**FIPCO**

**Disease**

**Management**

**Late Phase**

**Series A/E**

**Accepted BM**

**+ROI**

**Product**

**VIPCO**

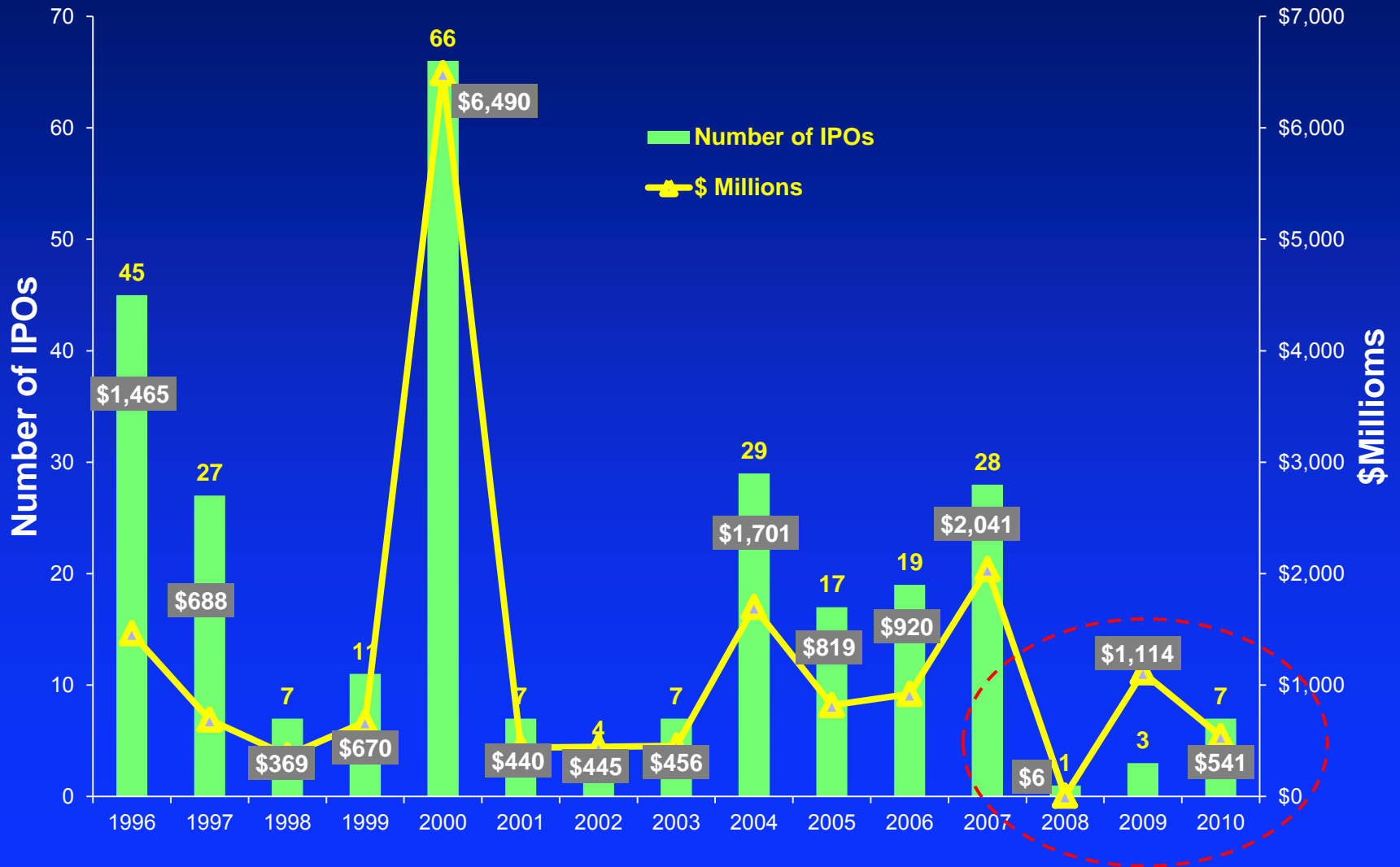
**Health**

**Management**

**CROSSING THE VALLEY OF DEATH**

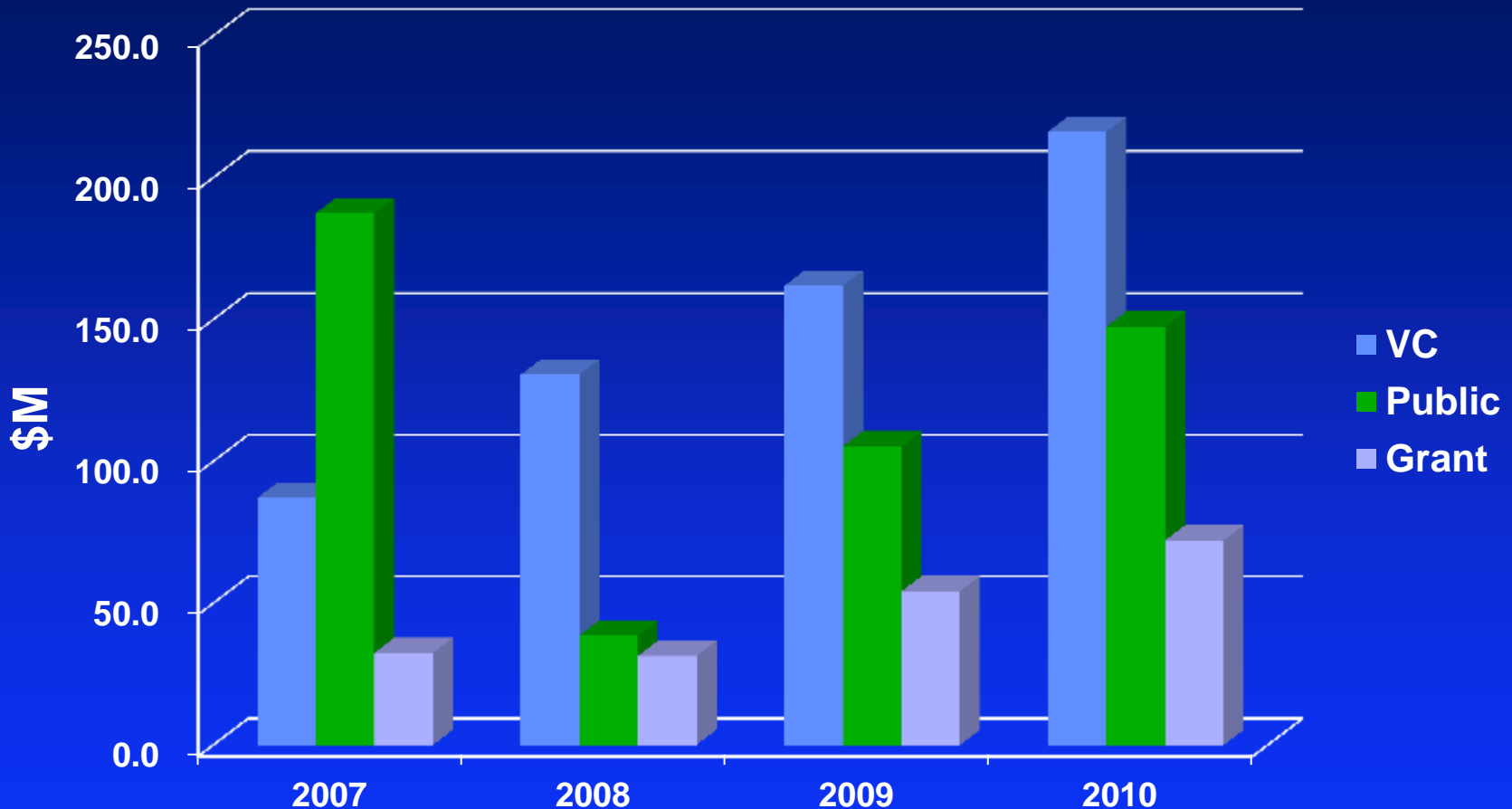


# Healthcare IPOs Since 1996\*



\*2010 data is not comprehensive

# Deal Flow in NanoBio: 2007-2010



- Based on 191 Private and Public Companies in our database
- Not all financings are disclosed
- Not including IPO and Abraxis-Celgene deal.

# Nanomedicine and NanoDiagnostics: Innovation, Regulation, and Investment

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  - Chairman & President, Nanoviricides, Inc
- **Subhas Malghan, PhD**
  - FDA, Deputy Director in the Office of Science and Eng Lab, CDRH
- **Scott Minick**  
President and CEO of Bind Biosciences
- **Misti Ushio, PhD**  
Managing Director, Harris & Harris
- **Hong Guo, PhD**  
VP of Research, pSivida