

Career Opportunities in Biotechnology and Drug Development

Careers in the Life Sciences Industry

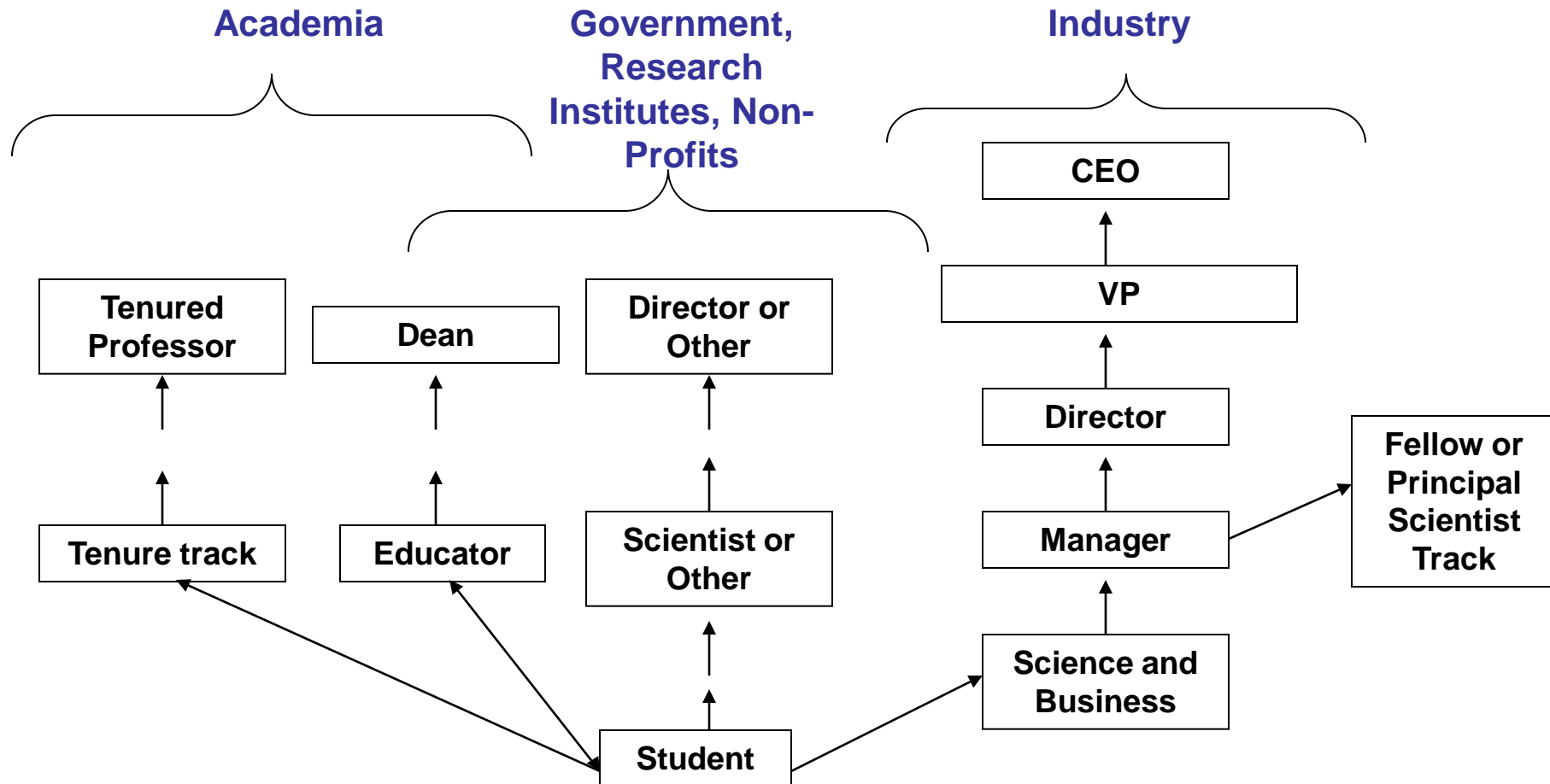
UC Berkeley—Go Bears!

Toby Beth Freedman, Ph.D.

May 24th, 2011

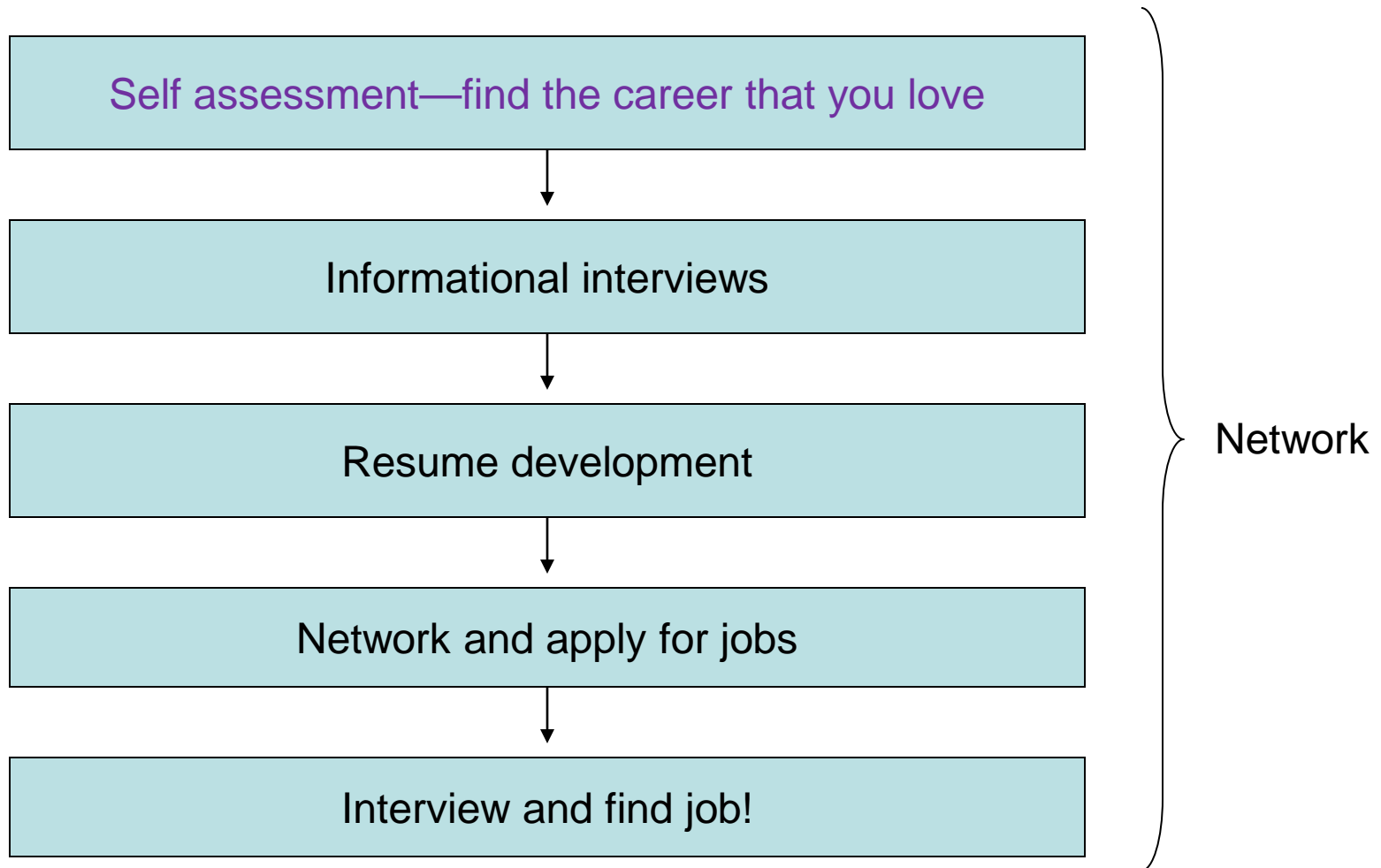
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Three Main Career Paths for Scientists



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Basic steps to finding the right career



My Experiment

- A comprehensive, systematic assessment of careers for life science professionals
- Not hypothesis driven
- Career choices for science and medical backgrounds
- Resource guide for career planning—so much information that readers identify a career that suits their skills, interests, goals and personality attributes

Goals: Be Sure To Enjoy a Job

“If you are doing what you love, then it’s not really ‘*work*’”

Peter David



Goals: Get on the Right Track

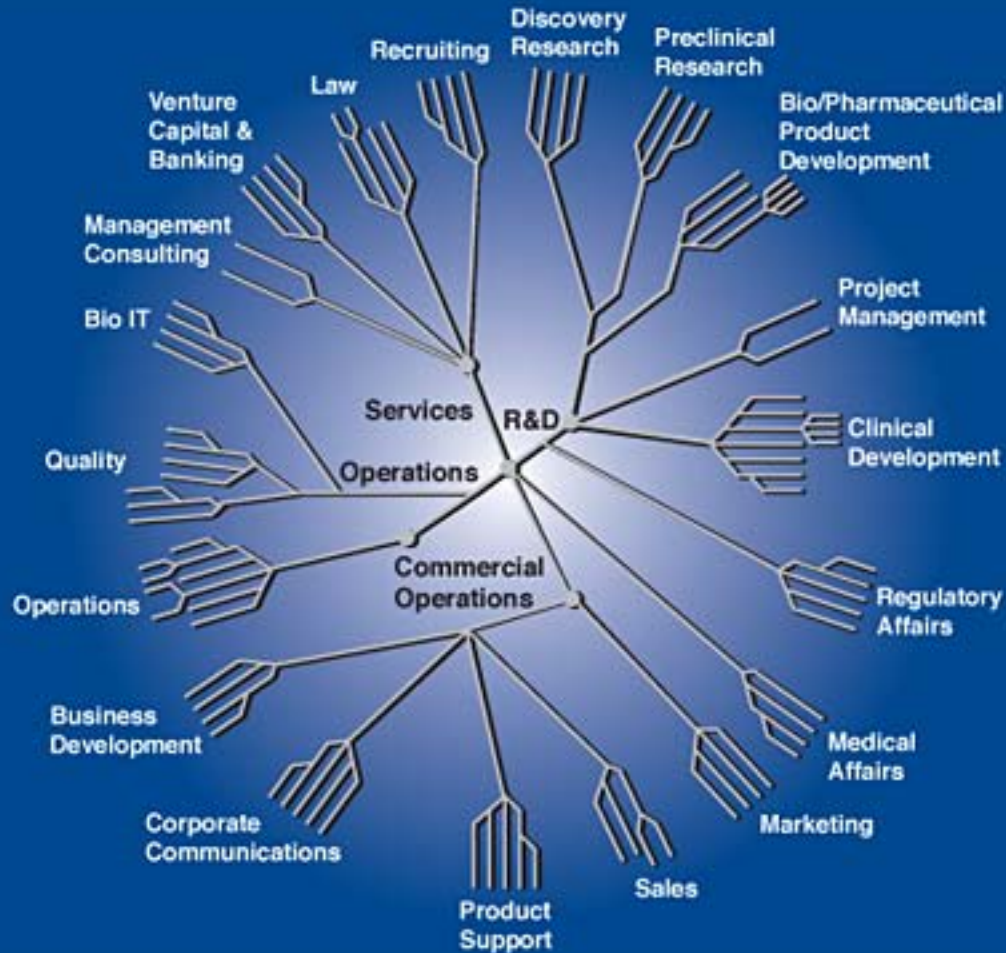


Methods

- 200+ interviews
- 1 hour telephone informational interviews
- Mostly VPs, Ph.D.s or MDs
- 10 interviews per chapter
- Compiled, analyzed and summarized
- Took three years
- Published by Cold Spring Harbor Laboratory Press and is on Amazon

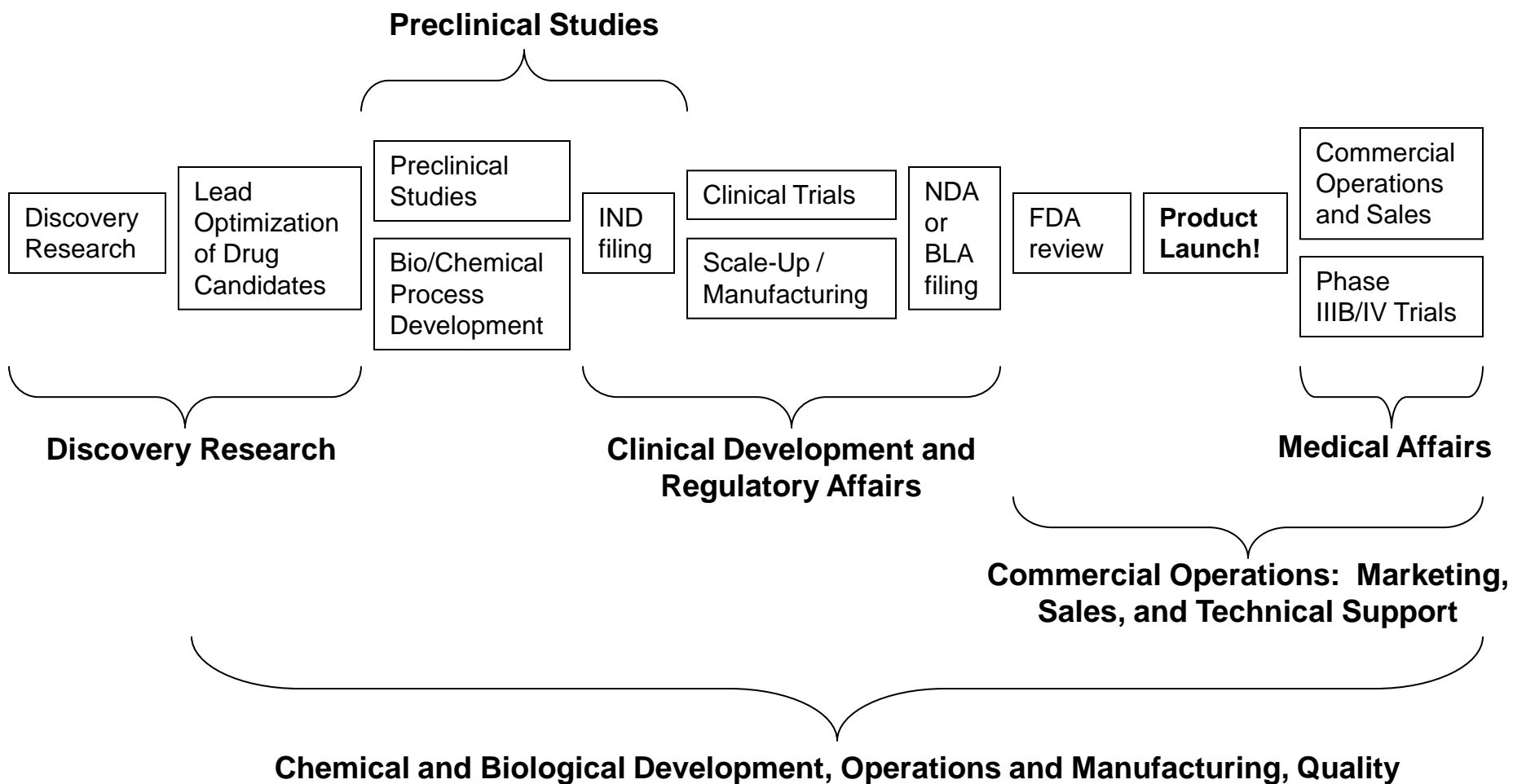
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Results: So Many Careers To Choose!



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Product Development Overview



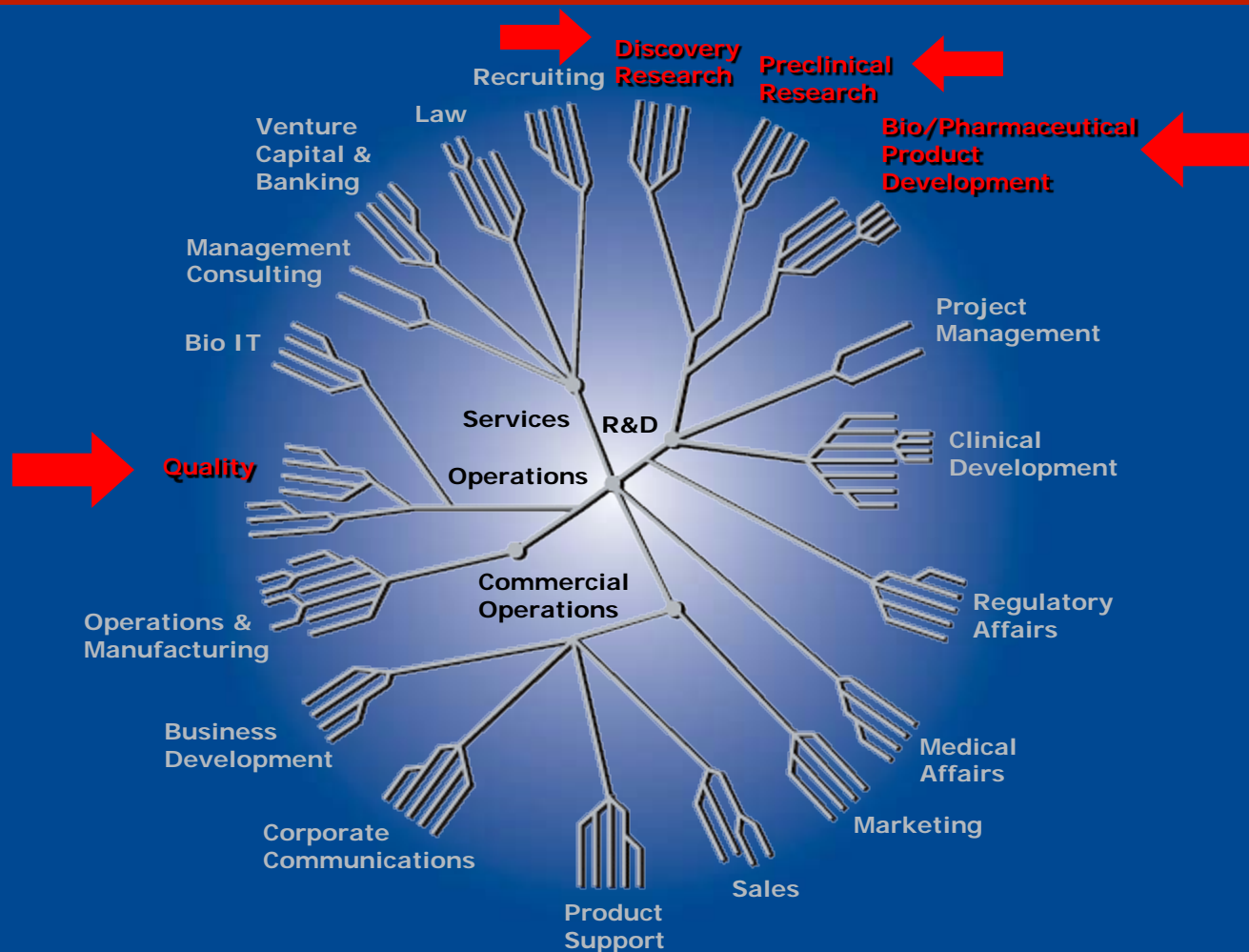
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Careers in Research



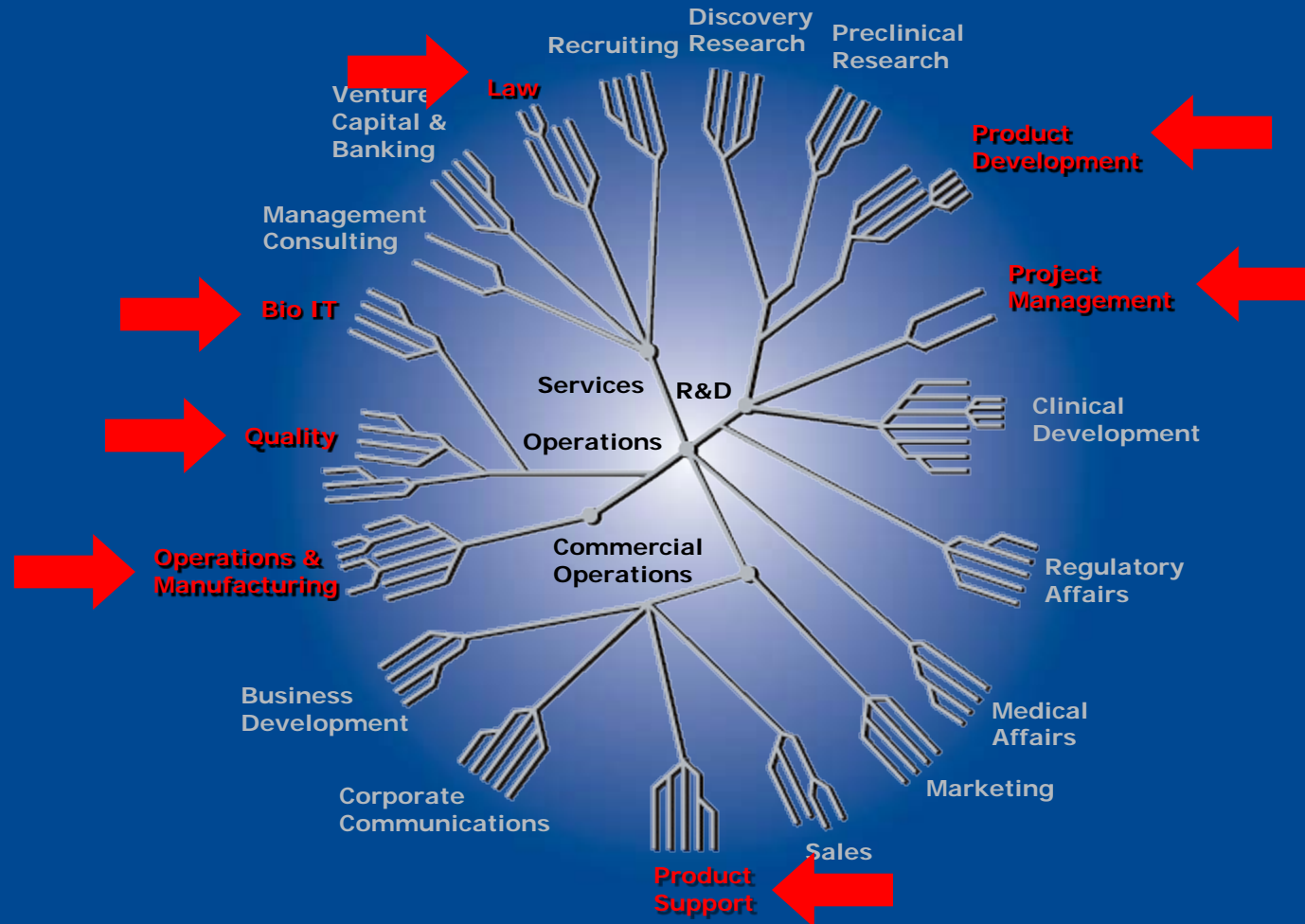
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Bench Research Positions

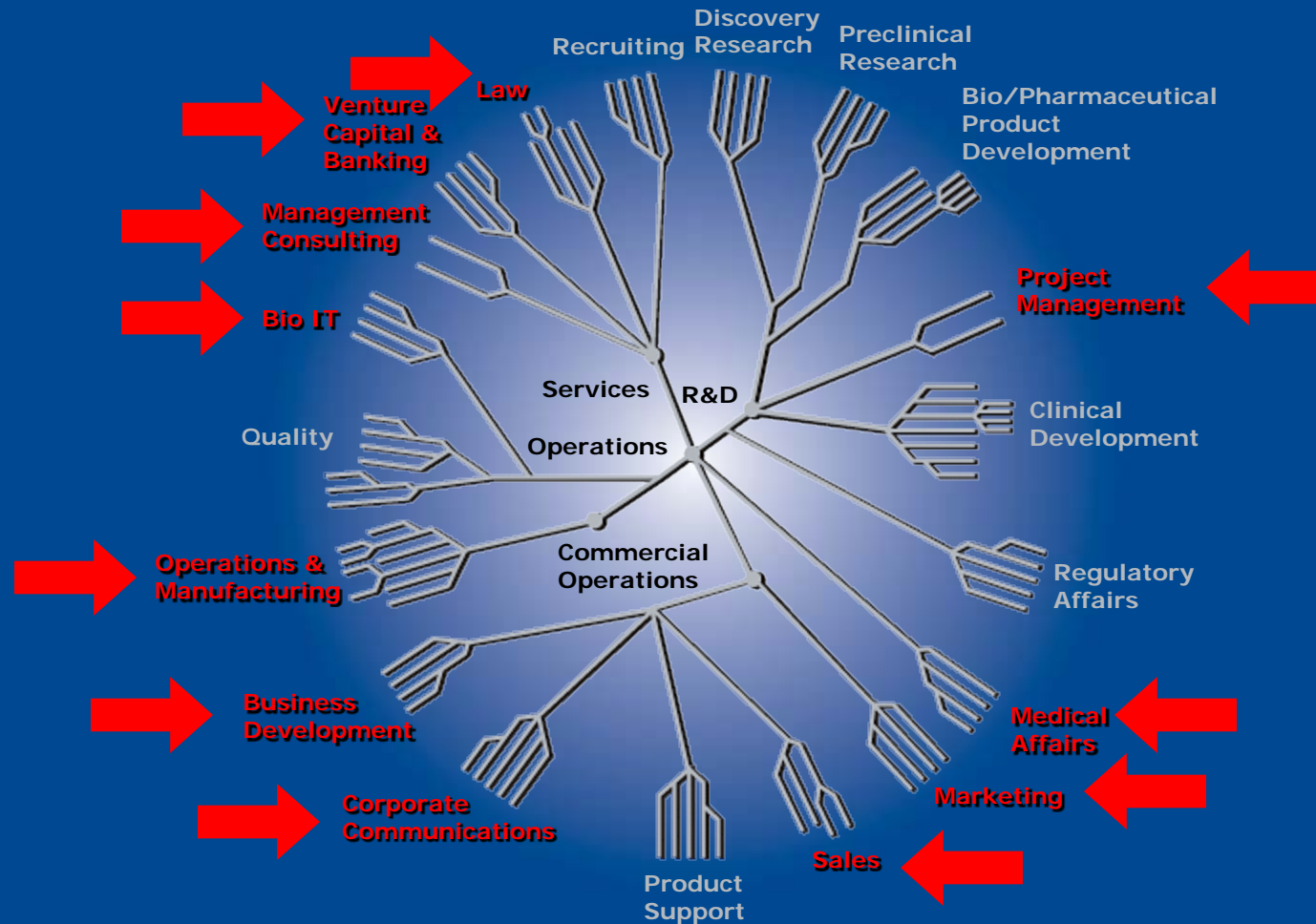


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Careers for Engineers: Medical Device and Biotech Tools Companies

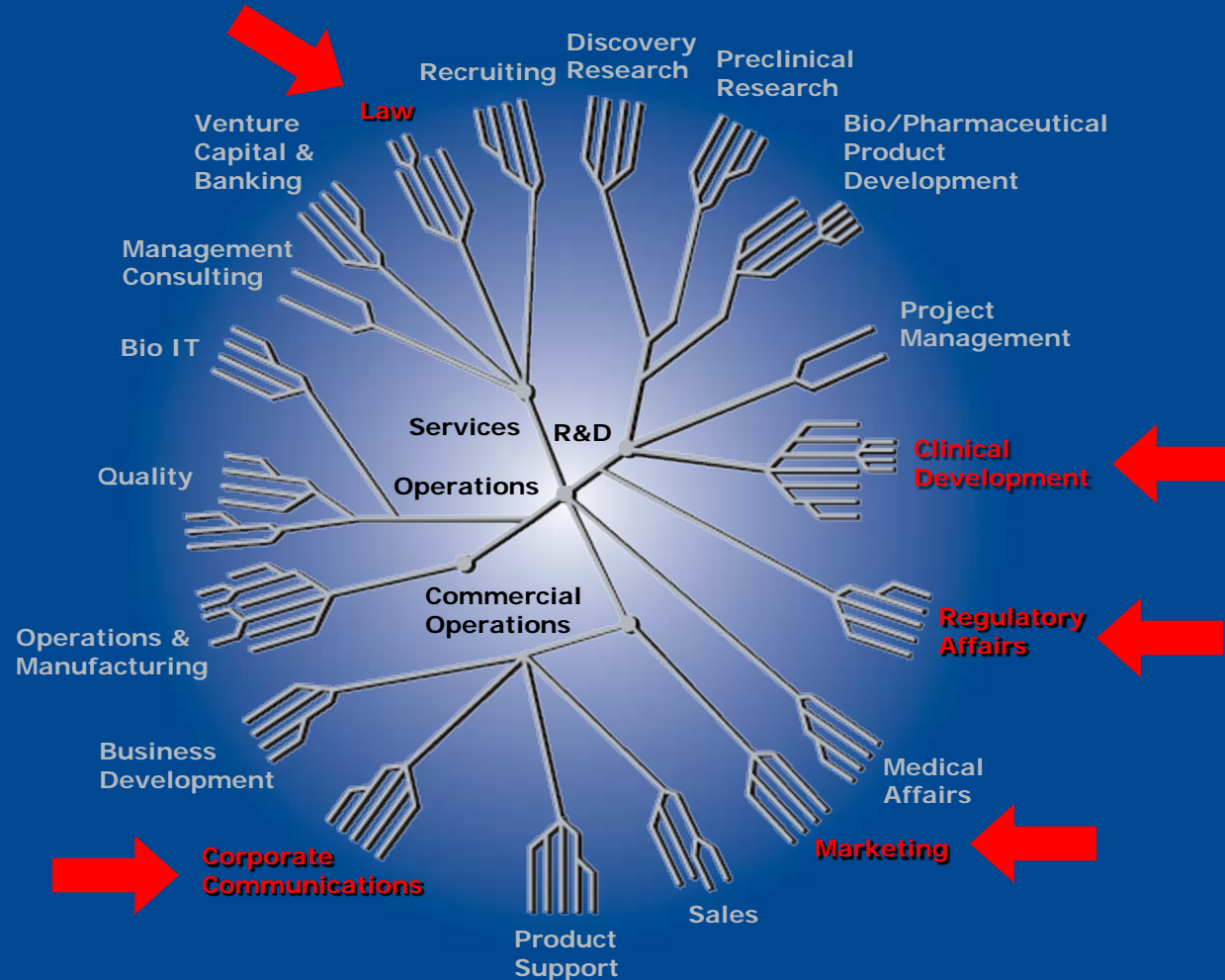


It's easier to train scientists about business than the reverse



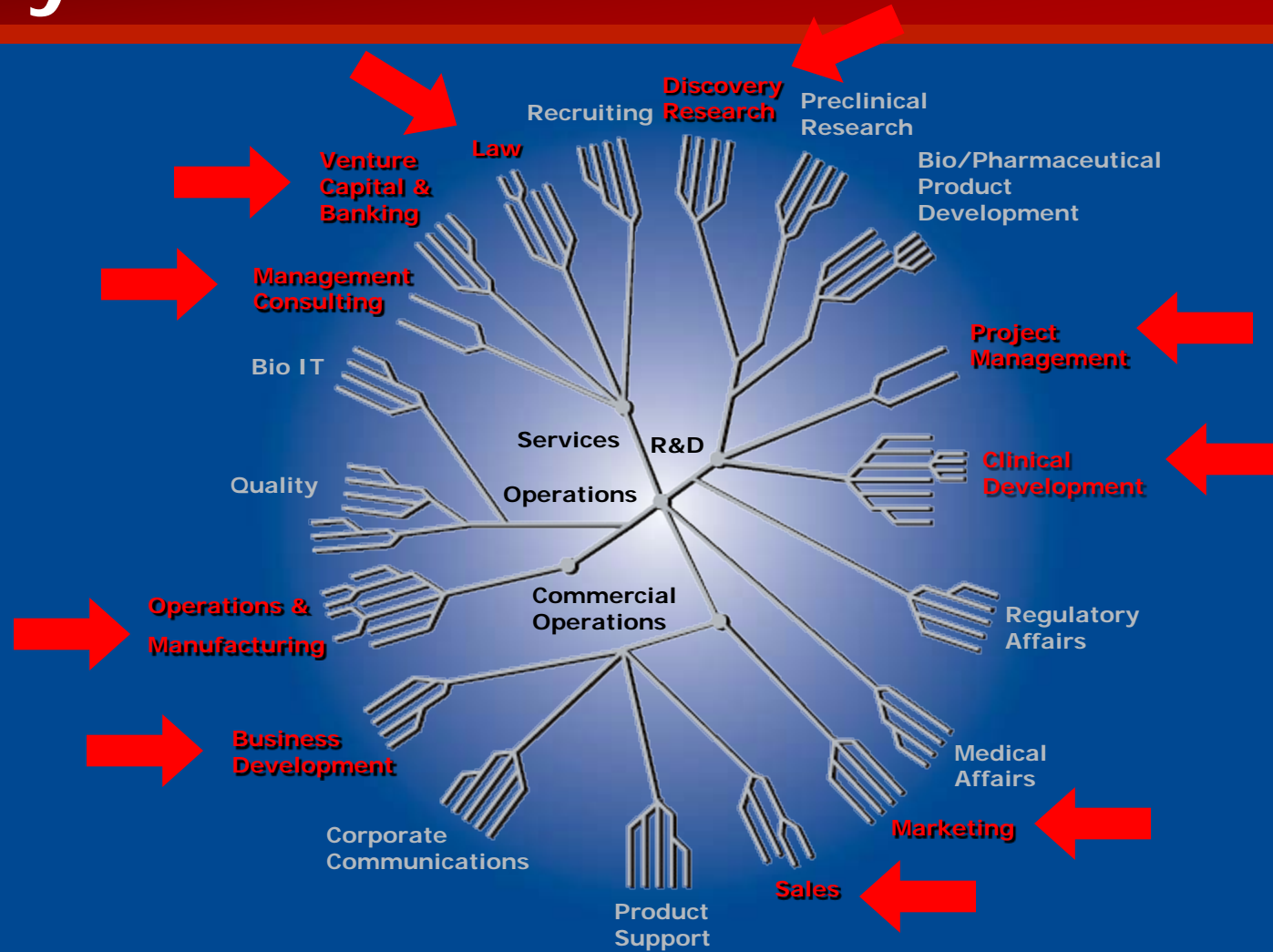
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If you enjoy writing...



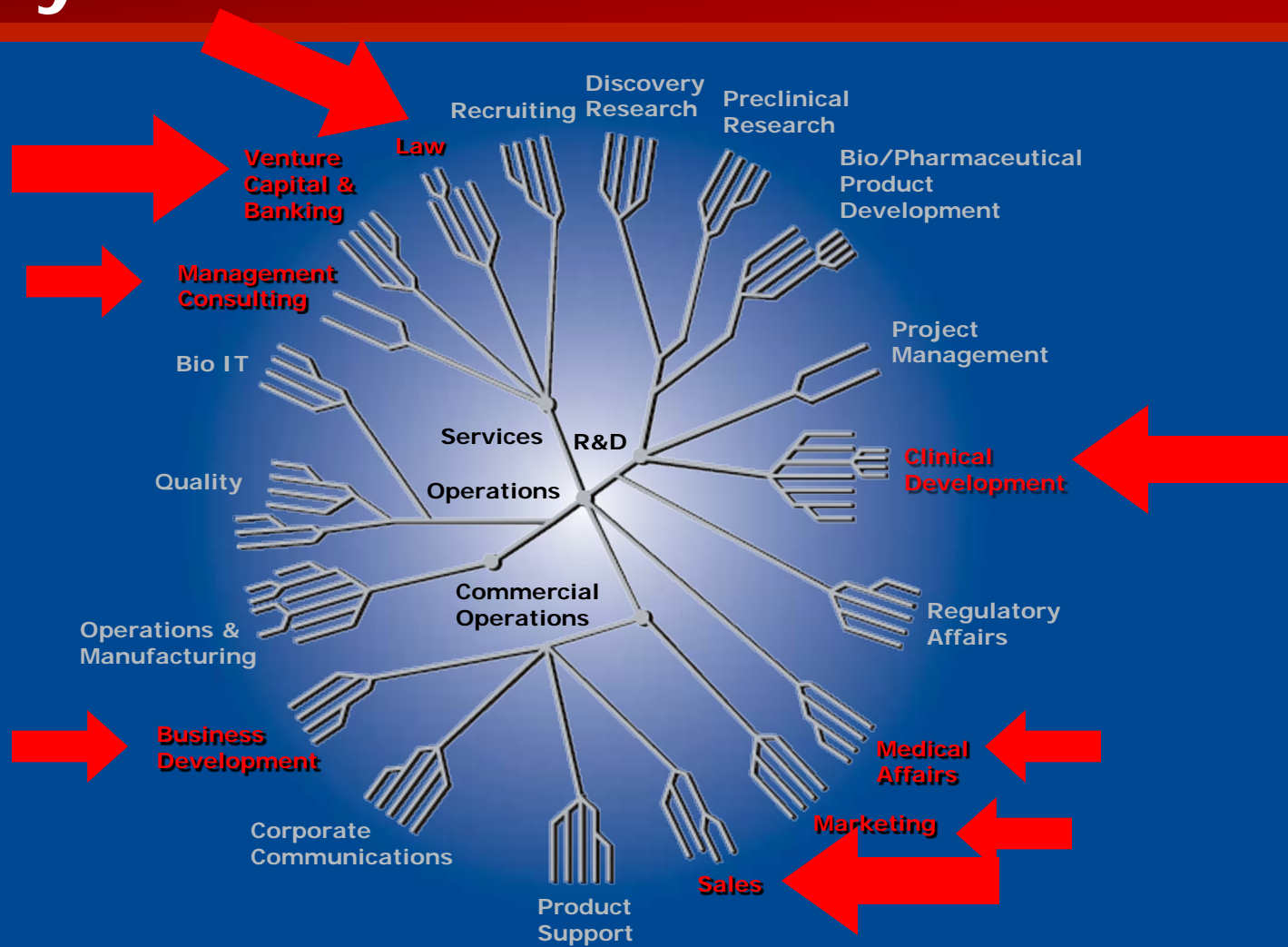
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Do you want to be a CEO one day?



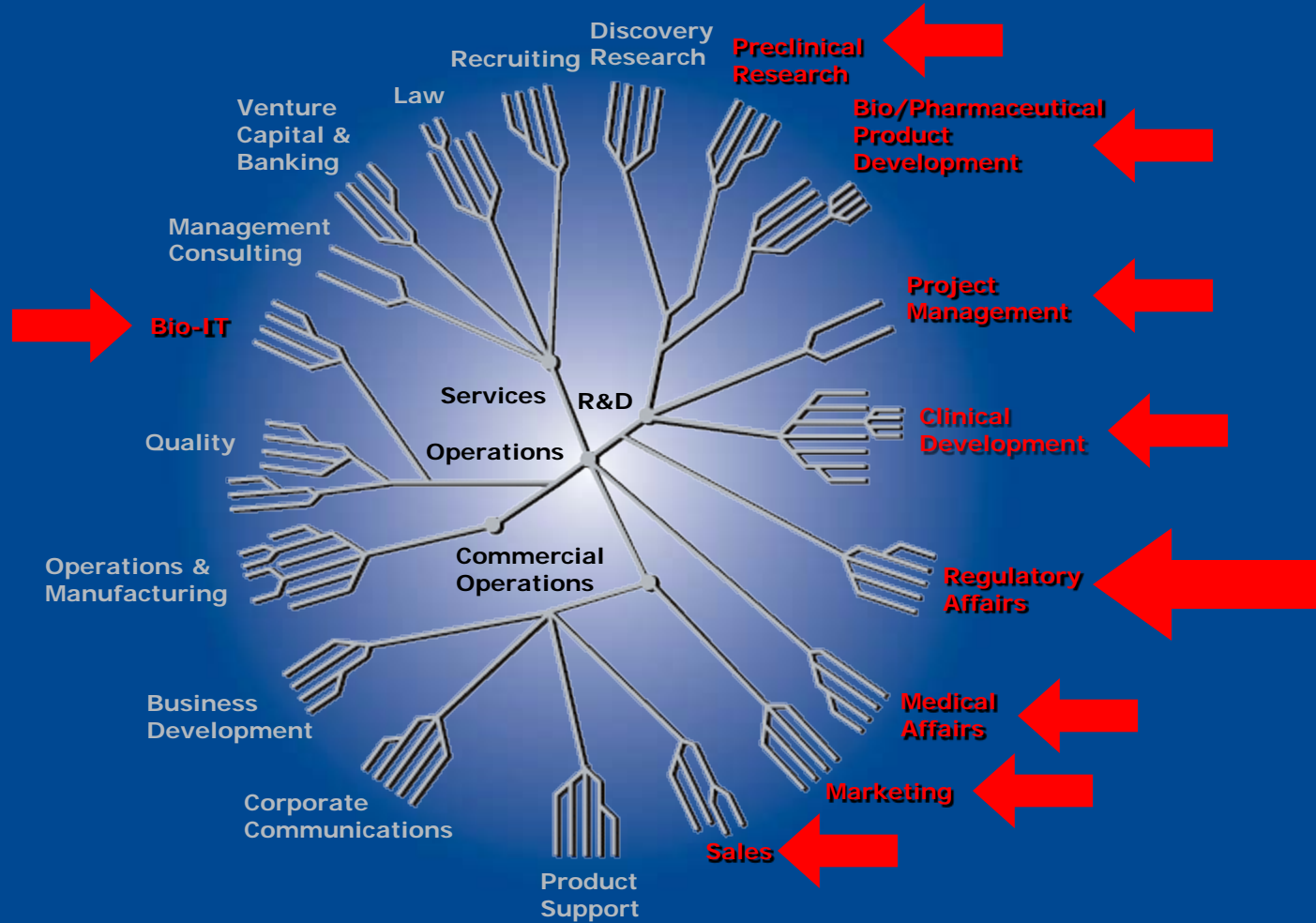
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Careers where you can earn the most money



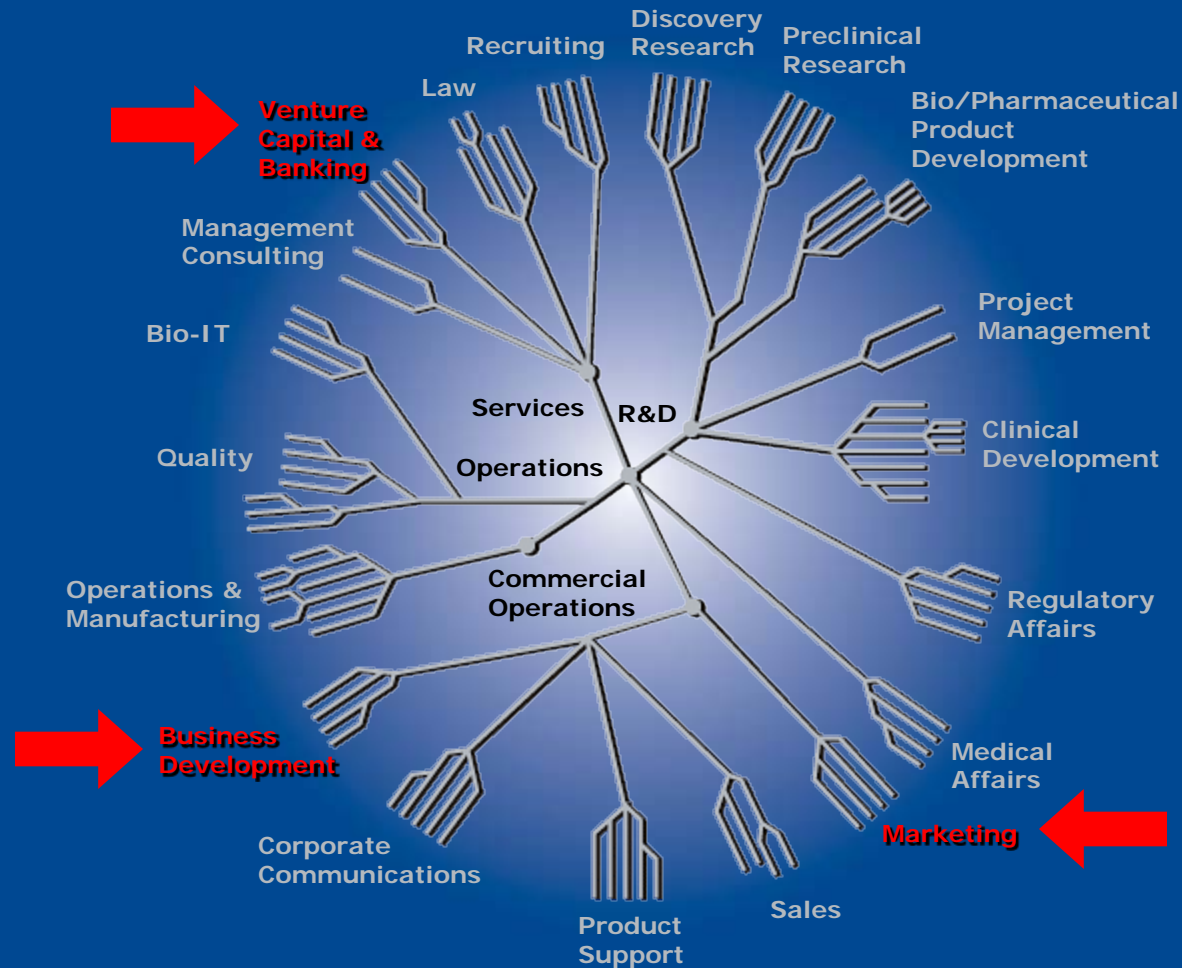
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Hot Jobs



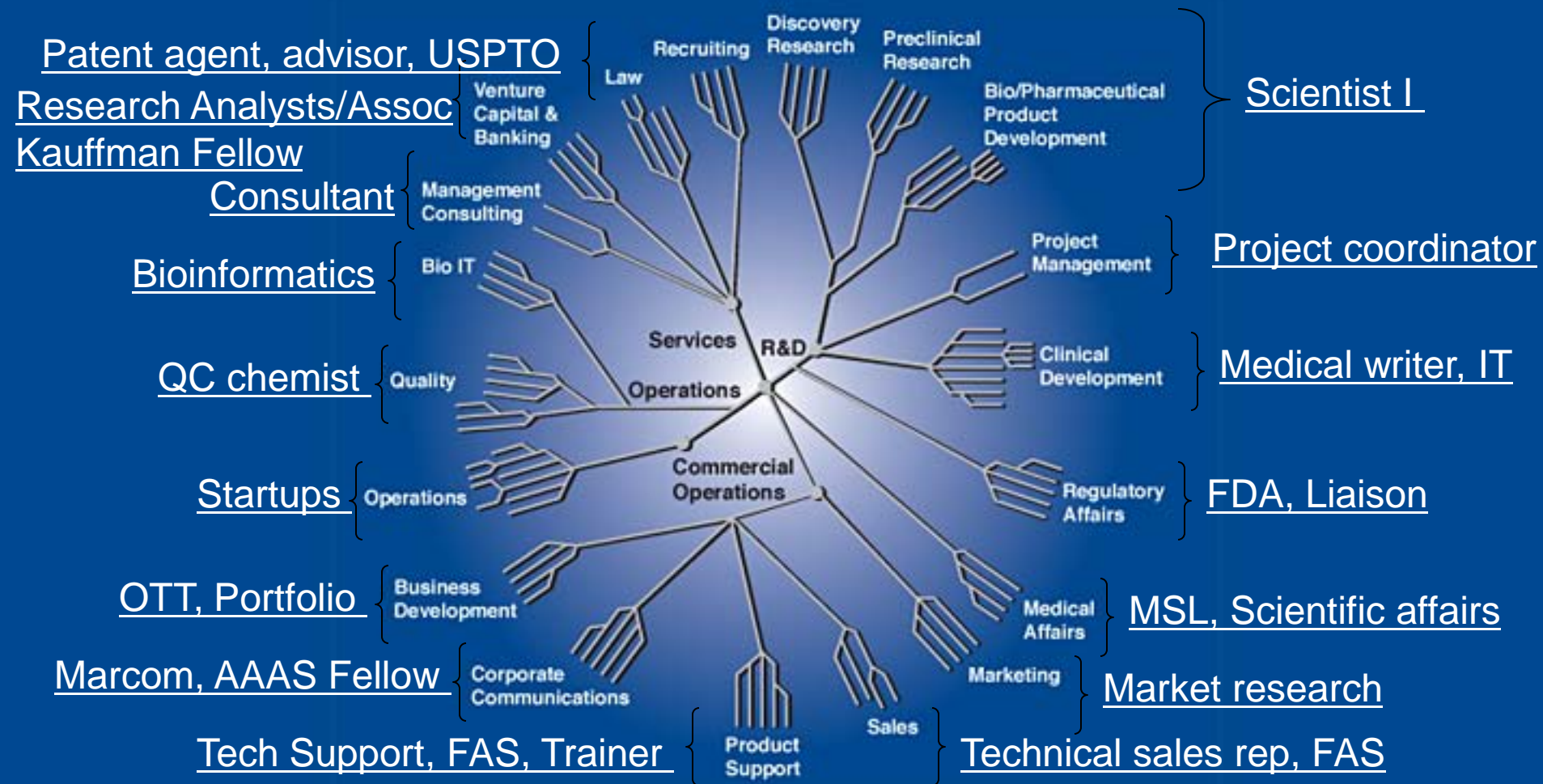
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Highly coveted jobs



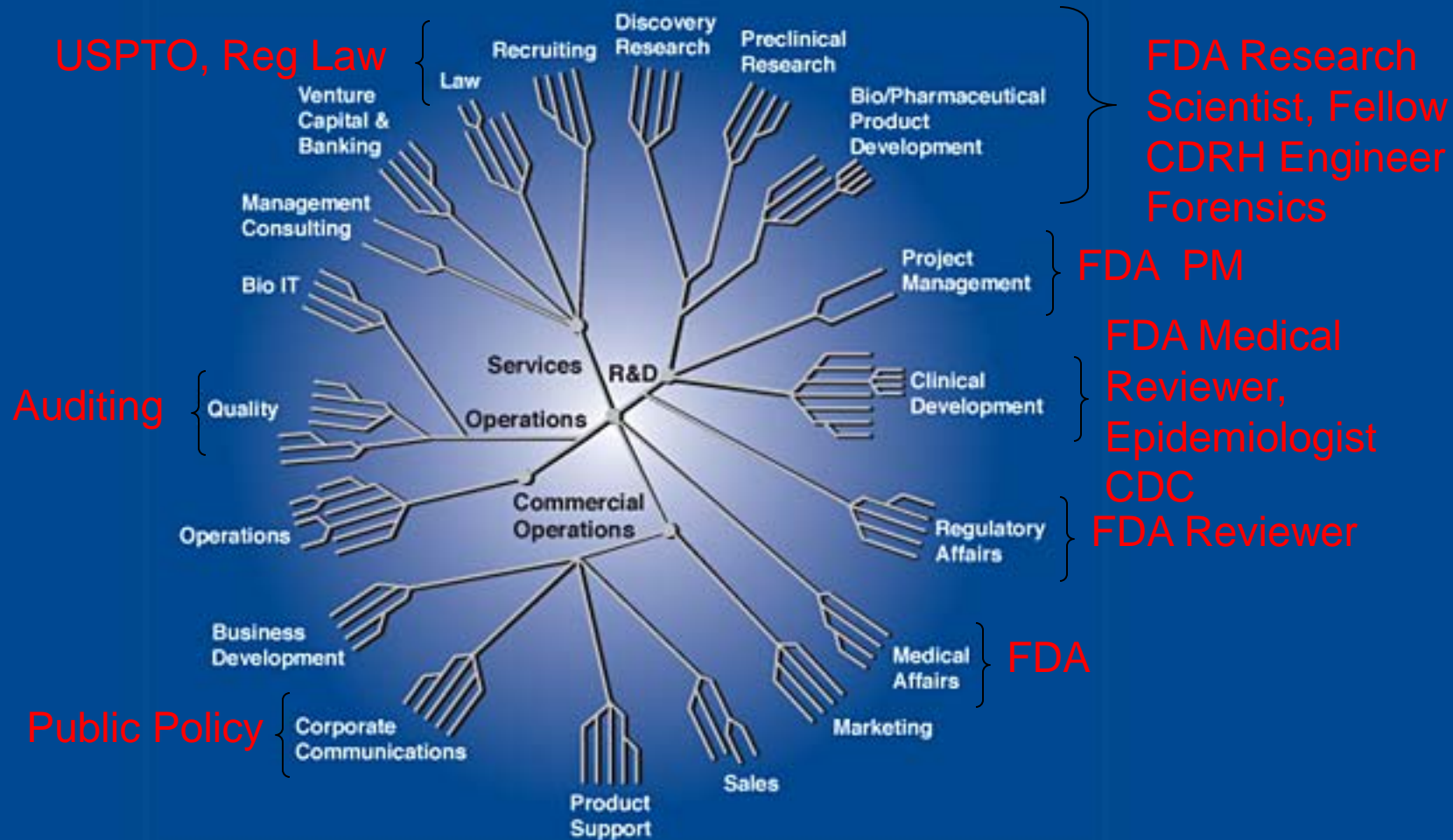
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Positions for PhDs/Postdocs



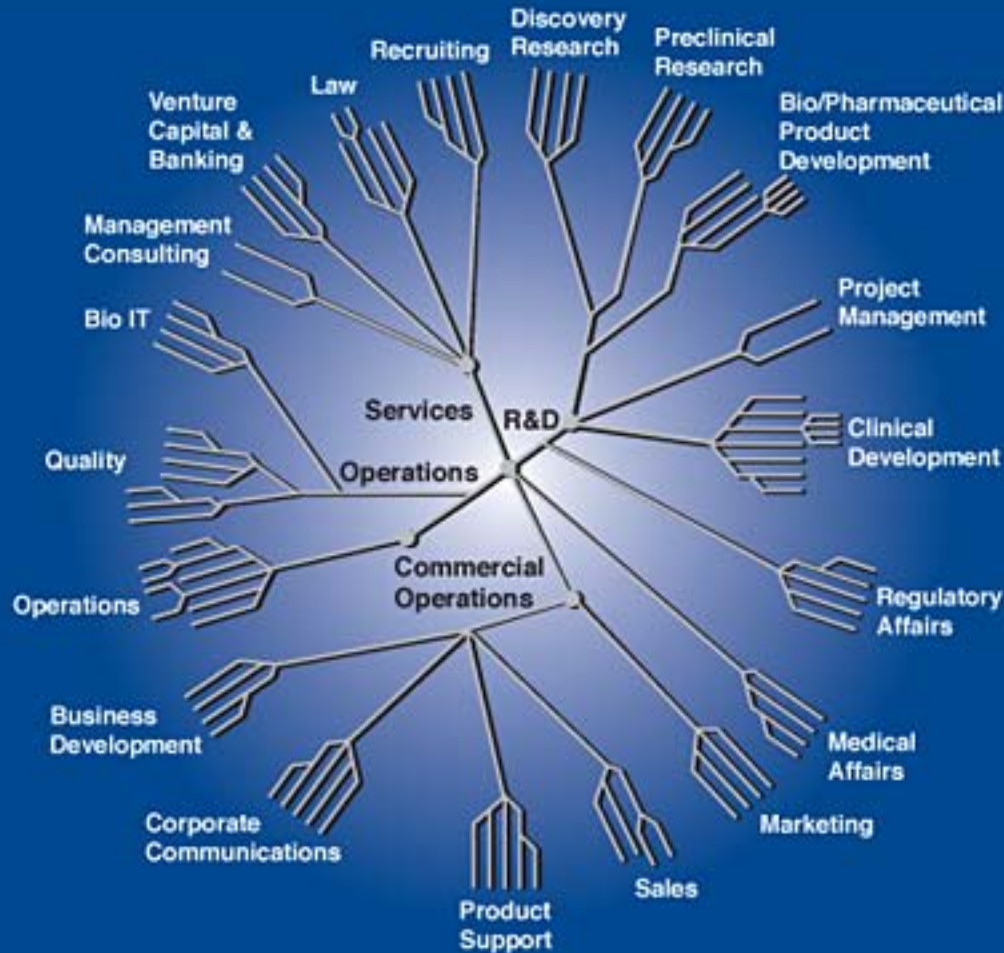
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Government Careers



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So Many Careers To Choose!



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Many areas to consider

Table 6-1: Biotechnology and Drug Development Overview... Where the Jobs Are

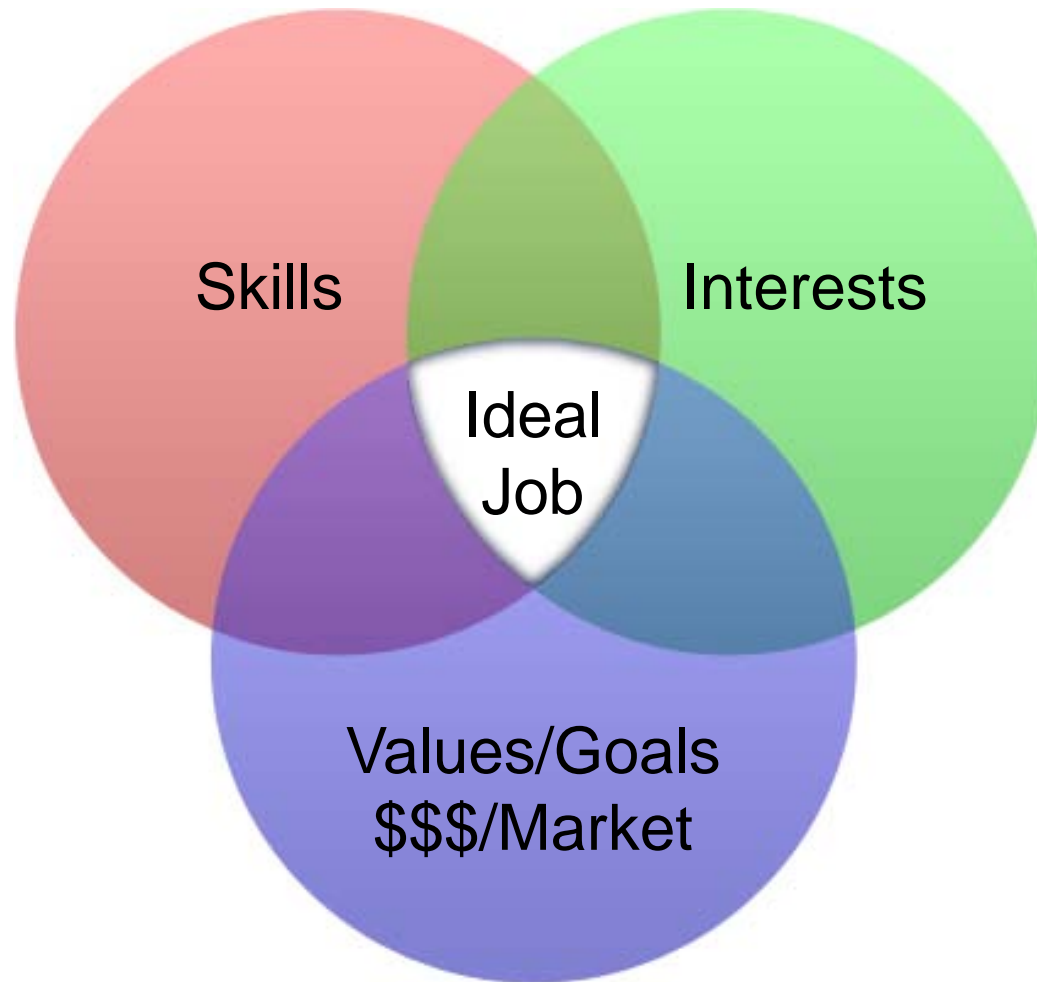
Drug Discovery & Development	Biotechnology "Tools"	Biotechnology Services	Other Pharma/ Biotech Areas	Government Institutions	Medical Devices	Academia
Pharmaceutical companies	Reagents and Chemical suppliers	Management consulting and accounting firms	Agricultural	Food and Drug Administration (FDA) and CBER	Medical devices	Tech transfer
Biotechnology therapeutic companies	Instruments (e.g., microscopes)	Law firms	Industrial biotechnology	Centers for Disease Control (CDC)	Diagnostic companies	Industry-supported labs and institutes
Vaccines	Platform companies (e.g., genomics, proteomics, nanotechnology)	Venture capital and investment banking	Molecular diagnostics	National Institutes of Health (NIH)	eHealth	Education
Drug delivery	Bio-IT	Recruiting firms	Veterinary companies	US Patent and Trademark Office (USPTO)	HC Informatics	Program management
Molecular Diagnostics	Software and hardware	Contract research organizations (CROs)	Foundations, non-profits, social philanthropy	Research institutes and government labs	Telemedicine	Incubators
	Molecular diagnostics	Contract manufacturers (CMOs)	Clean tech/energy	Homeland security & defense		
		Research and clinical testing: clinical labs, customized antibodies	Nanotech	CIA, FBI, and NASA		
		Bio-IT	Journalism	Trade commissions		
		Other agencies and niche providers: PR, advertising, market research, medical communications		Crime labs forensics		
		Consultants				

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Careers in Healthcare

Healthcare Practitioners	Nursing	Associated Careers and Therapists	Technologists and Technicians	Rehab Therapists	Healthcare Administration	Insurance Industry
Physicians	Licensed nurses	Acupuncturists	Anesthesiologists	Art therapists	Admitting officers	Administration
Chiropractors	Registered nurses	Audiologists	Blood bank techs	Certified athletic trainers	Accounting and finance	Actuaries
Dentists	Nurse anesthetists	Dental hygienists	Cardiovascular techs	Dance movement	Coordinators of health wellness	Agents and brokers
Optometrists	Nurse midwives	Dietitians and nutritionists	Radiology techs	Home health aides	Environmental health and safety	Claims adjusters
Podiatrists	Nurse practitioners	Genetic counselors	Clinical lab techs	Music therapists	Food service	Loss control specialists
Veterinarians	Home health aides	Pharmacists	Cytotechnologists	Occupational therapists	Health education	Medical insurance billing and coding reps
	Surgeon assistants	Psychologists	Cardiovascular	Patient reps	Health information technologists	Medical claims reviewers
	Nurse's aides	Occupational therapists	Nuclear medicine	Physical therapists	Human resources	Public relations
		Opticians	Dental assistants	Psychiatric aides	Librarians	Service reps
		Orthotists and prosthetists	Dental lab techs	Recreational therapists	Public relations	Sales and marketing
		Physical therapists	Diagnostic medical sonographers	Rehab counselors	Nursing home directors	Underwriters
		Recreational therapists	Diagnostic imaging	Respiratory therapists	QA directors	
		Respiratory therapists	Dietetic techs	Social services aides	Geriatric care managers	
		Pediatric occupational therapists	Electroencephalograph	Speech language pathologists	Medical records	
		Biomedical engineers	Emergency techs	Substance abuse counselors	Medical billing, claims, patient accounting	
		Biomedical equipment techs	Paramedics		Medical secretaries	
		Biomedical photographers	Food techs		Mental health workers	
		Biomedical writers	Histology techs			
		Child life specialists	Ophthalmic techs			
		Dietary managers	Optometric techs			
		Geriatric social workers	Perfusionists			
			Phlebotomists			
			Pulmonary techs			
			Radiation therapy techs			
			Surgical techs			
			Veterinary assistants			

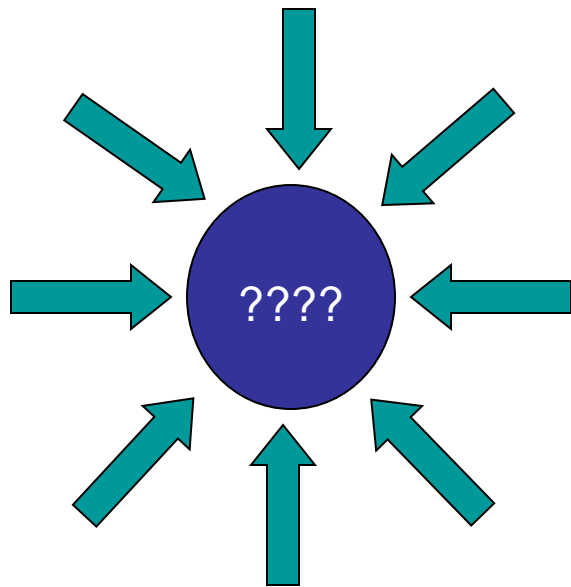
Ideal Job



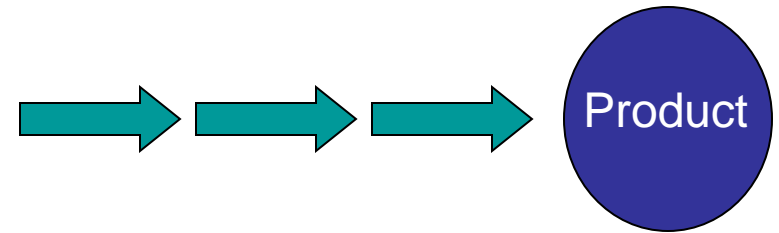
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Academia and Industry

Academia



Industry

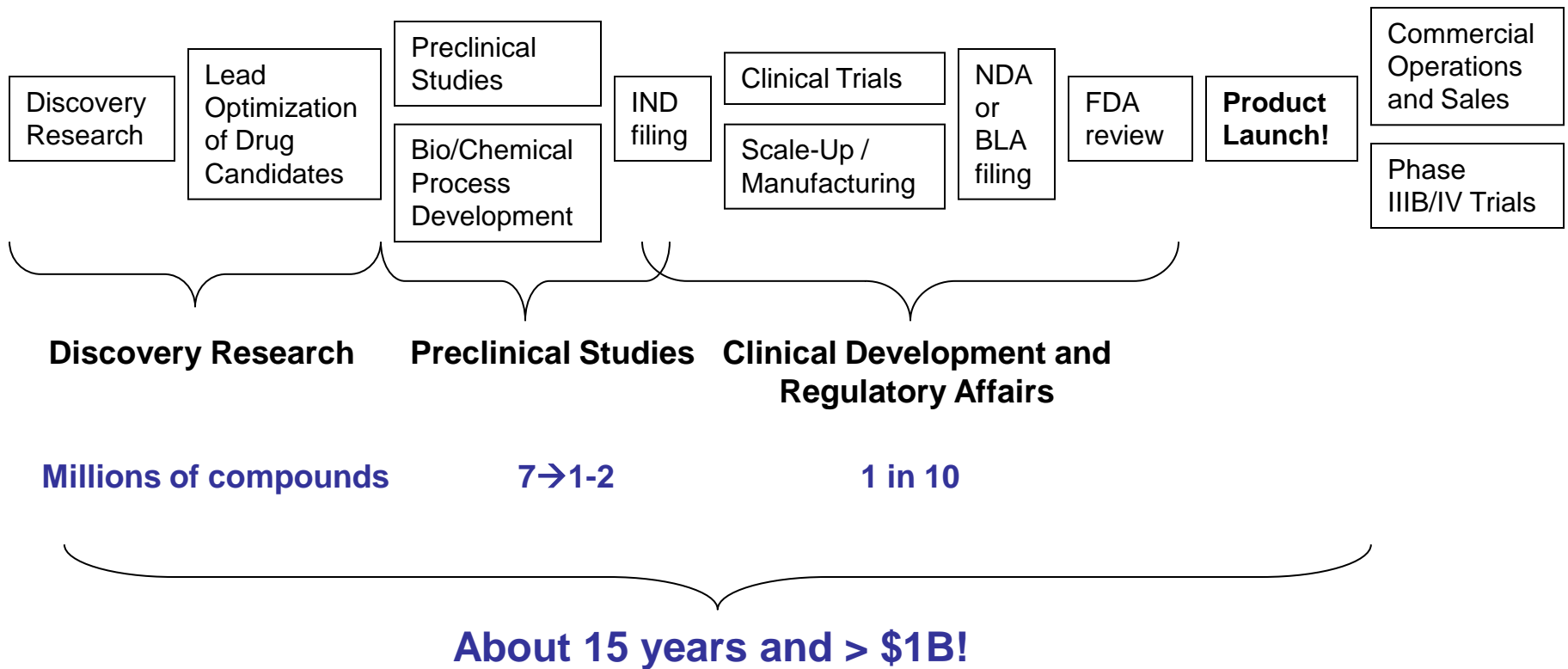


Key Outcome: Publications and Grants

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Drug Development: A Risky Endeavor



Corporate Cultures



Why Work in Industry???

- Most common answer to why people enjoyed their jobs?

Why Work in Industry???

- Overwhelming feeling of higher aspirations for developing drugs that promise to benefit mankind
- Developing cures for the most debilitating diseases, saving lives

Themes to Excel

Personality attributes to be successful,
regardless of the career?

Personality Attributes to be Successful in Industry

- Flexibility
- Communication skills
- Team player
- Interpersonal skills
- Can-do positive attitude, sense of humor
- Multitask
- “Forest through the trees”
- Customer’s point of view
- Creative problem solving skills

Advantages to working in industry (Discovery Research)

- The people
- A team can accomplish a lot—scientific progress is swift
- Team orientation
- Plenty of science to learn, broad exposure to diverse technical topics—intellectually interesting, emph on interdisciplinary science
- Job variety and career opportunities—the ability to escape the bench and explore diff aspects of personality
- Deep resources for doing “big science” (i.e. human genome project), access to soph technology
- **Perk:** you can retain adjunct faculty or clinical position

Disadvantages to Industry (Discovery Research)

- Job security is #1
- Project terminations are frequent and disappointing
- Decisions are made beyond your control
- As you move up the ranks, more meetings to attend (bureaucracy)
- Many more rules and procedures

Some of the Biggest Complaints

- Travel, esp unanticipated
- Stress
- Work/life balance

Advantages to Academic Careers

- **Job security:** tenure and pension plans
- You are your **own boss**--freedom of decision making within the scope of obtaining grants
- **Ability to remain an expert**
- Important role in society
- Mix of job function: advancing cutting edge basic science with teaching and writing

- **Perk:** consult or even start a company

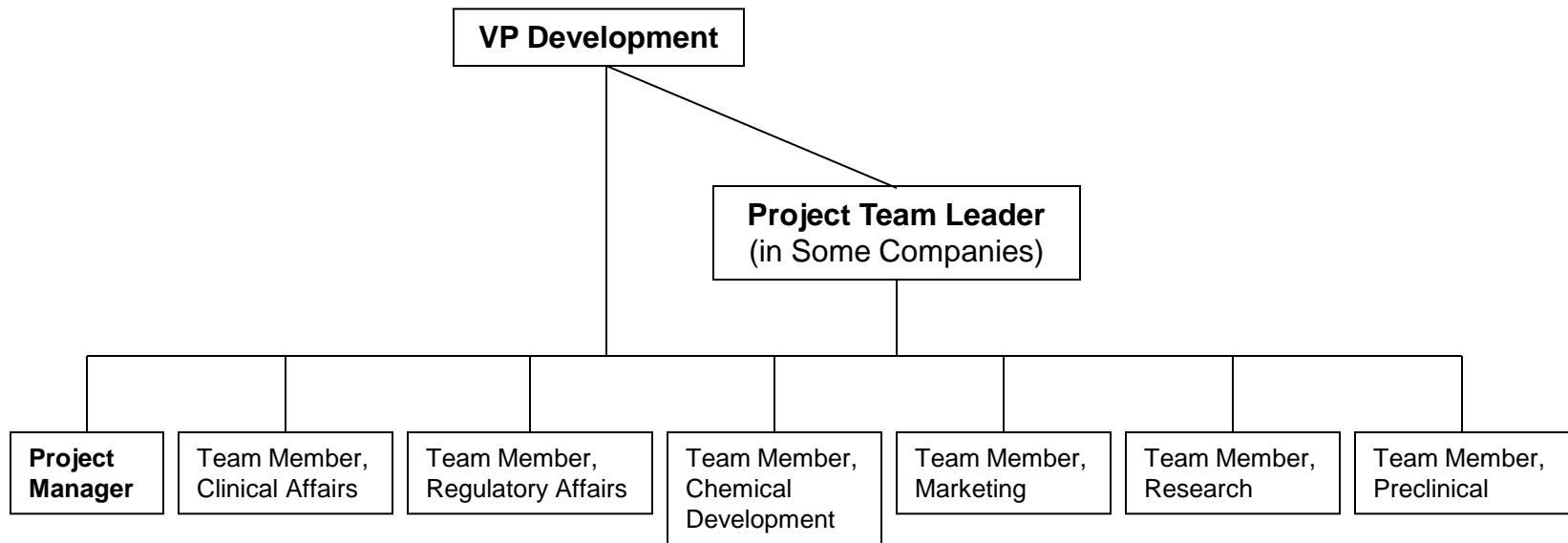
Some of the Disadvantages to Academia

- Number of tenure-track positions
- Grants

Aspects of Working in Industry: Grants

- SBIRs, STTRs
- May be main source of funding for startups
- Defend your research project to executive management team

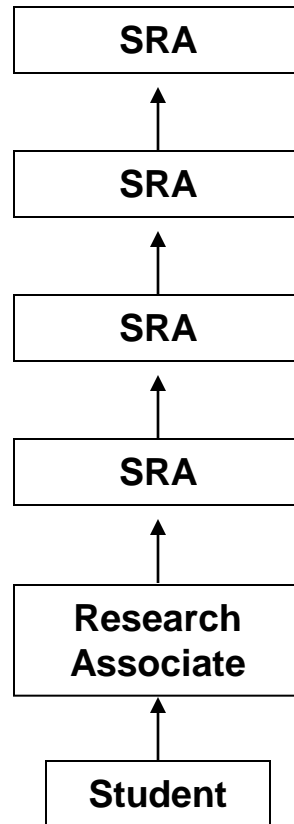
Aspects of working in Industry: Working in Teams



Working on teams

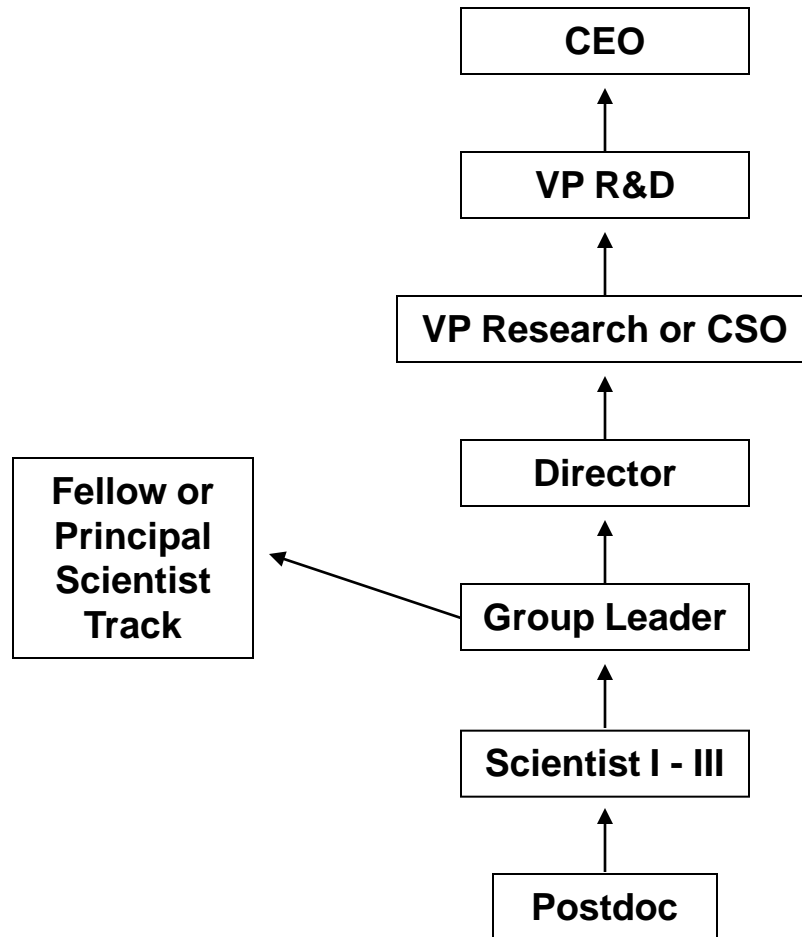
- Share knowledge
- Share successes and failures
- **Individual recognition vs team credit**
- Communication challenges

Career Ladder in Discovery Research for Research Associates



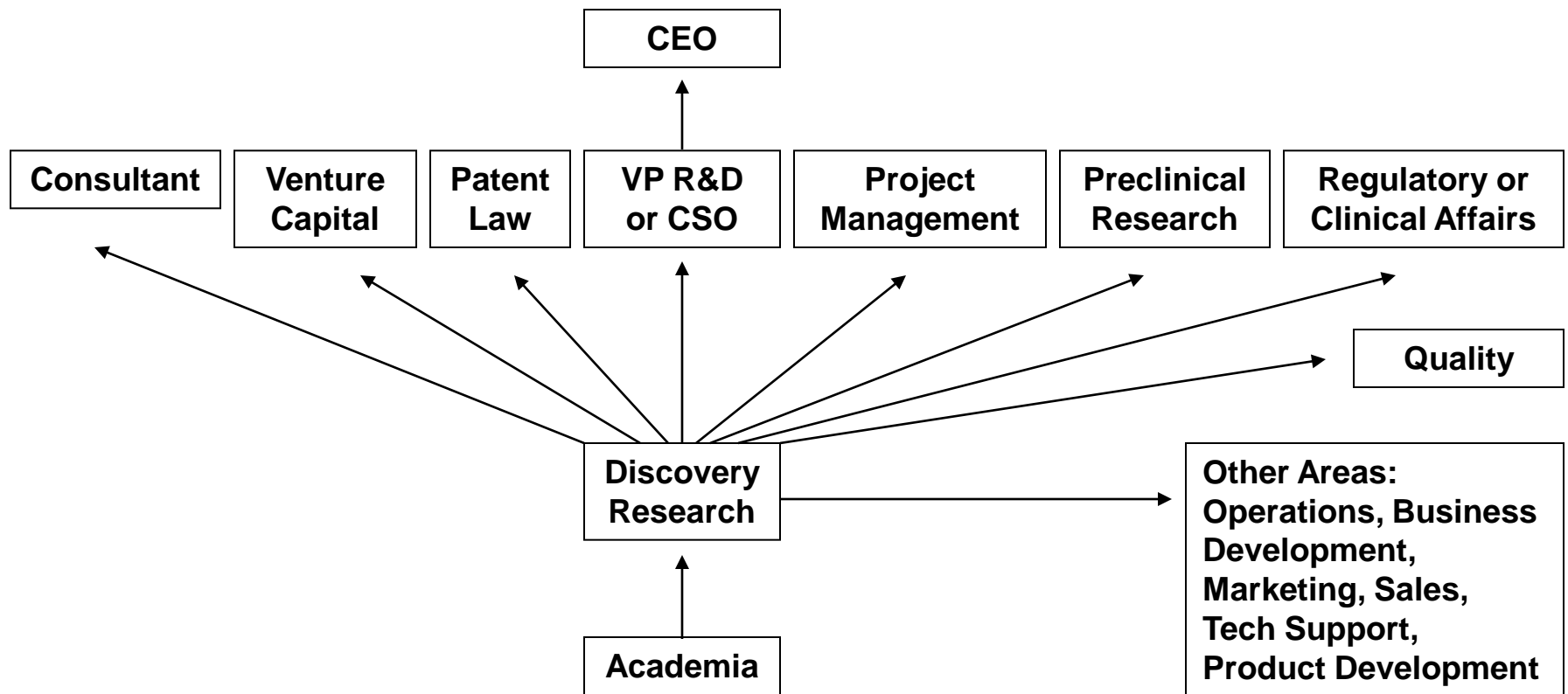
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Career Ladder in Discovery Research: Ph.D.s are not technicians



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Career Potential in Discovery Research



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Aspects of Working in Industry: Relationship with Boss

- Management by Objectives (MBO)
- Performance evaluations tied to promotion and salary
- Mentor and career development
- Areas need improvement
- Provide tools to be successful

Pick a good boss!



Aspects of Working in Industry: 9-5, weekends off, vacations



Exceptions: VPs, C-level, management consultants, investment bankers, bd, startups

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Image: Wikipedia

You may become unfathomably rich



Large and small companies

Go from big to small company



Large and small companies

Large companies:

- Training
- Credibility
- Pigeonholed into position
- Bureaucracy, more political

Large and small companies

Small companies:

- “Multiple hats”
- Corporate culture
- Have a bigger impact in a company
- Not enough resources (limited training)
- Unstable, M&A, licensing, clinical trial failure
- Word of caution: proper training

What you can do now to make yourself more marketable

- Human disease rather than basic research
- Hot therapeutic areas of interest to industry
- “Unmet medical needs”
- Same techniques, drug screens, applied science
- Patent your work
- Gain business understanding
- Gain understanding of clinical development

What you can do now -- continued

- Collaborate with industry cohorts
- Informational interviews
- Industry postdoc
- Follow biotech news
- Publish, publish, publish (but don't perish)
- Presentations and attend conferences and become a perceived expert (get visibility)
- Attend industry events, network and start early

Land a job on the business side

- Work at the OTT→BD
- Visit Haas MBA program—management consulting firms, career coaching
- Business classes
- Join a startup at QB3 or Mission Bay
- Entrepreneurial classes—CBE, QB3 series
- Entrepreneur chapter
- Talk to profs who consult or founders

What you can do now to land a job on the business side--continued

- Follow the biotech stock
- Invest in public companies—demonstrate financial acumen
- Show leadership—start something, run a program, be a President
- Pubs not needed in business

Making the Leap to Industry

- Industry postdoc
- MBT programs, KGI, JHU, SJSU
- Keck Institute's Postdoc Professional Master's Program (PPM)
- Certificates, classes @ UC Berkeley X and UCSC X
- Additional degrees: MBA, MPH, JD
- Volunteer/intern
- Network

Jobs (not about Steve)



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Jobs in Industry

- Difficult job market: 180,000 unsolicited resumes in 30 person company
- i.e. Scientist I at Genentech
- Lay-offs in research
- Large numbers of industry professionals seeking employment
- 2 weeks to 2 years

Finding a job

- Networking
- Informational interviews (networking)
- Applying for jobs online
- Career fairs
- Recruiters

Build Your Network!



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Why networking is so effective

- Someone that you know refers you to a job opportunity
- The more people you know, the greater your chances of being contacted or finding out about an opportunity

Local places to network

- Alumni your best bet
- Local and national conferences
- **www.baybiotechreview.com**
- **www.audreysnetwork.com**
 - www.biosf.org
 - www.awis.org
 - www.bioe2e.org
 - www.B2DG.org
 - www.baybio.org
 - www.EPPICglobal.org
 - www.CABSweb.org
- Many More! ACS, ACRP, you name it, there is a local society

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Networking



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Photo from Wikipedia

The Art of Networking

- It's a two-way street. Be helpful, ask questions, “what can I do for you?” What do you do?
- Have fun!

Networking No-No's

- Can you get me a job?
- Are there any job openings in your company? (what can you say instead?)
- Scanning the audience looking for other people to talk to
- Ask a question and then walk away
- Looking desperate
- “I have to get a drink—I’ll be right back”
ditch

Networking on the Internet

- Google “therapeutic area conference”
- Contact speakers, authors
- Search LinkedIn in specific companies that interest you for people that you might know
- Professors who consult/founders
- Contact alumni
- Talk to sales reps

Using LinkedIn and Internet networking sites

- LinkedIn.com
 - The greater your LinkedIn network, the more access you have
 - LinkIn with LIONS and power users
 - Join LinkedIn groups, alumni organizations
 - Treat LinkedIn profile like a resume
 - Email address or way to be contacted
 - Keep professional
 - Jobs are on site and groups
- Social Media: Twitter, Facebook

“Shop” for a Job on the Internet

- Job posting sites
 - www.biospace.com
 - www.craigslist.org
 - www.audreysnetwork.com
 - www.careersbiotech.com
 - www.indeed.com
 - www.ventureloop.com
- Professional societies
 - Therapeutic areas and functional areas, i.e. immunology, neurosciences, oncology, marketing, business development

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Career Fairs

- BioSpace, www.biospace.com
- Campus Career Fairs
- Society meetings, i.e. ASCB, AAAS,

Trade Shows at Scientific Conferences

- BIO, www.bio.org the biggest
- InformEx, Chemistry www.informex.com
- ASCB, www.ascb.org
- Interphex, manufacturing, www.interphex.com
- Tri-Molecular, www.tri-conference.com

Free Biotechnology News

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 - www.biospace.com
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- FierceBiotech
 - www.fiercebiotech.com
- FierceBioResearch
 - www.fiercebioreseracher.com
- **OnBioVC**
 - www.onbiovc.com
- **The IN VIVO Blog**
- Nature Biotechnology
 - www.nature.com/nbt/
- **The Scientist**
 - www.the-scientist.com
- Biotechnology Industry Organization
 - www.bio.org

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Career counselors and services

- On campus, medical schools, business, law programs
- Alumni school counselors usually free
- Off campus
- www.edd.org, www.jvs.org, www.thejobforum.org, NOVA, ProMatch, Peninsula Works, EastBay Works, free interview coaching and resume preparation

Resumes



Image: Wikipedia

Resumes: how to stand out

- Prepare for the 5 second scan
- Resume is about what you can do for the company
- Align skills with the position specs
- Highlight and show how you fit the position
- Add key words, therapeutic areas

Tips for submitting your resume to large companies

- Job requisition number
- Career objective
- Submit resume to same types of jobs
- Apply directly on the company's website
- Network, network, network!

Working with Recruiters

- You are your own best job agent—don't rely on other people to help you find a job
- Recruiters are paid by the company--not by the job candidate

Working with Recruiters

- They know about positions that may not be posted on the Internet—the “hidden” job market
- They will get your resume in front of the hiring manager

Working with Recruiters

- Recruiters are hired to place hard-to-find talent, i.e. 10-15 yrs industry exp
- Rely instead on temp-to-hire firms Lab Support and Kelly Services

Interviewing



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The Art of Interviewing

- Don't interview like a postdoc!
- Research the company

Good Interviewing Books

- Knock em dead
- 101 Great Answers to the Toughest Interview Questions
- 301 Smart Answers to Tough Interview Questions

The Current Economy



The current economy: "The Times, They are a Changin'"

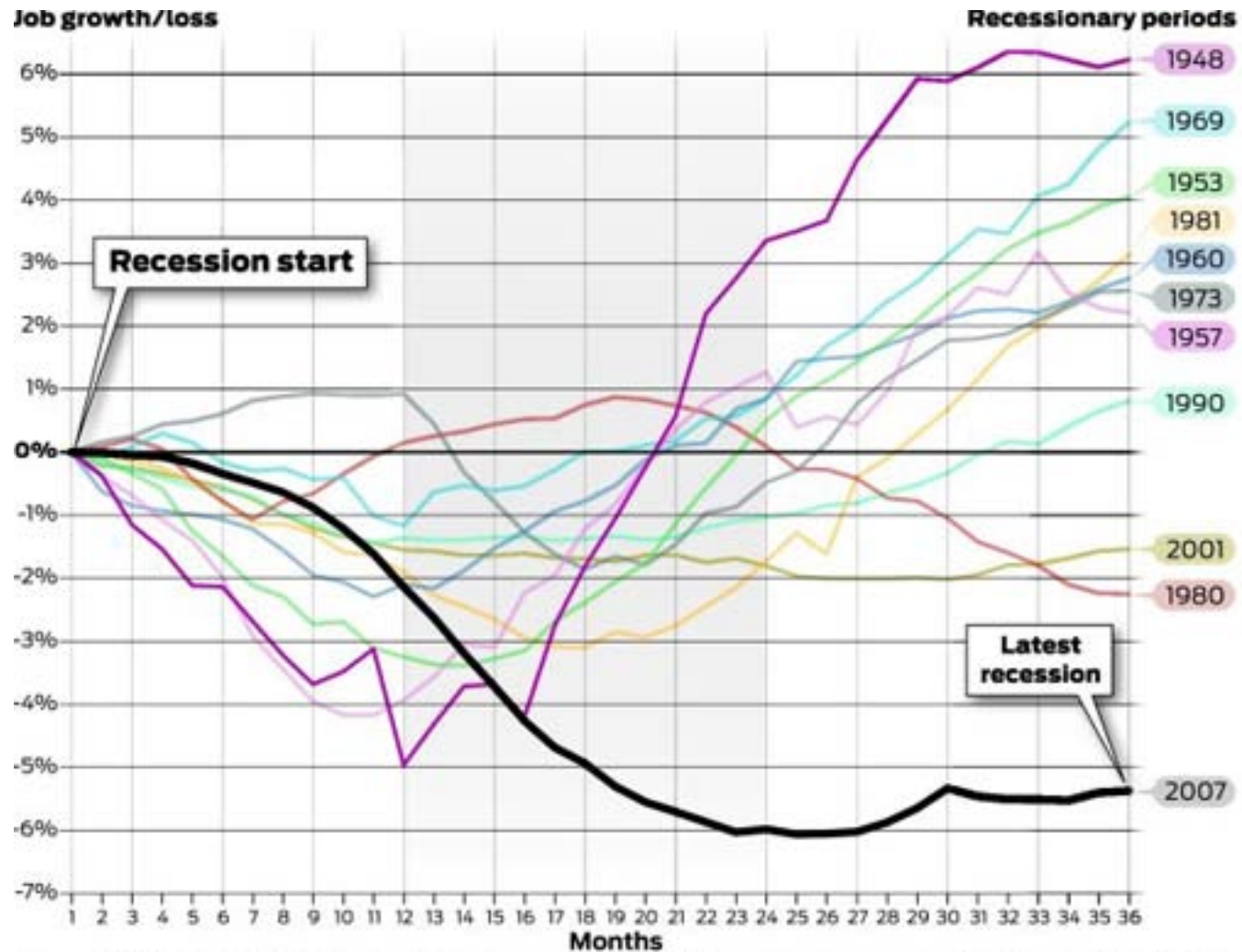
- 2008 was a bad year
- 2009 was a *terrible* year
- 2010 a little better
- 3 IPOs in 2009, 17 IPOs in 2010, lackluster receptions
- Raised \$55B in both 2010 and 2009

Top 5 lay-offs in 2009

- Pfizer/Wyeth – 19,500
- Merck/Schering Plough – 16,000
- J&J – 8,900
- Astra Zeneca – 7,400
- GlaxoSmithKline – 6,000

Source: www.fiercebiotech.com, December 9, 2009

Unemployment Rate 2010



Sources: Heather Boushey, Center for American Progress, Bureau of Labor Statistics

John Blanchard / The Chronicle

Trend: It's becoming more difficult to develop drugs

- Rising costs of product development >\$1.3B
- Increased failure of Phase III drugs
- Number of approved drugs per year
- FDA becoming more stringent
- Rapidly raising HC costs
- Reimbursement a big issue

Industry trends

- ROI for LS VCs was -1.5%
- Less VCs, less money, smaller investments
- More difficult for startups to raise money
- Public markets less interested in LS, IPO window lackluster

Not so bad off...

- Biotech and medical devices better than other industries
- Big biotech is doing well
- Big pharma is cash rich, patents expiring, need to fill pipelines
- A great time to start a company
- Ex-Genentechers founding companies

VCs are Funding Biotech and Medical Device Companies

Investments by Industry / Q3 2010

Industries Defined	Total \$ Invested	Average \$ Per Deal	Deals
All	\$4,820,088,400	\$6,179,601	780
		Amount	% of Total Deals
<u>Software</u>		\$1002M	20.79%
<u>Biotechnology</u>		\$944M	19.58%
<u>Medical Devices and Equipment</u>		\$572M	11.88%
<u>IT Services</u>		\$453M	9.40%
<u>Industrial/Energy</u>		\$440M	9.14%
<u>Semiconductors</u>		\$250M	5.18%
<u>Media and Entertainment</u>		\$240M	4.97%
<u>Telecommunications</u>		\$207M	4.29%
<u>Healthcare Services</u>		\$128M	2.65%
<u>Networking and Equipment</u>		\$124M	2.57%
<u>Electronics/Instrumentation</u>		\$94M	1.94%
<u>Computers and Peripherals</u>		\$86M	1.79%
<u>Business Products and Services</u>		\$82M	1.70%
<u>Consumer Products and Services</u>		\$74M	1.54%
<u>Financial Services</u>		\$74M	1.53%
<u>Retailing/Distribution</u>		\$38M	0.79%
<u>Other</u>		\$12M	0.25%

Source: PricewaterhouseCoopers, Money Tree Report, www.pwcmoneytree.com

The Scenario at Big Pharma...

- Dismal internal R&D returns
- Cost per successful drug has risen (cost of R&D has gone up, shorter periods of economic returns due to generics and patent life span, declining productivity)
- Regulatory hurdles higher

Big pharma solution: outsource R&D to biotech

- “Externalize” small mol discovery research, pre-Phase III compounds, particularly for riskier therapeutic areas (NR, COPD, Cardio)
- Reduction in R&D research and reallocating resources to in-license deals with biotechs
- Move from R&D to “Search & Development” orgs
- Reduces investment risk
- Biotechs expected to become pharma’s main R&D engine

Reason for biopharma to outsource: develop presence overseas

- Pursue a market presence
- China expected to be third largest Rx market by 2014, number two in 2020
- Growing markets Australia, S. Korea, India, Vietnam, Japan, Russia
- Cost of dev is 1/5 to 1/3rd, labor costs are rapidly rising

Outsourcing and impact on jobs

- Chemistry and manufacturing overseas
- Small molecule, devices, large mol safer
- Clinical trials, preclinical, research and IT
- Virtual companies= growth in services and consultants
- Still need quality and PM
- Global need

Where are the jobs?

- Academia (stimulus package)
- Research institutes, i.e. CIRM, Scientific Officer
- Genentech, successful biopharmas
- Service companies, i.e. CROs and CMOs
- Biofuels (bioreactors, fermentation, microbiology, plant genetics (agbio))
- Personalized medicine
- Small venture-backed companies

Hot growth potential sectors: new and emerging areas

- Healthcare, surgery centers
- Generics and biosimilars
- Biofuels and green/clean tech, grey water, energy
- Personalized medicine/companion Dx
- Combination therapies
- Telemedicine, mobile HC apps, “doc-in-the-box”

Trend to transition to electronic data capture in just about every job function

- Healthcare informatics (i.e. electronic health records)
- Laboratory automation
- Bioinformatics (personalized medicine)
- Data management, bio-IT
- Regulatory affairs, i.e. electronic filing
- Discovery research, i.e. eNotebooks
- Intersection of life and computer sciences training

The Future of the Life Sciences Remains Promising

- Significant unmet medical needs remain—neurological disorders, cancer, infectious diseases, diabetes, obesity, cardiovascular diseases
- People are living longer, aging population all over the world
- Tremendous market opportunity in China, India and other emerging countries
- Energy

Recommendations for job search during difficult economic times

- Non-glamorous jobs
- Temp-to-hire/contract ops
- Flexibility in job search
- Can't find a job--start a company!
- Start networking and start early

Find your niche



Acknowledgments

- Over 200+ industry professionals

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- Molly Schmid, Joseph Carlino, Betsy Alberty, Angelie Agarwal, Bill Lindstaedt

Even More Special Thanks to:

- My father, Bill Freedman, who edited the chapters multiple times and Peter Symonds

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Additional Information

- Free sample chapter on Careers in Project Management, www.careersbiotech.com
- List of job posting sites under career resources at www.careersbiotech.com

Recommended Books for Academia

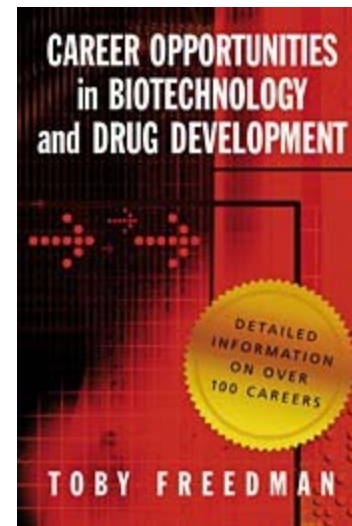
- *At the Bench and At the Helm*, Kathy Barker, CSHLP
- *Making the Right Moves: A Practical Guide to Scientific Management for Postdocs and New Faculty*, Burroughs Wellcome Fund, HHMI, www.hhmi.org/labmanagement
- *Lab Dynamics: Management Skills for Scientists*, Carl and Suzanne Cohen, CSHLP
- *Managing Scientists*, Alice Sapienza

Recommended Industry Books

- *Science Lessons*, Gordon Binder, Former CEO of Amgen
- *Put Your Science to Work*, Peter Fiske
- *Career Opportunities in Clinical Drug Research*, Rebecca Anderson
- *Nontraditional Careers for Chemists*, Lisa Balbes
- *Alternative Careers in Science*, Cynthia Robbins-Roth

Book Information

- *Careers in Biotechnology and Drug Development*
- Published by Cold Spring Harbor Laboratory Press
- Books available on Amazon and www.cshlpress.org
- Paperbacks selling for \$35
- Hard covers selling for \$47
- Now available in German!
- www.careersbiotech.com



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and May you find a Cure for Cancer!