

So, you want to
build a biotech
company?

Therapeutics: From the Bench to the Boardroom



John W. Holaday, Ph.D.
Founder, Medicis, EntreMed, MaxCyte
Chairman, HarVest Bank of Maryland

Summary

- ✓ Biotech history and accomplishments
- ✓ Building biotech companies
- ✓ Critical path for drug development
- ✓ Drug approval - FDA
- ✓ Big pharma - Biotech
- ✓ Critical path for financing
- ✓ Outlook for the future

Biotech Companies are Entrepreneurial

- ✓ Founded by an individual or perhaps a small group, usually scientists
- ✓ Technology obtained from tech transfer
- ✓ Angel or Venture capital backed
- ✓ High risk
- ✓ There are now over 300 public U.S. biotechnology companies out of 600 public biotech companies worldwide
- ✓ U.S. companies generated over \$40B (72% of worldwide biotech product revenues) in 2002

History of Biotechnology

- ✓ 1953 - double helical structure of DNA published in *Nature* by Watson and Crick*
- ✓ 1980 - the U.S. patent for cloning genes is awarded to Cohen and Boyer**
- ✓ First biotech companies formed:
 - 1976 - Genentech
 - 1978 - Biogen
 - 1980 - Amgen
 - 1981 - Immunex
 - 1981 - Chiron
 - 1981 - Genzyme

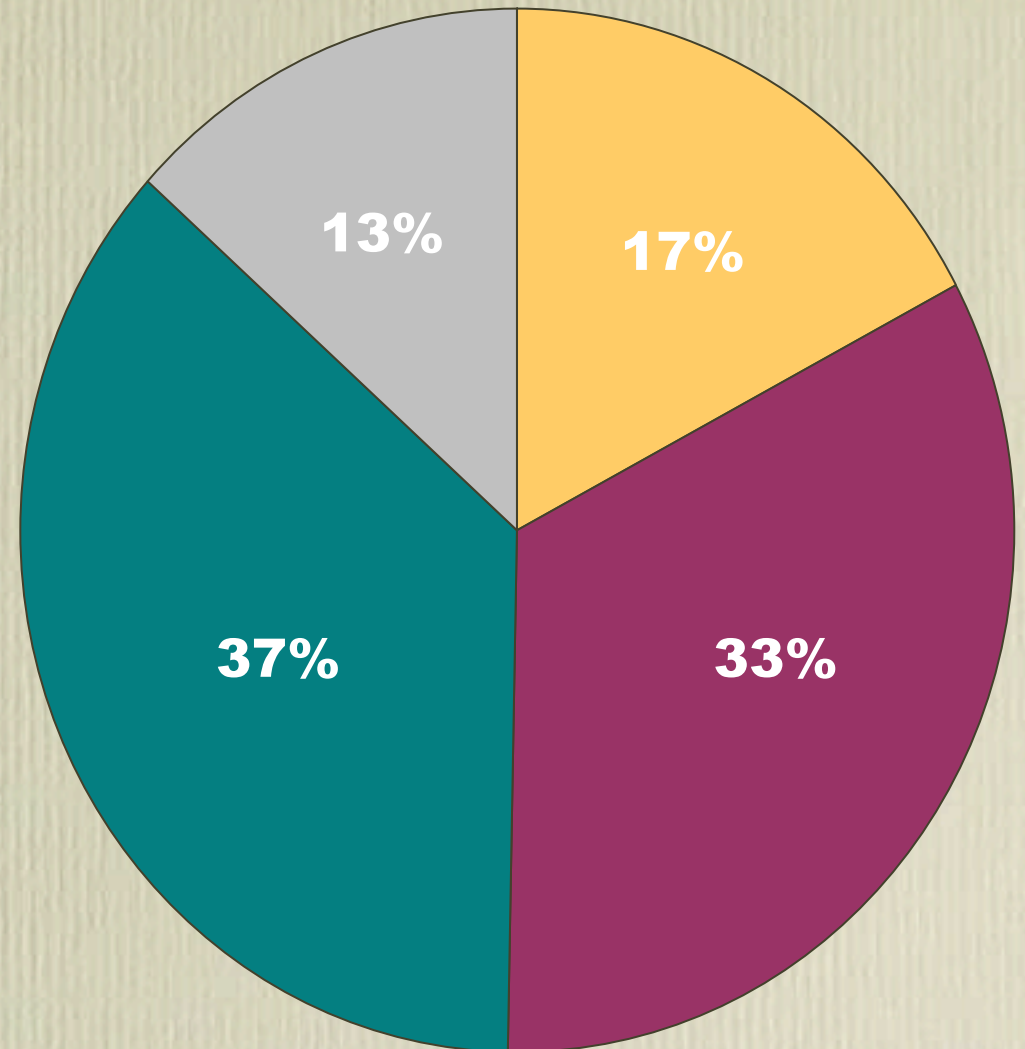
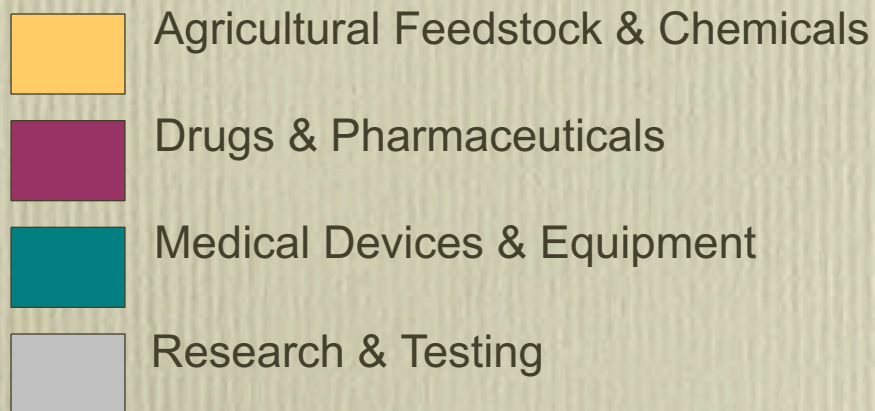
The industry is
only 25 years old...
it takes time!

*Nature 171, 737(April 2, 1953)

**Proc Natl Acad Sci U S A. 1973 Nov;70(11):3240-4 and
Proc Natl Acad Sci U S A. 1974 May;71(5):1743-7

The Biosciences

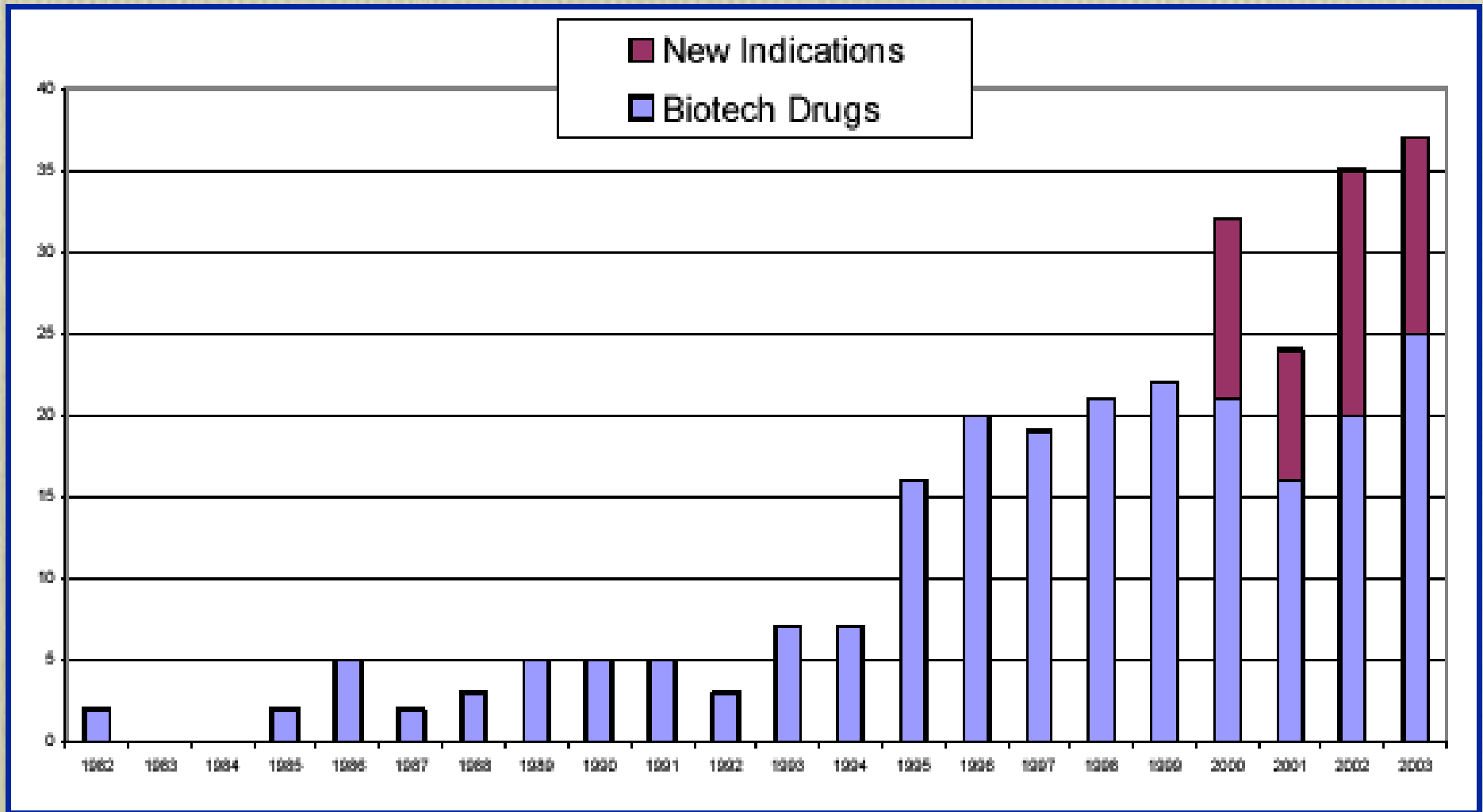
885,000 people are employed in the Biosciences in the US



Contributions of Biotech

- ✓ More than 325 million people worldwide have been helped by 160 approved biotech drugs and vaccines
- ✓ >350 more biotech drugs and vaccines now in clinical trials targeting more than 200 diseases (Big Pharma only has ~75 drugs)
- ✓ Biotechnology is responsible for hundreds of diagnostic tests, including HIV tests and home pregnancy tests, DNA fingerprinting...

Number of biotech products approved



It takes imagination...



And execution!

Licensing Goals

- ✓ Enhancement of the education process
- ✓ Maximize research benefits to society
- ✓ Facilitate commercialization of IP
- ✓ Creation of companies and jobs
- ✓ Provide a fair financial return to university on licensed IP (but Tech Transfer is not a major source of funds)

When is science ready
to become a business?

There are too many
science projects
masquerading as
companies...

Karen Bernstein
BioCentury

Caveats for successful startups...

- ✓ Be careful to select science with commercial potential
- ✓ Secure intellectual property
- ✓ Bet on the jockey, not on the horse
- ✓ Establish frequent and candid dialogue among investigators and stakeholders
- ✓ Avoid conflicts of interest, practice good business principles

How do you build biotech companies?

Follow the “P’s”:

People

Pipeline

Persistence

People

Potential

Perspiration

Plans

Partners

Passion

Patents

Price

Pfocus

Products

Promises

Pfinancial

Platform

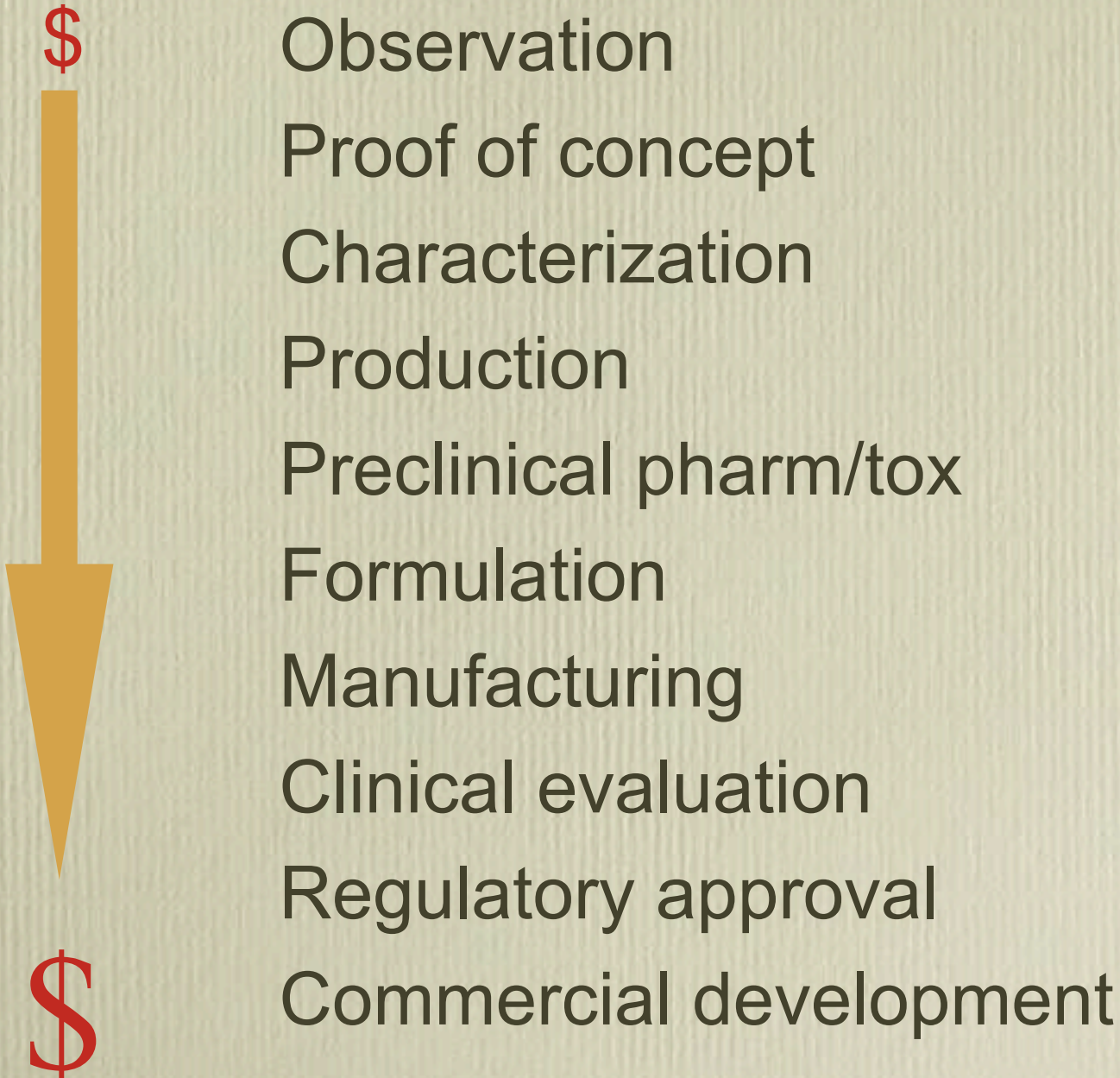
Performance

P-luck

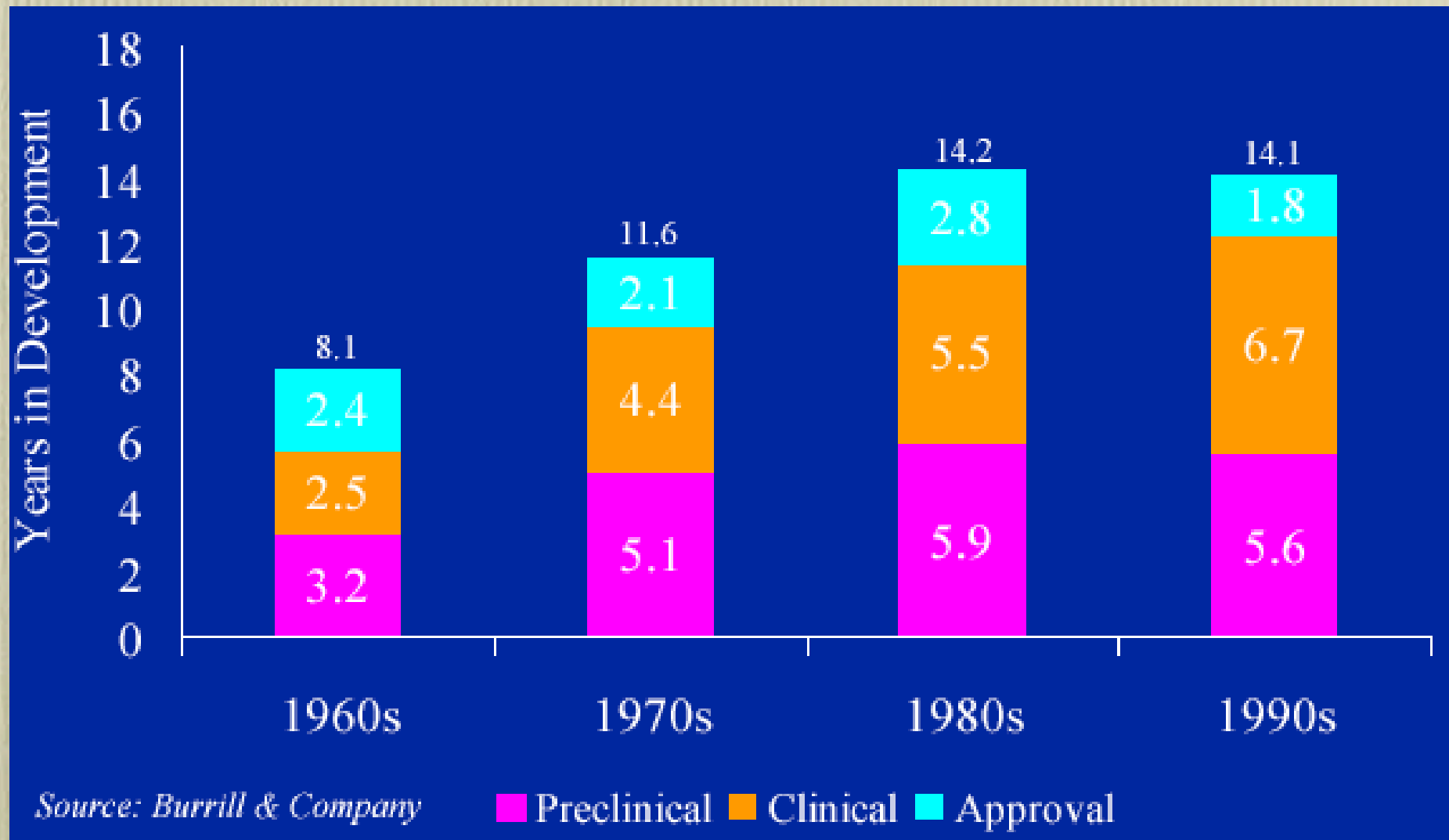
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Drug Development

Drug Development-Critical Path



Drug development times...

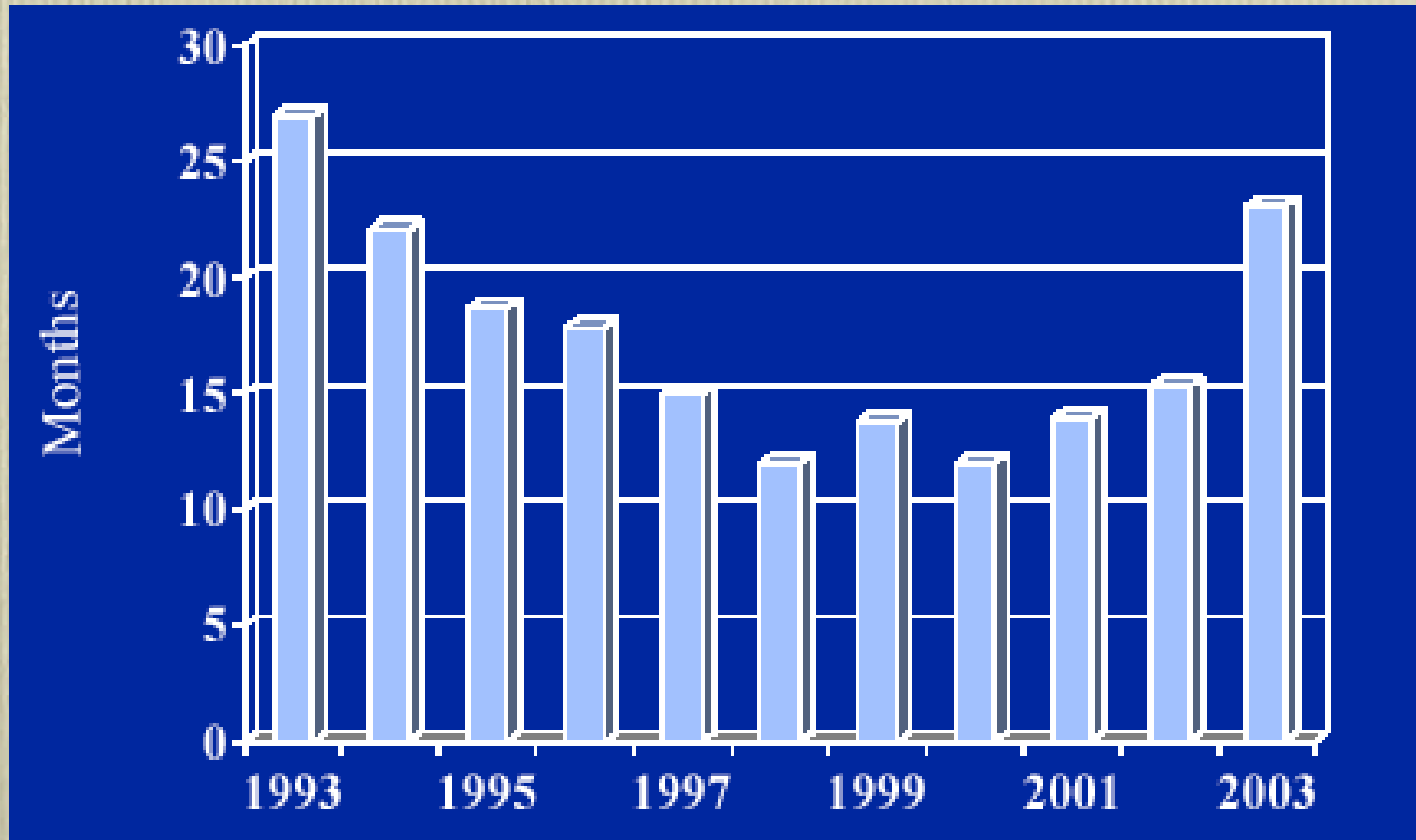


FDA

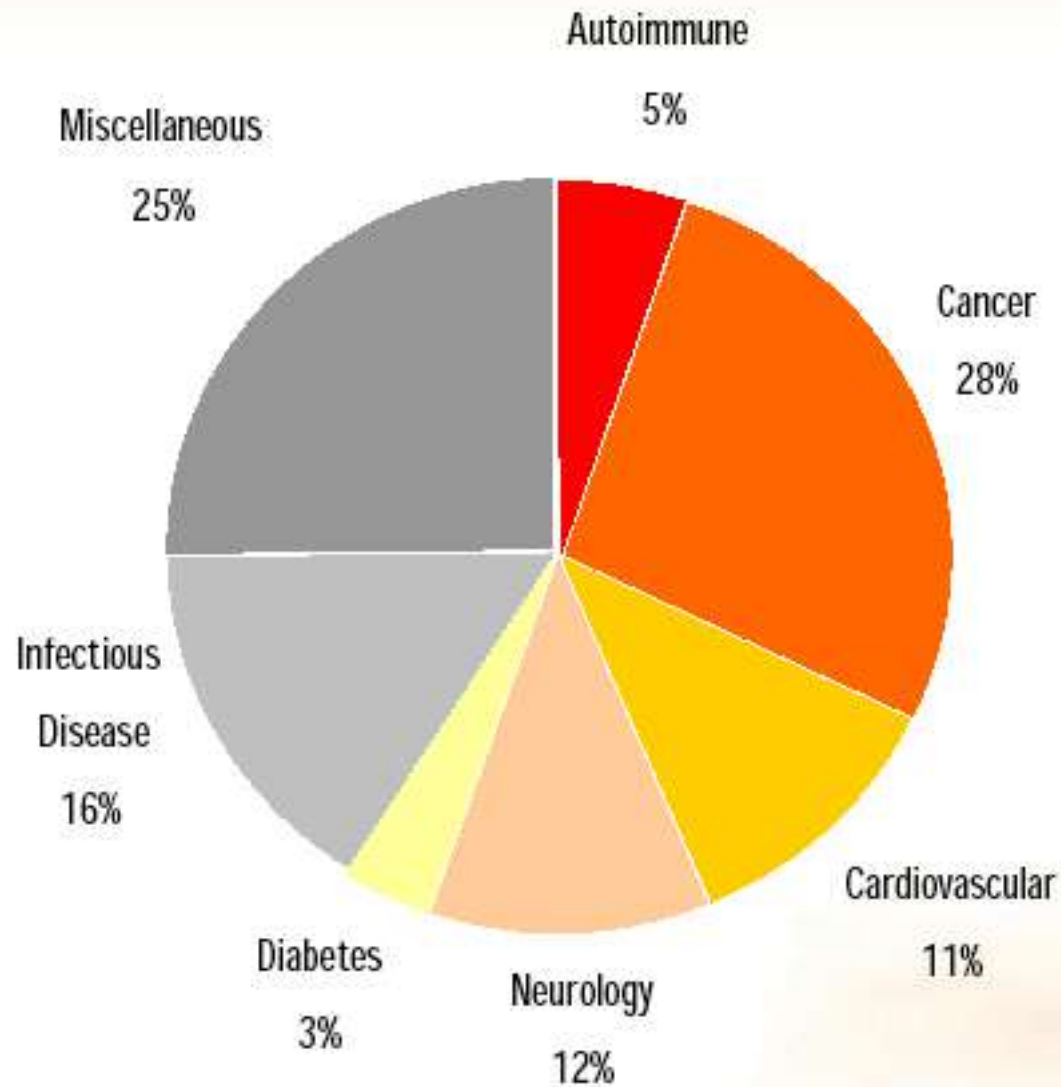


**"I found the secret to happiness, but the FDA
won't let me release it."**

FDA approval times increasing...



296 products in Phase III trials : % by therapeutic category



Big Pharma and Biotech

Biotech - Big pharma Alliances

Biotech does some things very well (invent, proteins, niche)

Big pharma does some things very well (develop, market, sell)

Must overcome NIH

As with any marriage, both parties must nurture the relationship



**Big companies like small
molecules, small companies
like big molecules.**

Judah Folkman

Big pharma challenges...

- ✓ R&D spending growing faster than sales growth
- ✓ New product discoveries lagging relative to industry growth needs
- ✓ Need for licensing products from outside
- ✓ Blockbuster drugs going off patent - 40% of Pharma revenues become generic in 2005

Revenue and Patent Expiration of Top 12 Pharmaceuticals

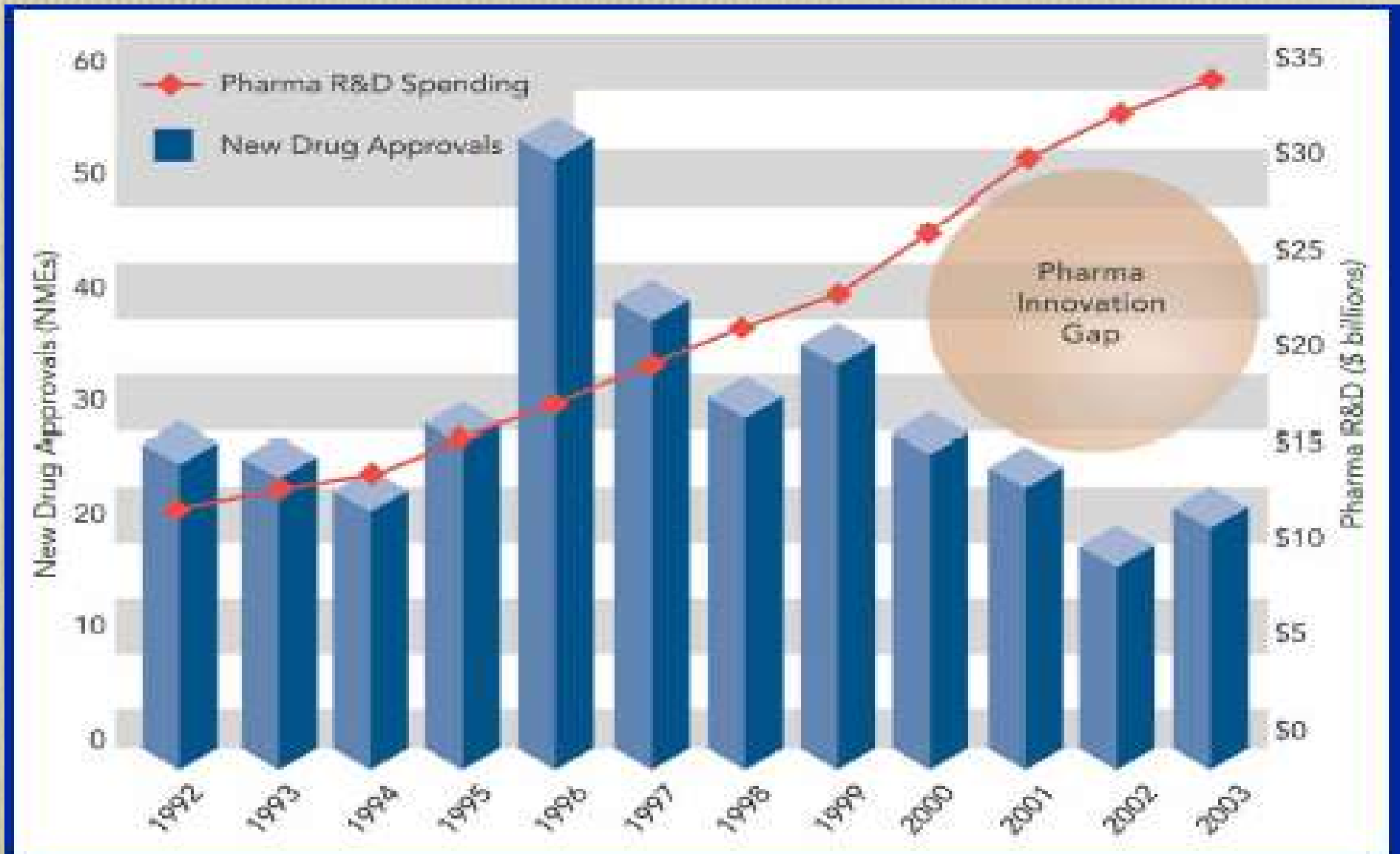
Drug	Company	1997 Revenue in \$ Millions	Patent Expiration
Zocor	Merck	3,575	2005
Losec	Astra	2,816	2001
Prozac	Eli Lilly	2,550	2001

\$82 billion worth of global blockbusters will have lost US patent protection by 2007

Augmentin	SmithKline Beecham	1,517	2002
Zoloft	Pfizer	1,507	2005
Paxill	SmithKline Beecham	1,474	2005
Cipro	Bayer	1,441	2004

Note:* Includes alliances with values estimated to be greater than \$20M including up-front payments, equity, R&D funding, and contingent milestone payments
Sources :Recombinant Capital, MedAd News

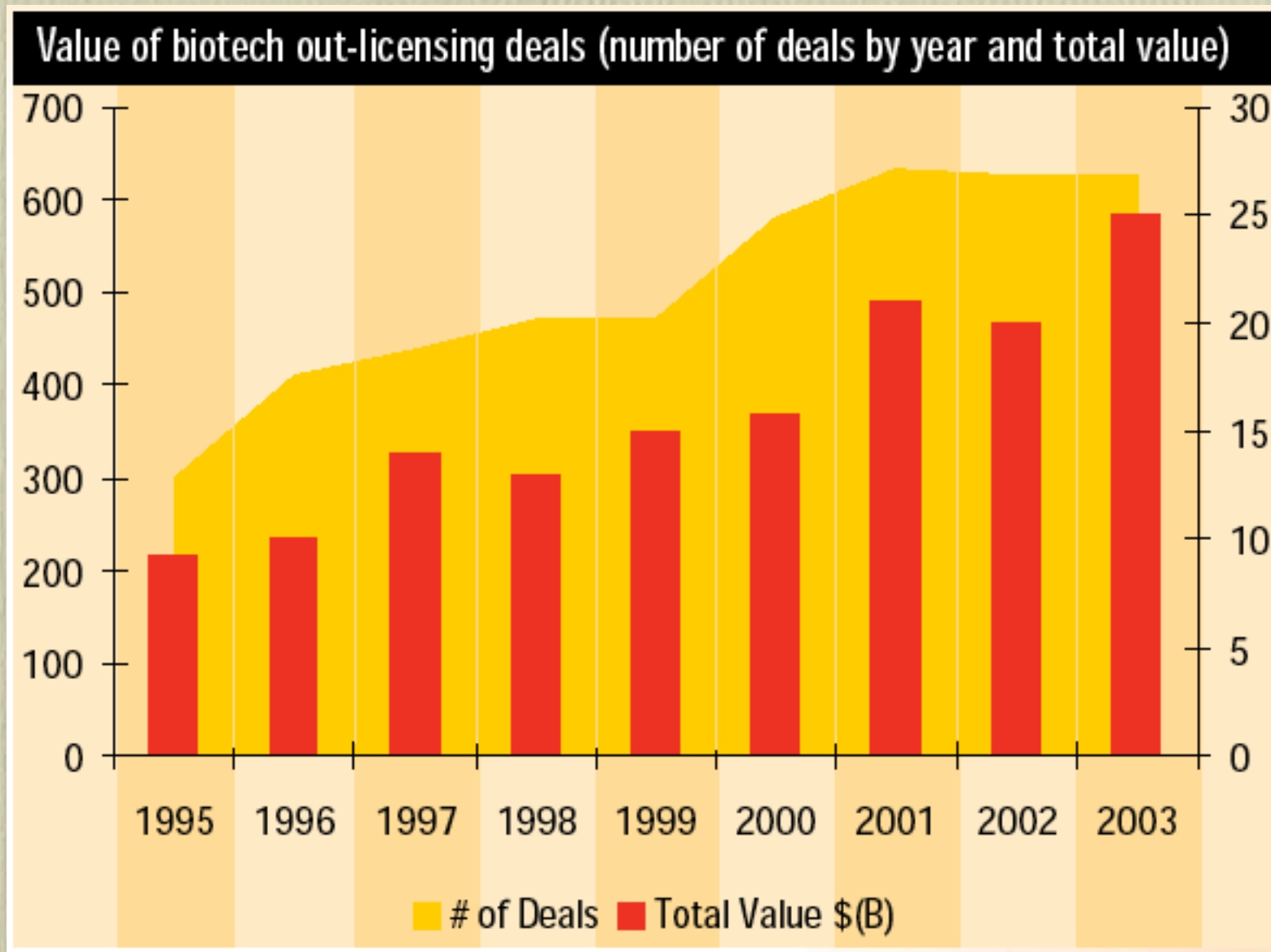
Innovation gap...



“By 2010 most pharmaceutical research will be undertaken by biotechnology companies”

Deutsche Bank

Biotech outlicensing...



Sorting the wheat from the chaff

Only 1 drug of every 5,000 is commercialized
(*most drugs fail!*)

It costs over \$1M

And takes over 12 years

2/3 of all drugs that make it to the market do
not recover R&D expenses

Who is going to pay?

Financing

Dollars vs. Data



Financing -Critical Path



3 F's (friends, family, fools)

Grants (SBIR, ATP, DARPA)

Angel investors

Venture capital

Partnering

Public offering (institutions)

Merger/acquisitions

The saga of biotech...



"I think I can make you very happy if I can get funded."

Capital Financing Needs

Company Stage Private investment per company

Proof of Concept \$25,000 – \$100,000

Pre-seed \$50,000 – \$500,000

Seed \$150,000 – \$2 million

Early-stage \$1 million – \$5 million

Expansion-stage Up to \$10 million

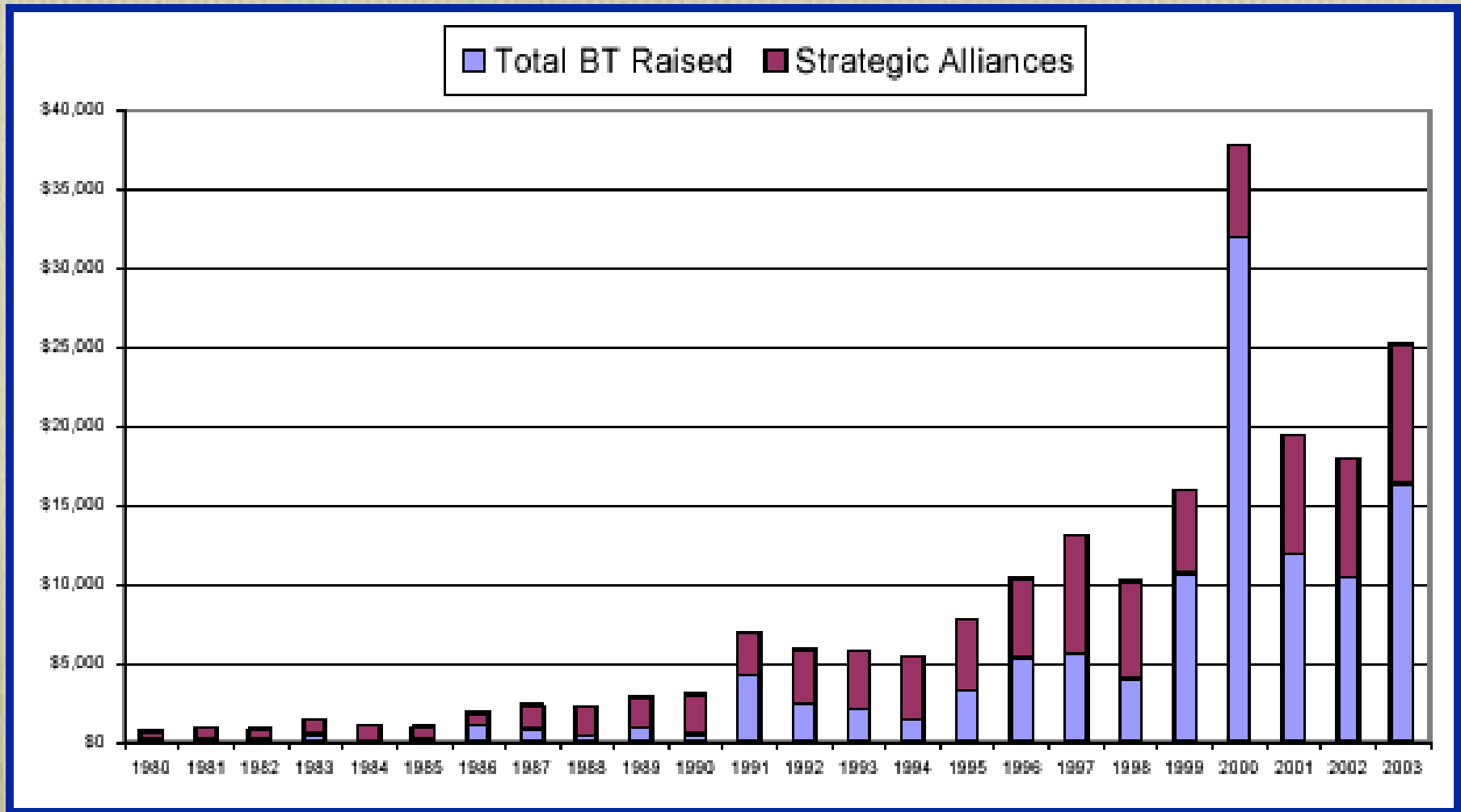
Mezzanine Up to \$20 million

Financing

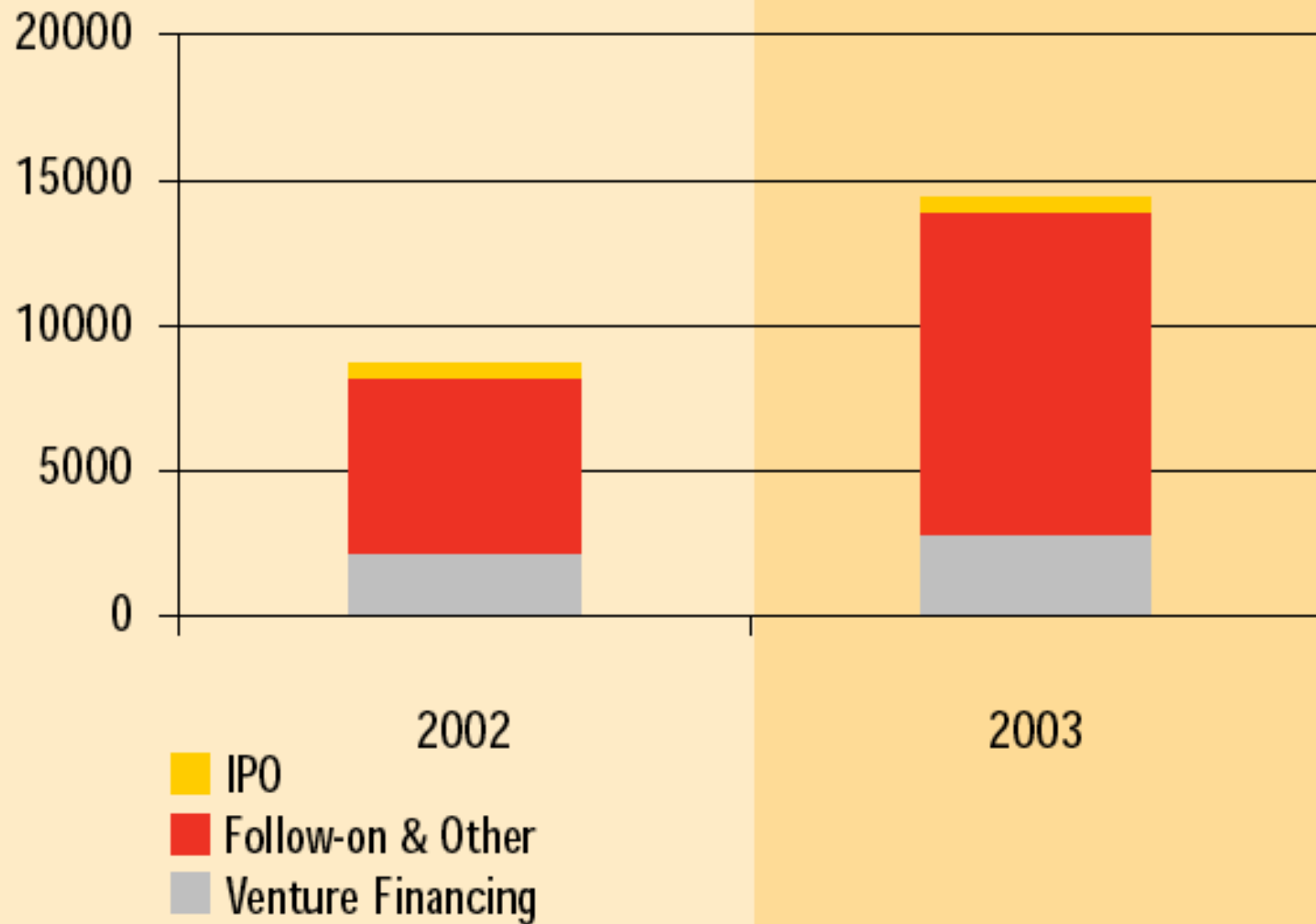
What companies are getting financed?

- ✓ Experienced management
- ✓ Companies with products - clinical stage or later
- ✓ Companies already owned by investors
- ✓ Companies with clear business plans/clear milestone driven events
- ✓ Companies with revenue that provide services leading to products

U.S. biotech industry fundraising (\$ in Millions)



Summary of 2002 and 2003 financings



U.S. Biotech...cash survival time

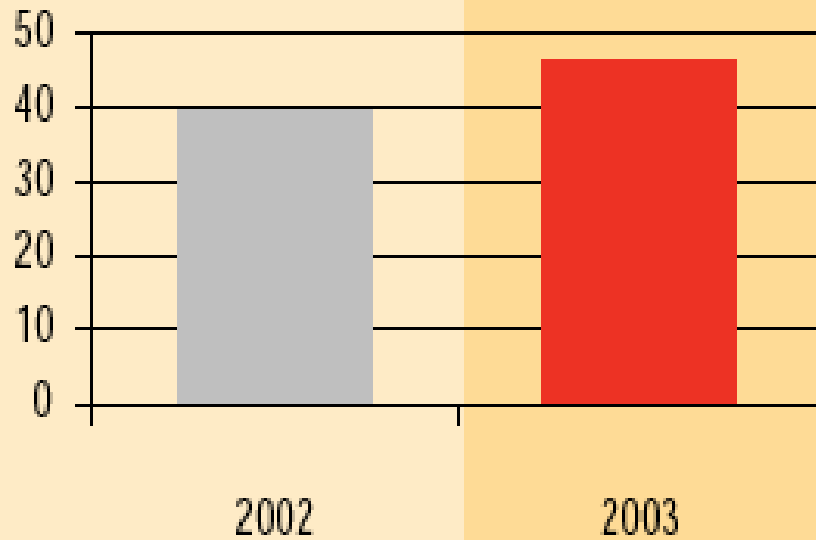
2002



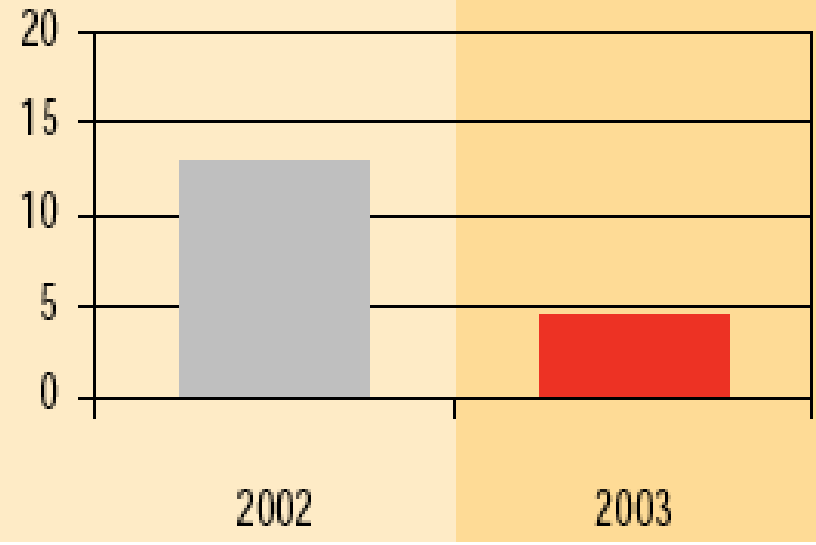
2003



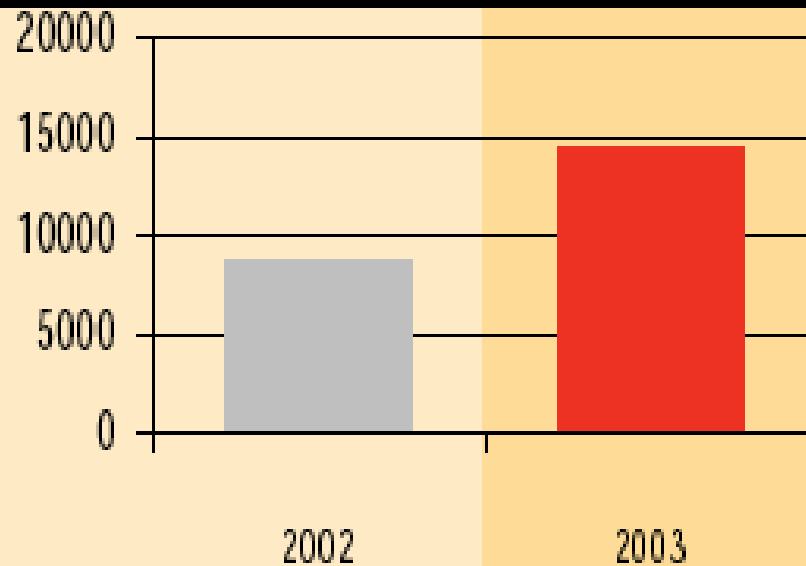
Global revenue



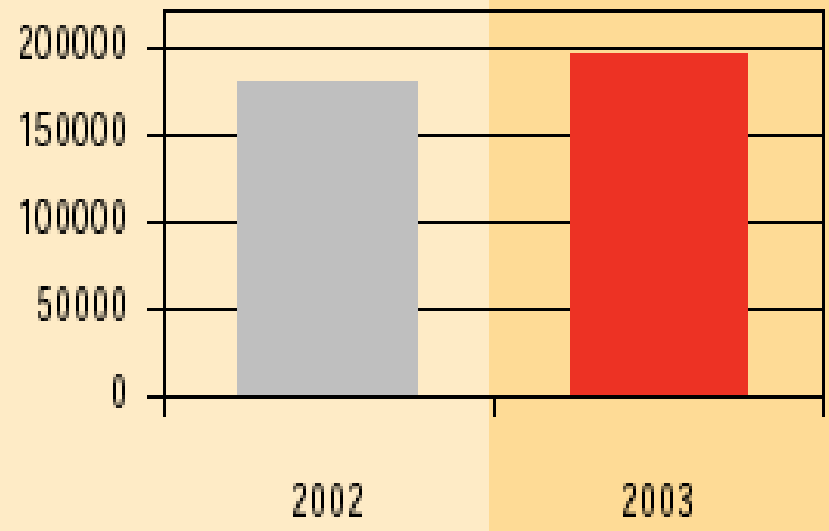
Global net loss



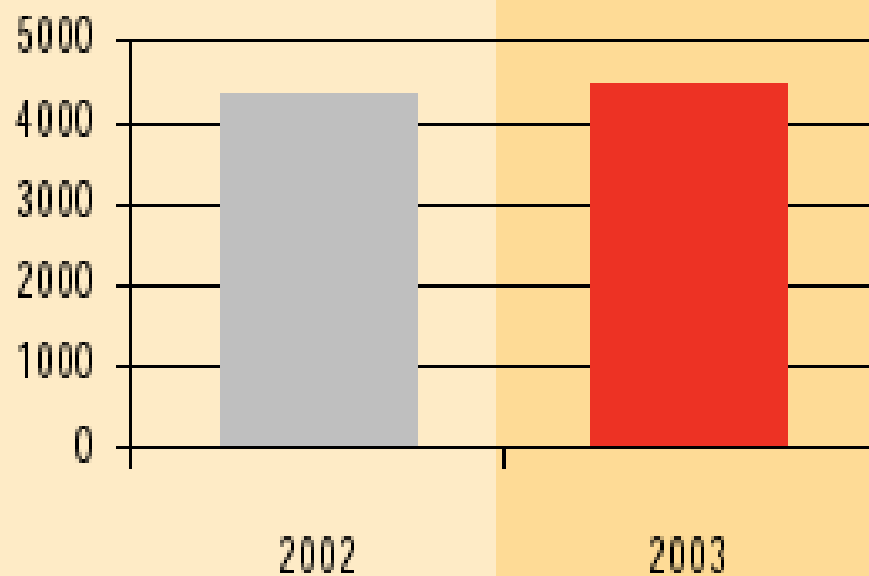
Global investment



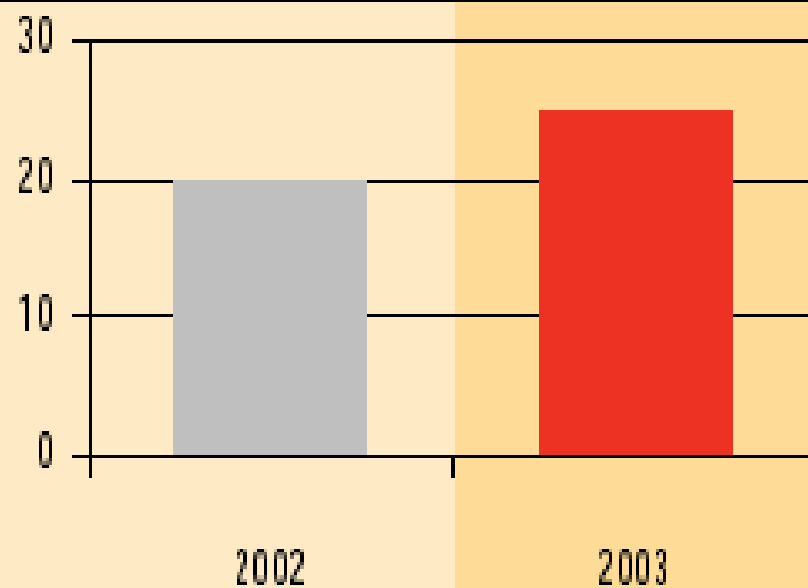
Global employees



Global # of companies

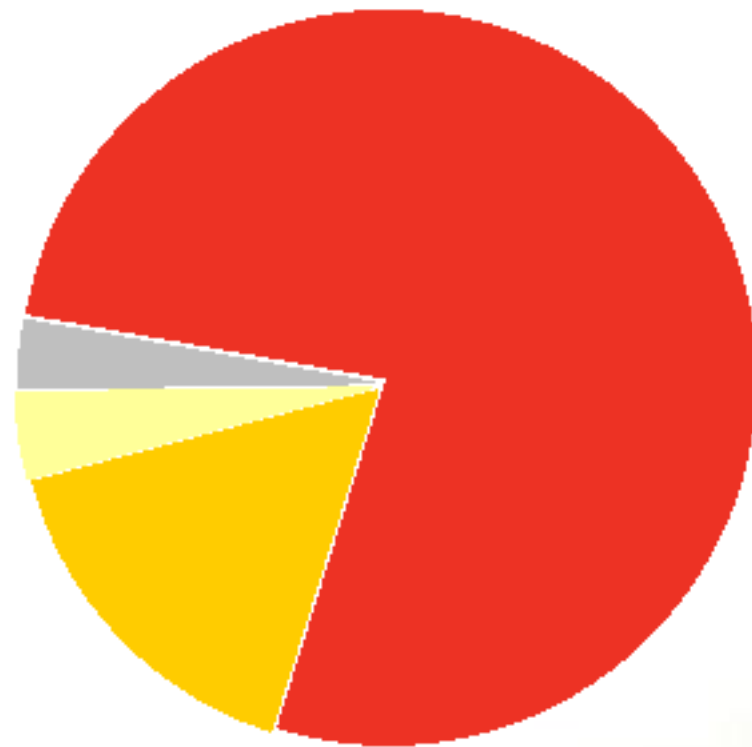


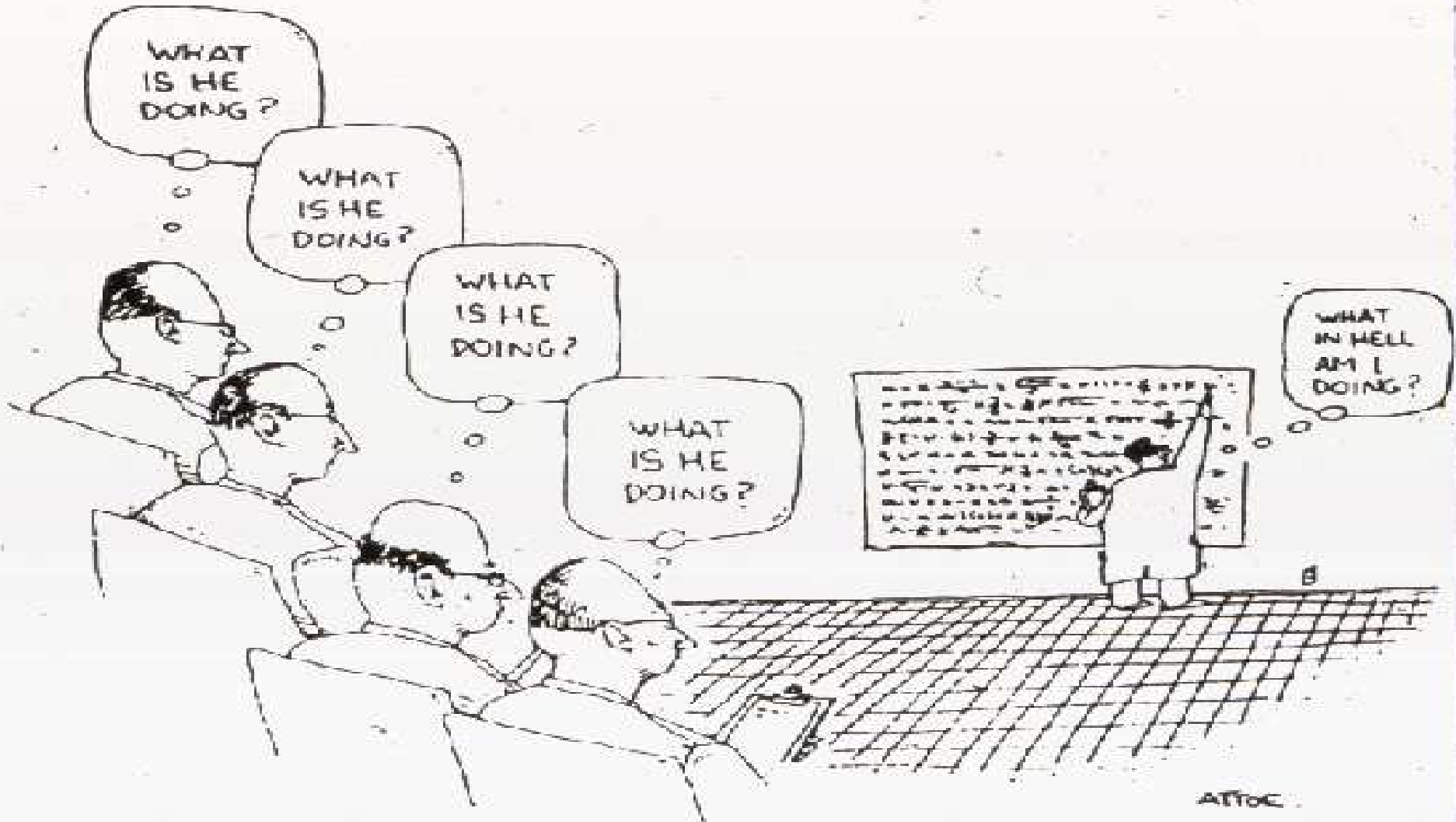
Products approval



2003: Global revenues of \$46.3 billion

- U.S 77%
- Europe 16%
- Canada 4%
- Asia Pacific 3%





WHAT IS HE DOING?

WHAT IS HE DOING?

WHAT IS HE DOING?

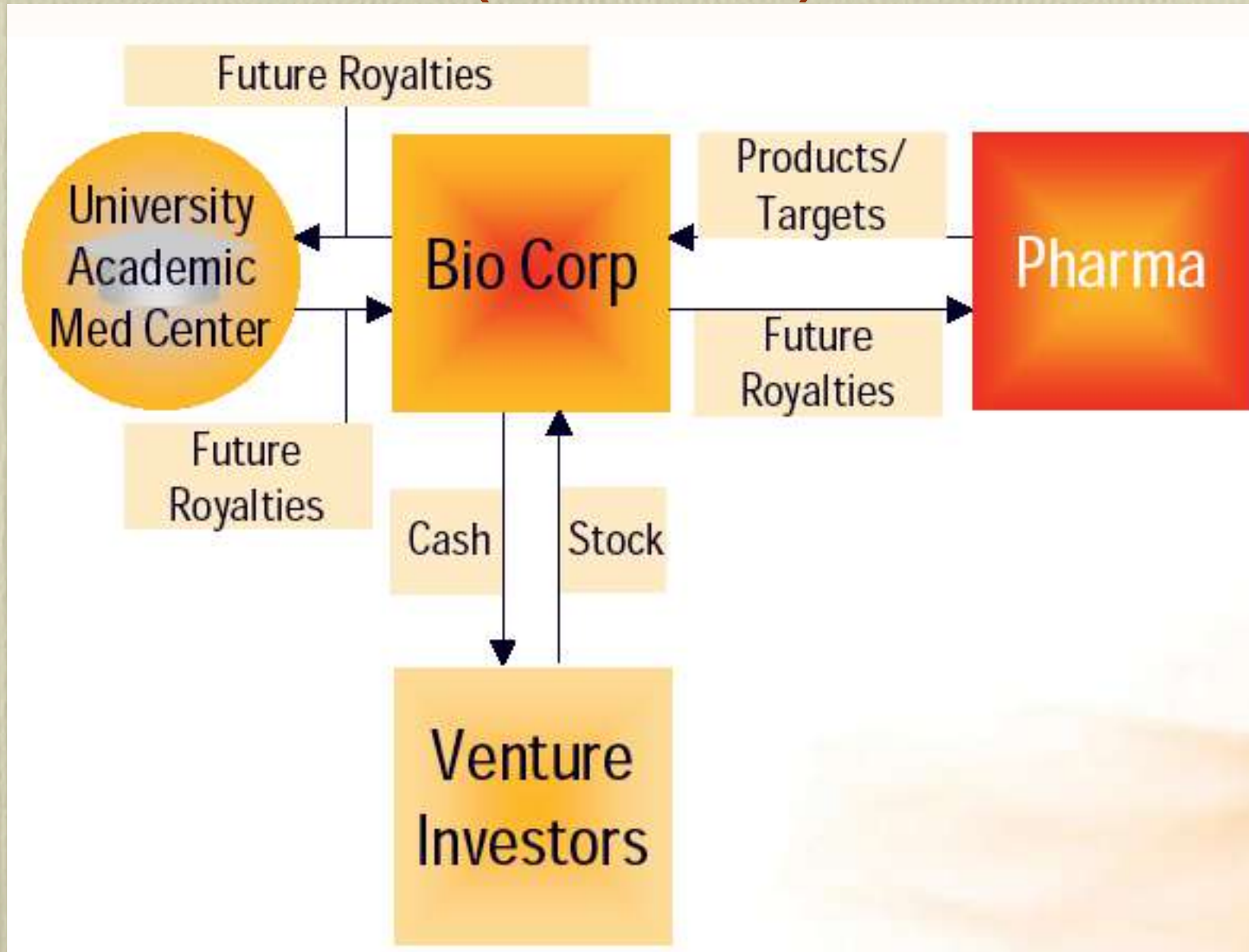
WHAT IS HE DOING?

WHAT IN HELL AM I DOING?

ATTOE

Bringing it all
together...

No Research, Development Only (NRDO)



QuickTime and a
TIFF (LZW) decompressor
are needed to see this picture.

**A commercial bank... helping to
build Montgomery County's
Business Community**

HarVest Bank of Maryland

- ✓ Maryland bioscience, tech, government contracting & professional communities - rapidly growing
- ✓ Clear need for industry savvy bank
- ✓ Clear industry and geographic focus
- ✓ Local companies will have their accounts managed by seasoned bankers who understand the industry
- ✓ Not the primary lenders, but providers of critical introductions to financial resources, government contracts, strategic partners, real estate, insurance providers and others to facilitate business growth

The Future...

Things are looking up!

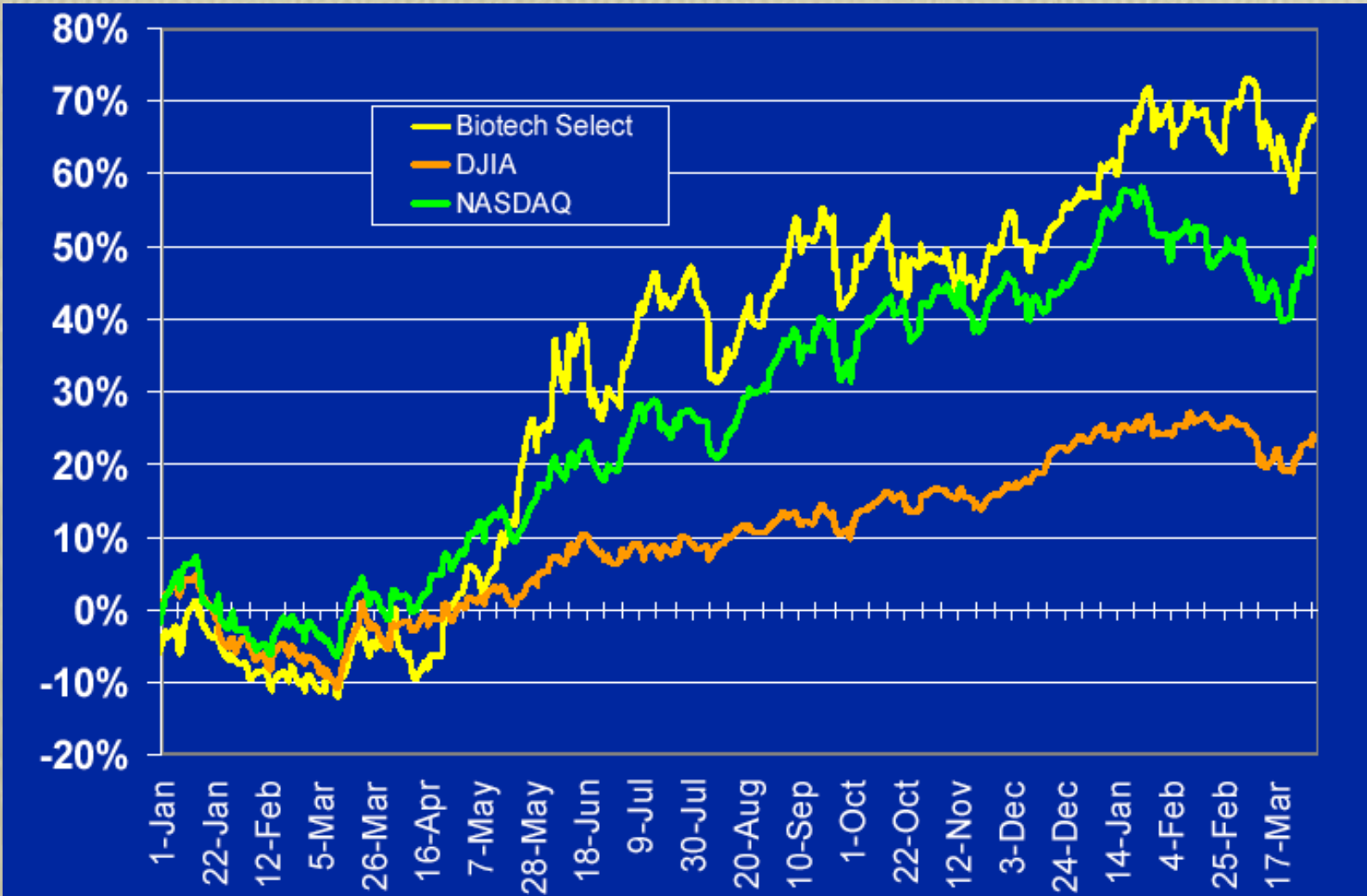
- ✓ Powerful innovation, capitalizing on human genome project
- ✓ Deep pipeline
- ✓ Regulatory environment improving
- ✓ Impressive revenue growth
- ✓ Healthcare spending increasing
- ✓ Strategic alignment with big companies
- ✓ Good corporate governance = best business practice

The environment improved in 2003



**“We’re expecting stocks to rally but we
don’t know which ones and when.”**

Things are looking up!



What is the future of Biotech?



Acknowledgements...

- ✓ Burrill and Company
- ✓ Ernst and Young
- ✓ Biotechnology Industry Organization

What it takes...

Money

Passion

Dancing

You gotta work like you don't need the money,
Love like you've never been hurt,
And dance like nobody's watching...

Satchel Page