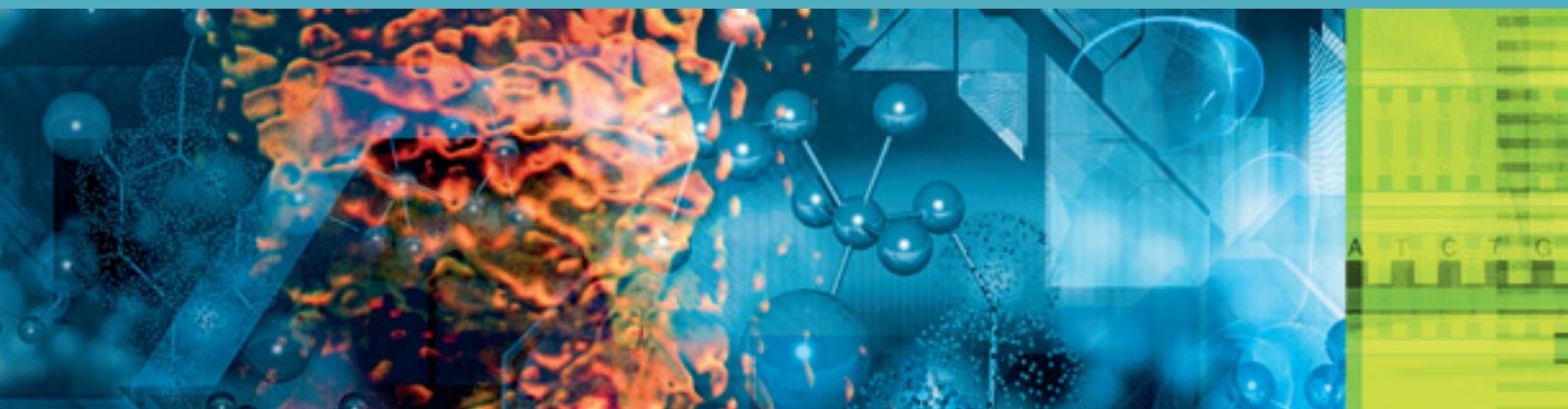


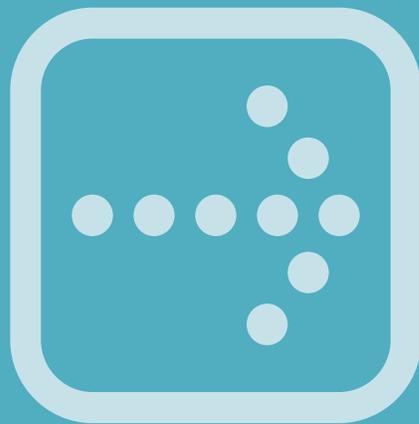
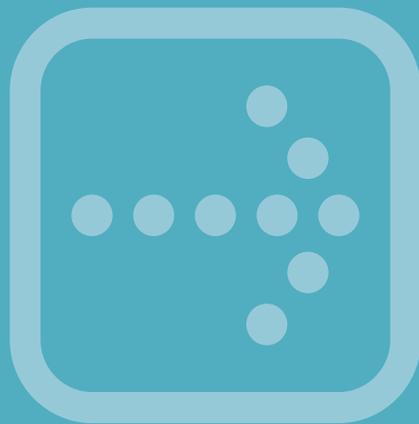
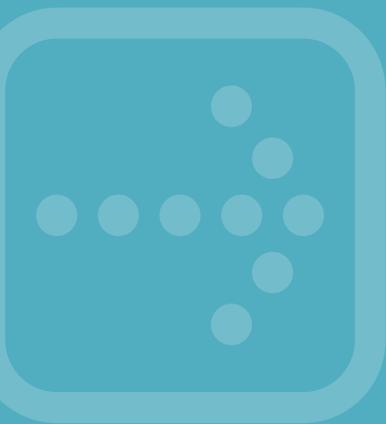
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## 2005 Compensation and Entrepreneurship Report in Life Sciences

2005  
( ( A B R I D G E D   V E R S I O N ) )







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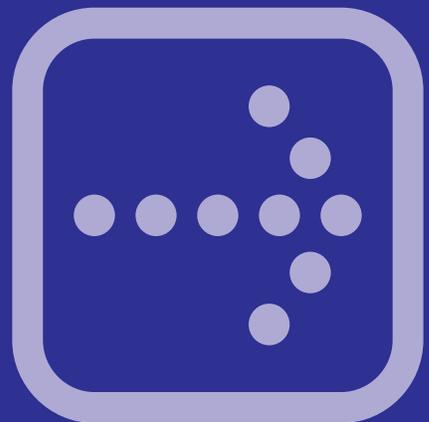
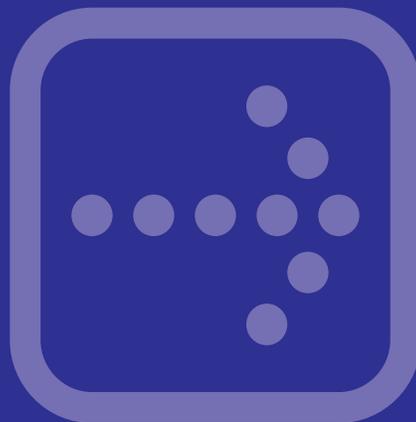
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Contained within this document are summary level results of our proprietary study of executive equity and cash compensation. This report provides authoritative pay data for ten senior management positions and is based on data collected from 170 private Information Technology companies. The report also provides a window into compensation for outside Board Members. The results are arranged by financing stage, founder/non-founder status, number of employees, company location and business segment within the Information Technology market.

This study was produced by professionals at Wilmer Cutler Pickering Hale and Dorr, Ernst & Young and J. Robert Scott. We were assisted in our work by academics from the Harvard Business School.

You may also access these summary level results from our website at [www.compstudy.com](http://www.compstudy.com) for no fee. We appreciate your professional courtesy in providing proper attribution when citing study results.

Participants have been provided detailed unabridged data results at no charge. You may secure a copy of the detailed report for \$500 plus a commitment to participate in our next survey. Contact Mike DiPierro of J. Robert Scott at 617-563-2770 or [mdipierro@j-robert-scott.com](mailto:mdipierro@j-robert-scott.com) to obtain the unabridged results.





We are pleased to present the 2005 edition of our annual Compensation and Entrepreneurship Report in Life Sciences. This survey represents our most comprehensive respondent population to date with data from more than 800 executives and over 170 private companies from across the country in a wide variety of industry segments: Pharmaceuticals, Therapeutics, Diagnostics, Devices, Bioinformatics, Genomics and Molecular Technologies.

This survey was conducted between January and April of 2005. While the broader US economy continues to show signs of sustained recovery, companies and investors struggle to understand the affect on compensation and the ability to attract and retain key executives. Our inspiration for creating this survey of Life Science company executive compensation emerged from a desire to respond to our clients need for tools to assist them in critical decision making for attracting, rewarding and retaining key executives. There is very little compensation data available on private companies. Our survey continues to grow and represents one of the few reliable sources for executive pay information in the industry. The overall objective has been to provide fundamental information in a useful, analytic framework to evaluate and respond to the compensation dynamics of the senior executive team.

Our sample size has substantially increased and our analytical framework has become richer and more nuanced. This year's presentation is multidimensional. Variables include: financing stage; company size, both in terms of headcount and development stage; founder/non-founder status; industry segment; and geography. We also wanted to understand the impact on private companies after the new accounting rules that require the expensing of stock options; accordingly, we have added a more granular look at the equity compensation vehicles private companies are using in their compensation packages.

This survey has evolved over the years as a result of the input we have received directly from the industry. This year we have correlated executive compensation to company development stage and have provided additional analysis of the data compared to financing rounds. Founders are often compensated using different criteria; therefore we have pulled founder compensation data out of the core analysis and have included a separate section analyzing founder compensation.

Our intention is to continuously improve our data in an effort to more closely serve the needs of the industry and we encourage readers of this publication to submit comments and suggestions to help ensure the changes we make accurately reflect the requirements of the market. Suggestions and comments should be directed to Mike DiPierro of **J. Robert Scott**, [mdipierro@j-robert-scott.com](mailto:mdipierro@j-robert-scott.com).

Lastly we'd like to express our gratitude to two individuals who contributed greatly to the 2005 addition: Professor Brian Hall and Associate Professor Noam Wasserman of the **Harvard Business School**. Additional thanks go to David Hale, President and Chief Executive Officer of **CancerVax Corporation**, Stelios Papadopoulos, Managing Director at **SG Cowen**, and Lita Nelsen, Director of the Technology Licensing Office at **MIT**. Each generously took time out of crowded schedules to provide perspective on this dynamic industry.



KEY:



## DEMOGRAPHICS OF RESPONDENT POPULATION

- The survey was conducted between January and April 2005. Data was collected from more than 800 executives in 172 Life Sciences and Medical Device companies.
- This report provides an aggregation of the data as well as an examination of the population from a number of different perspectives, including: financing stage, founder status, geography, headcount, business segment and product life cycle.

### Financing Rounds

- For analysis, the population was divided between companies that have raised one or fewer rounds of financing, two or three, and those that have raised four or more rounds of financing. This is a further increase in detail from our previous editions of this survey. Companies in the earliest stage represent 25% of the population, those with two or three rounds raised represent the largest slice, 49% of the overall companies, and those with four or more rounds raised comprise 26% of the population.

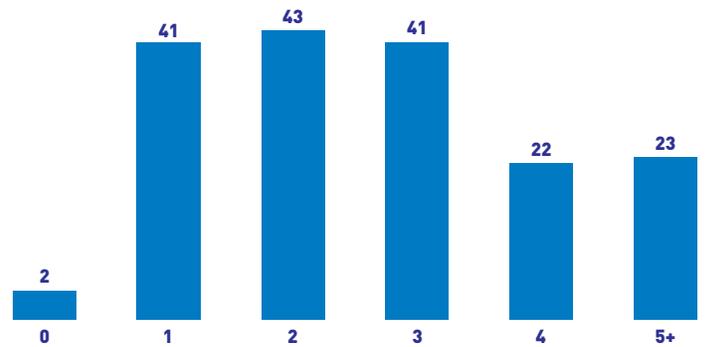
### Founder Status

- 24% of the executives in the population were founders of their company. This figure was 29% in our 2004 edition of this report. CEOs were most frequently founders of their company with 47% founders, followed by the Head of Platform Technology/CTO at 45% and the CSO at 43%.

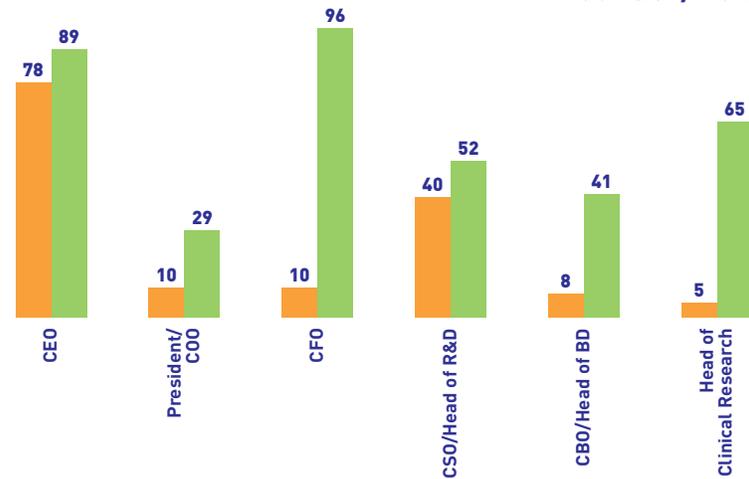
### Headcount by Number of Full Time Employees (FTEs)

- 51% of companies surveyed in this report have fewer than 20 FTEs, while 10% were in the largest category, more than 61 FTEs.

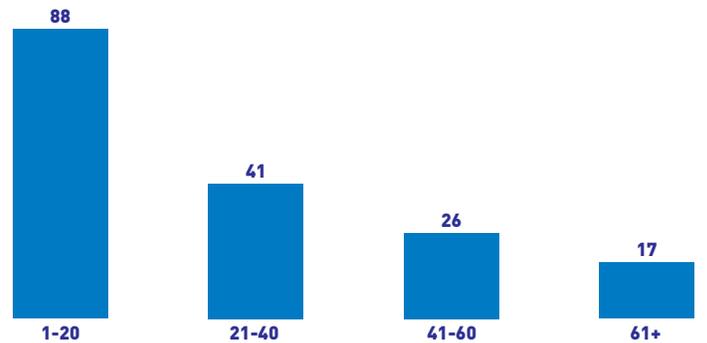
## Financing Rounds



## Founder/Non-Founder

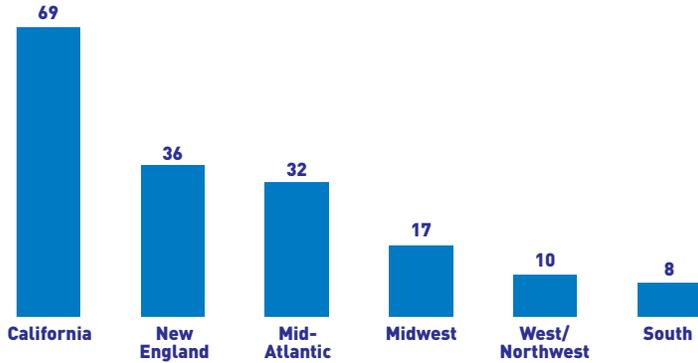


## Headcount by Number of Full Time Employees (FTEs)





### Geography



### Geography

- The geographical distribution of the respondents was most concentrated in California with 40% of the population. The New England and Mid-Atlantic regions were the next largest regions with 21% and 19% each in the respective regions. The South was again the smallest category with 5% of the population.

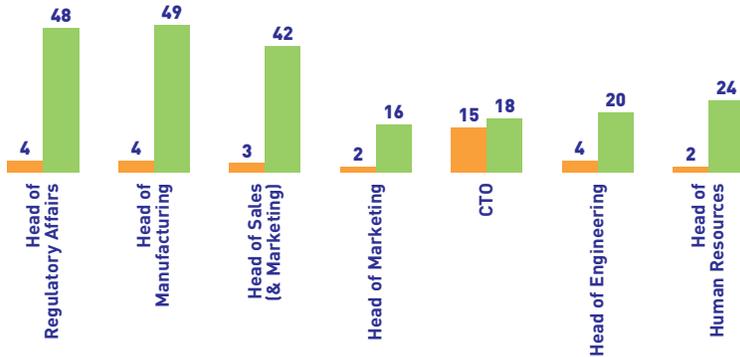
### Business Segment

- Distribution between Life Sciences and Medical Device companies was again similar to our 2004 edition; Life Sciences with 65% of the companies surveyed and Medical Devices with 35%.

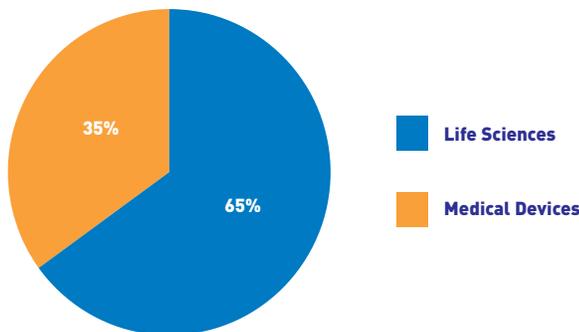
### Product Life Cycle

- 30% of the companies surveyed in this report currently have a product or service on the market.

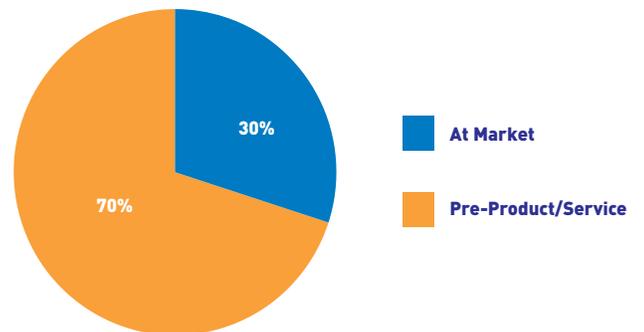
### Founder Status

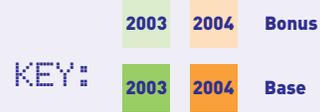


### Business Segment



### Product Life Cycle





### Total Cash Compensation – 2003 and 2004

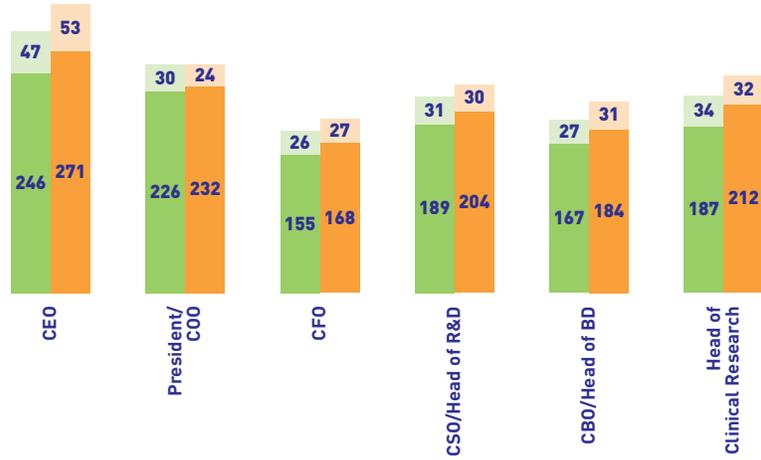
This data represents 2003 and 2004 compensation for non-founding executives.

- Overall, total average cash compensation across the survey population increased from 2003 to 2004 by 8%, an 8% rise in base salary and 3% rise in bonus.
- No single position saw a decrease in base salary or total cash in 2004.
- Base salary increased most dramatically for the Head of Clinical Research, by 13% in 2004. The Head of Marketing also enjoyed a double digit increase in base salary of 11% as well as the CEO, Head of Technology and Head of Business Development, 10%.

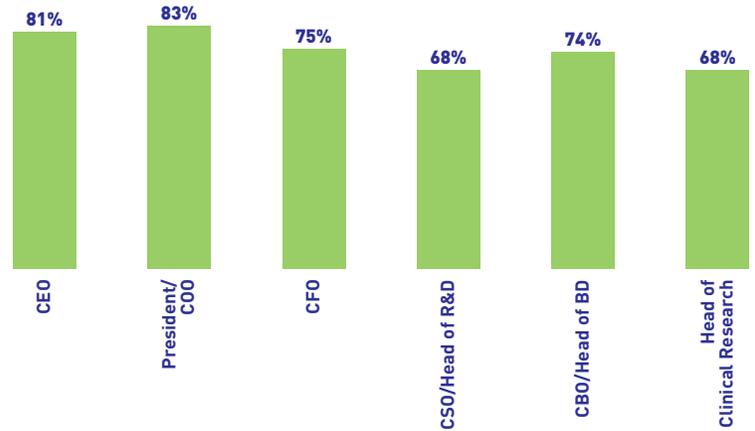
### Bonus as a Percentage of Base Salary

- The overall population average bonus as a percentage of base salary remained steady between 2003 and 2004 at 15%.
- The Head of Sales and CEO had the highest bonus as a percentage of base salary with 24% and 20%, respectively.

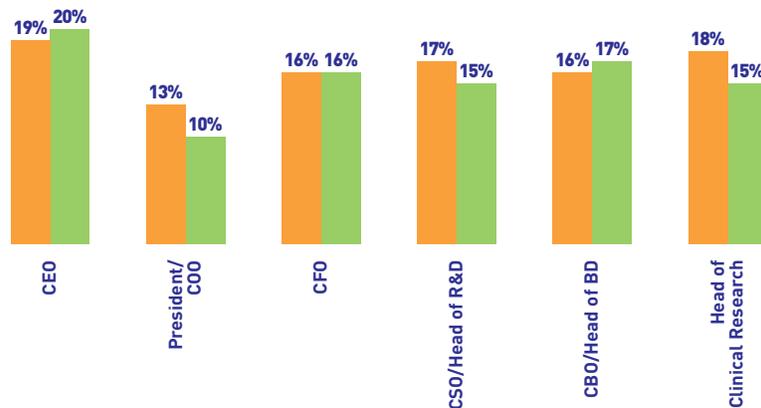
### Total Cash Compensation



### Executives Eligible

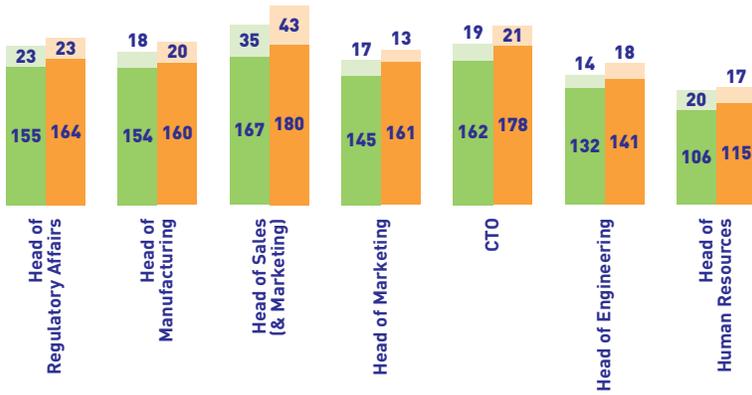


### Bonus as a Percentage of

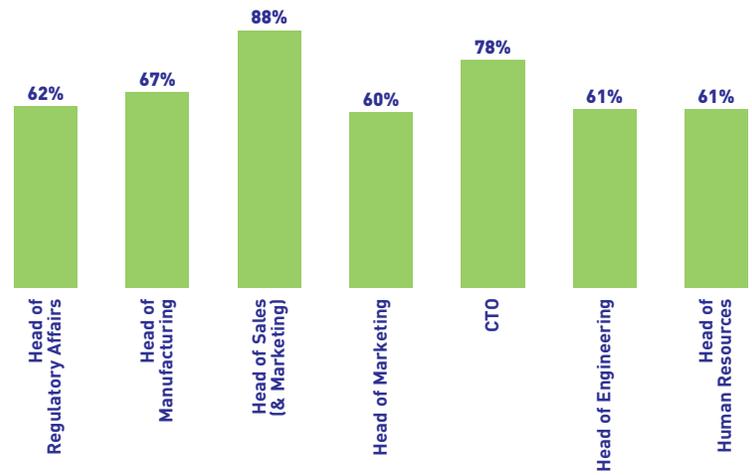




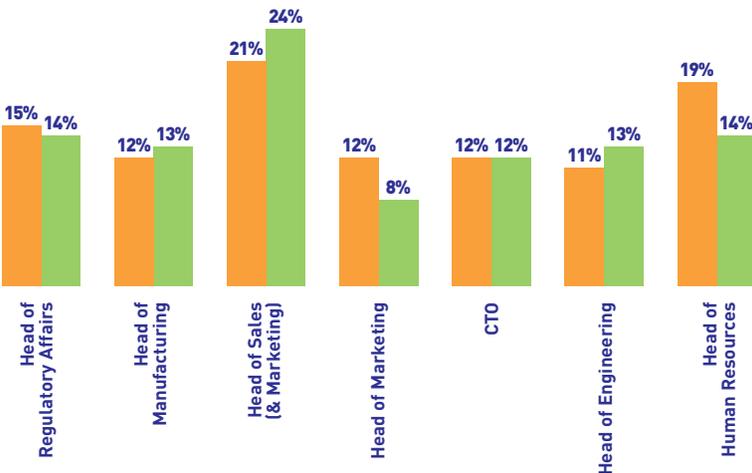
- 2003 and 2004



for Bonus 2004



Base Salary - 2003 and 2004





KEY:

Median

Average

### Total Equity Holdings

- The non-founding CEO holds an average of 4.06% of their company while the non-founding CSO holds 1.48%, highest among the positions surveyed.
- The majority of the executives surveyed hold an average near 1.00% of their company.

### Equity Granted at Time of Hire

- Average equity grants at time of hire were highest for the CEO, 3.98%, and the CSO/Head of R&D, 2.13%.

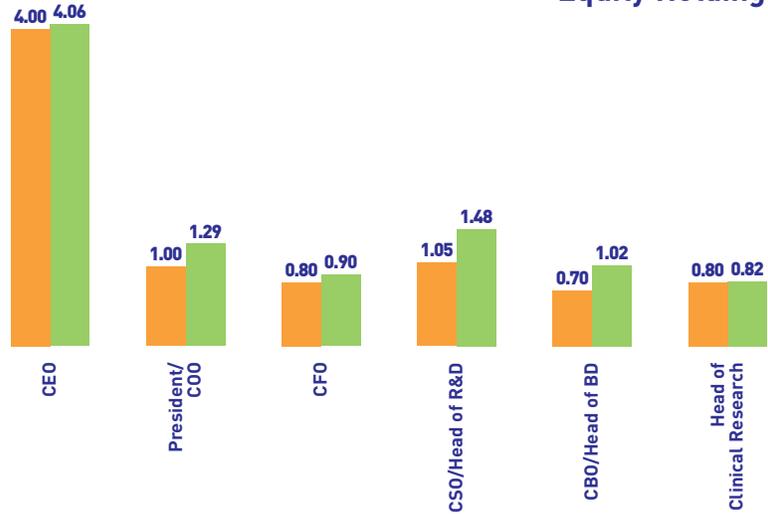
### Severance Packages

- 96% of the non-founding CEOs in the survey have a severance package, with a median of 12 months. The non-founding CSO has a severance package 58% of the time.
- Severance packages are most often set at 6 or 12 months for the executive positions surveyed.

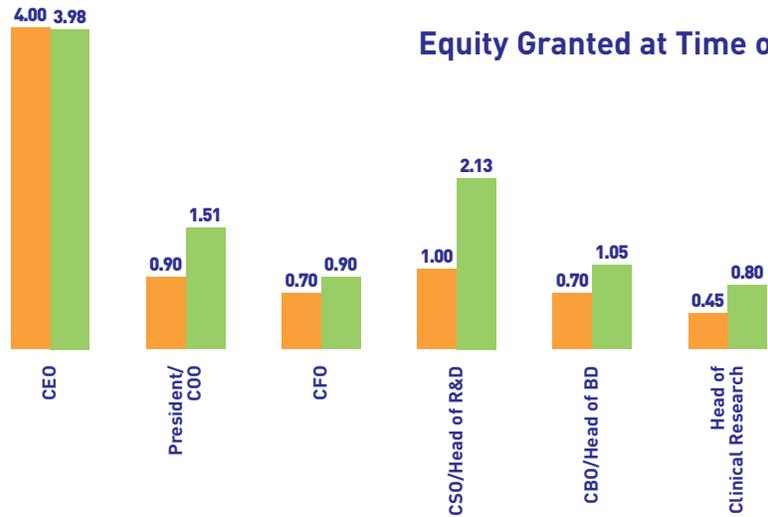
### Equity Vehicles Used

- 77% of the companies surveyed for this year's report utilize stock options for time of hire grants. 11% use both stock and options, while just 2% use only stock grants. 10% of companies surveyed use other equity vehicles or have no equity grant plan.

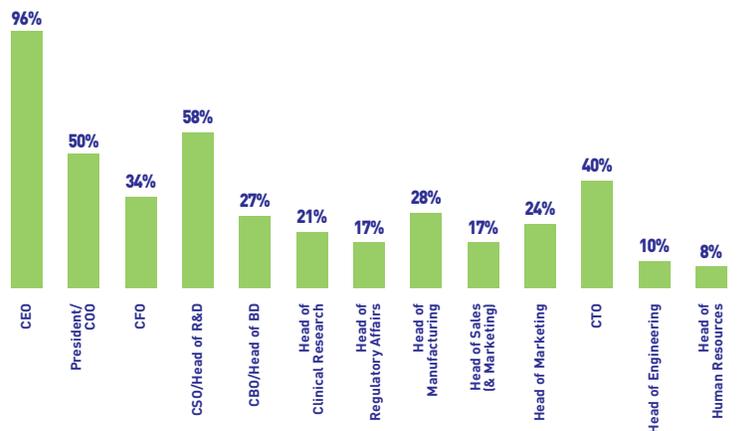
### Equity Holdings



### Equity Granted at Time of Hire

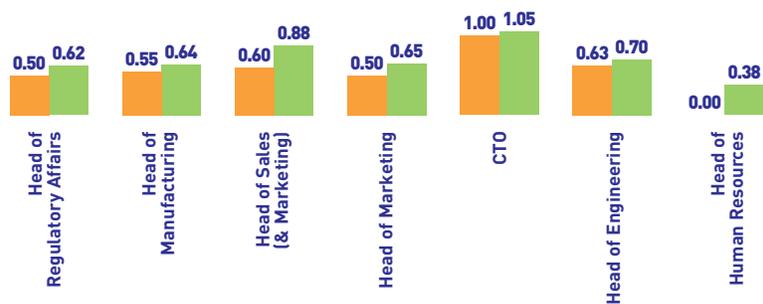


### Executives with Severance Package

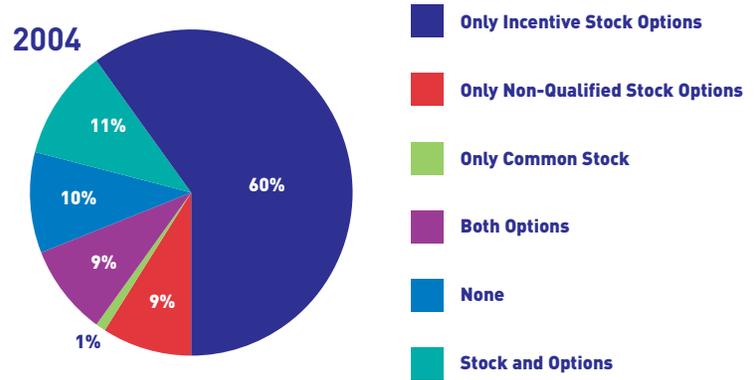




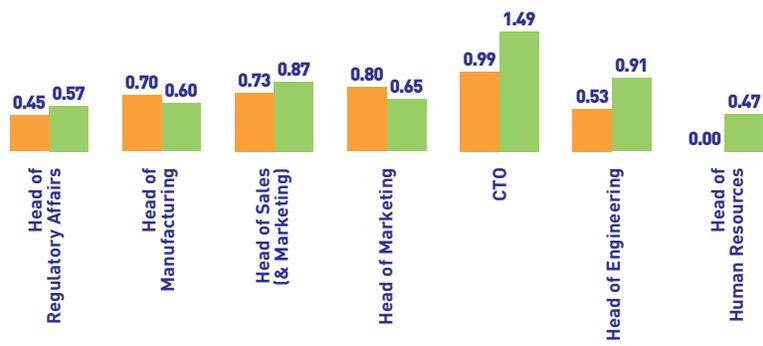
### Median vs. Average (%)



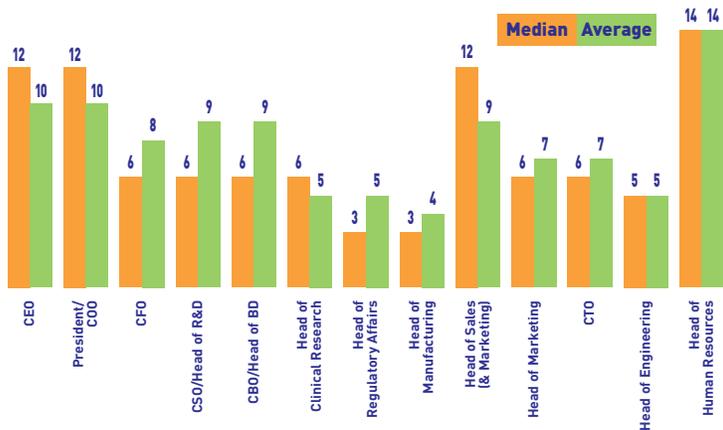
### Equity Vehicles Used

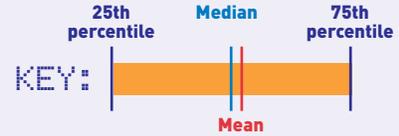


### Hire Median vs. Average (%)



### Severance Package (Median vs. Average in # of Months)





### Total Cash Compensation

- Founders also saw a slight rise in average total cash compensation in 2004. For the founding CEO, base salary rose 8% to \$236,000.
- In general founding executives earn less than their non-founder counterparts, particularly in terms of average base salary.

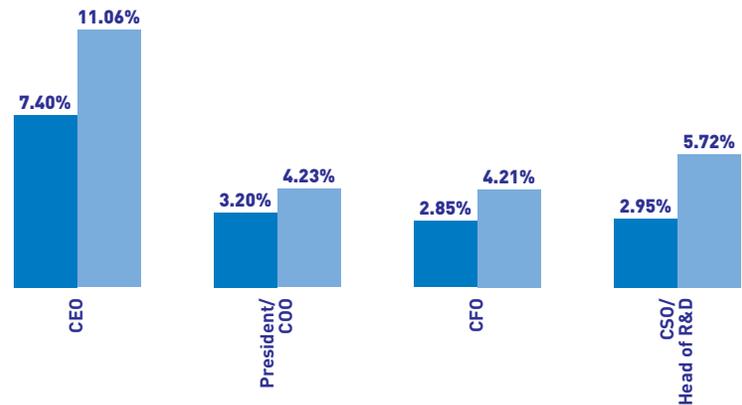
### Equity Holdings

- As expected, founders hold a considerably larger equity stake in their companies than any non-founding executive. For the founding CEO, the average equity holding is 11.06% while the median amount is 7.40%. This difference is attributable to a small number of CEOs holding a relatively large amount of equity in comparison with other founding CEOs.

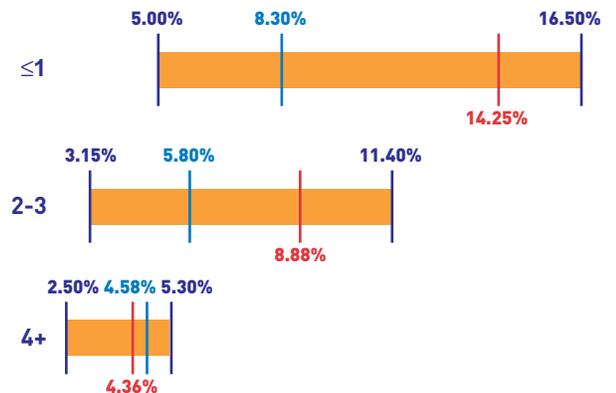
### Total Cash Compensation

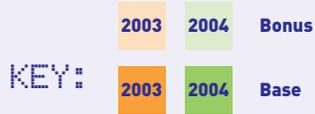


### Equity Holdings

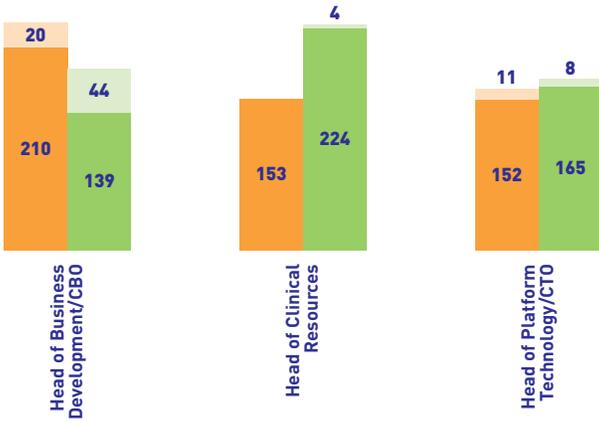


### Founder CEO – Equity by Financing Round





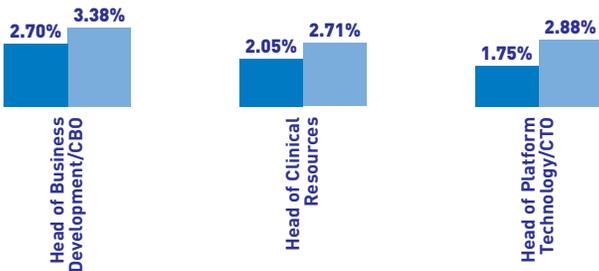
- Founders



CEO Equity Holdings by Financing Round

- Dilution of equity for the founding CEO is sharpest for the first few rounds of financing raised, moving from an average of 14.25% equity at companies with one or fewer rounds raised to 8.88% at companies with two or three rounds of financing.

- Founders





## DAVID HALE

### President and Chief Executive Officer

#### CANCERVAX CORPORATION

David Hale is President and CEO of CancerVax Corporation, a biotechnology company focused on the research, development and commercialization of novel biological products for the treatment and control of cancer.

Mr. Hale has had a significant career in the biotechnology industry. After joining Hybritech, Inc., the first monoclonal antibody company, as Sr. VP Marketing and Business Development in 1982, he became Chief Operating Officer in late 1982, President in 1983 and CEO in 1986, when Hybritech was acquired by Eli Lilly and Co. He served from 1987 to 1997 as Chairman, President and CEO of Gensia, Inc., which merged with SICOR to become Gensia Sicor (now Sicor, Inc.) and as Chairman of Viagene, Inc. from 1987 to 1994, when Viagene was acquired by Chiron, Inc. He was President and CEO of Women First HealthCare, Inc. from late 1997 to June 2000, prior to joining CancerVax in October 2000.

Prior to joining Hybritech, Hale was Vice President and General Manager of BBL Microbiology Systems, a division of Becton, Dickinson & Co, and from 1980 to 1981 he was Vice President Sales and Marketing. From 1971 to 1980 he held various marketing and sales management positions with Ortho Pharmaceutical Corporation, a division of Johnson & Johnson, Inc.

Mr. Hale currently serves on the Board of Directors of Santarus, Inc., Metabasis Therapeutics, Inc., and Xcel Pharmaceuticals, Inc., and as Chairman of the Board of LMA North America, Inc., SkinMedica, Inc., and Somaxon Pharmaceuticals, Inc. Hale also serves as Chairman of BIOCOM/san diego (formerly the Biomedical Industry Council of which he was the founder), and serves on the Board of the California Healthcare Institute (CHI) and the BIO Emerging Growth Companies Section Governing Body. Hale also serves on the Board of Directors of the San Diego Economic Development Corporation and Children's Hospital of San Diego. He is a founder of the UCSD CONNECT Program in Technology and Entrepreneurship and currently serves on the CONNECT Leadership Council.

**Bill: How about some personal history? You went to college in Alabama with a Biology major. Does that mean you set out to be a doctor?**

**David:** Yes, I did. A stint in the Emergency Room taught me that blood and trauma didn't bother me, but if somebody threw up I threw up right behind them. A very weak stomach led me to the pharmaceutical business.

**Bill: Well the Biotechnology business takes a strong stomach, so yours must have strengthened over time. Was Hybritech a watershed experience in your career?**

**David:** Yes it was. My way of getting the job was unusual; I started my career with J&J, and had a number of sales and marketing jobs in pharmaceuticals. Then came a few years with Becton, Dickinson, running BBL Microbiology Systems, a diagnostics division. One day I found myself sitting in my office in Baltimore. It was snowing outside and my assistant had gone on break. A recruiter (and I didn't talk to recruiters) called me up and I answered the phone. The guy said to me, "I know you're not interested, but this company out in San Diego called Hybritech is really interested in you. It can't hurt to look. Why don't you just treat it like a weekend in the sun and bring your wife out?" In San Diego at the time it was 75 degrees, and it was 20 in Baltimore, so I agreed to go.

**Bill: Famous last words! A recruiting story as old as the hills!**

**David:** At the time, Becton, Dickinson had been investigating monoclonal antibodies. I had been involved in putting together this recommendation on the strategic importance of monoclonal antibodies for the company. A week before my encounter with the recruiter, the powers at BD rejected the notion, saying, "We don't think monoclonals will be ever be of use for anything other than research purposes because of their specificity, and for other reasons."

**Bill: This further inspired your enthusiasm for San Diego.**

**David:** Yes, it did. At the time, there were only a few people at Hybritech. I saw them doing in the laboratory what the people at Becton Dickinson said was just not going to happen. And I was young and excited about Biotechnology. I figured, "What the heck, if it doesn't work out, I'll just go get another job. I may have to

## INTERVIEW WITH DAVID HALE, PRESIDENT &amp; CEO, CANCERVAX CORPORATION

start over again, but that's okay." I proceeded to interview and was offered the job during my visit. My interest for Hybritech lay in the fact that, at the time, I was one of the few people in the country with experience in both Pharmaceuticals and Diagnostics. Also, Ted Green liked the fact that I was trained by J&J.

My taking the job at Hybritech turned out to be a pivotal point in my life and my career. The transition was not easy in that it required my accepting something of a demotion. At BD, I had finally gotten to be a General Manager. I started at Hybritech as Senior Vice President of Marketing and Business Development. Within a short period of time, however, I became Chief Operating Officer, then President, and eventually CEO. The great thing was being part of watching a technology grow and develop and building a company and a team of people. In the process, we had to focus on recruiting great people. That was the key to Hybritech – outstanding people across the board. And to give you an idea of the impact of that group of senior management we assembled is that ultimately they've had direct involvement in starting over seventy companies in San Diego.

**Bill: What was Ted Green like? What was his leadership style that created such a potent management culture? There's a book coming out of Harvard Business School later this year analyzing Baxter culture. The author, Monica Collins, took a look at the results produced by all the great Baxter people, including Ted Green, who've gone on to be successful entrepreneurs. She then asked the question, "Why did Baxter spawn so many of these unique individuals?" Her explanation centered on the potency of the Baxter environment. The company recruited great people and then gave them a baptism by fire. It was survival of the fittest, and the fittest often left to start their own companies – people like Bob Carpenter (Integrated Genetics), Gabe Schmergel (Genetics Institute) and Henri Termeer (Genzyme). Is this relevant to your description of the Hybritech progeny?**

**David:** At Hybritech, all began and ended with recruitment – we set out to bring in entrepreneurial people who were willing to leave the big companies to prove something to themselves and the world. Back in 1981-1982, it was neither wise nor acceptable to forsake Corporate America for a dream. Hybritech people were at once normal and exceptional, perfectly capable of fitting into Corporate America, but finally dissatisfied with being there. This recruitment discipline made Hybritech a culture of can do, getting the job done, of moving forward. And once people had a taste of being in a small company environment, it was not something that they were about to give up.

**Bill: How did Ted Greene contribute to Hybritech's cultural richness?**

**David:** Ted was not a great manager, but he did have a vision that Hybritech could be a major player in this Biotechnology revolution. So he was always looking at the big picture trying to determine how best to build the company to realize that vision. He left me to worry about the operating aspects. Ted's key role was keeping the company's vision of success. This allowed me and others to develop as independent managers while executing on his vision. Ted recruited myself, Ron Taylor, Dennis Carlo and Tom Adams. And then I recruited Cam Garner, David Kabakoff and Tim Wollager. The organism perpetuated and enriched itself.

**Bill: Was there a big Baxter contingent at Hybritech?**

**David:** No, there were a few Baxter people, people from J&J and other large pharmaceutical companies. Hybritech was not focused on the company you came from but rather on how good you were. I found Cam Garner in Ohio working for Gilford – that's a division of Corning. Hybritech was a great experience because of the fact that you had people across the board who were driven to succeed and caused the organization to be driven to succeed.

**Bill: At the time, geography was not on your side. San Diego just wasn't the big deal in Biotech that it is today.**

**David:** We were the first biotech company in the region. There was literally no one here who understood anything about Biotech or the Pharmaceutical industry. Everybody we recruited or used for professional services had to come from somewhere else. In the process, one of my objectives quickly became to build up San Diego's support capabilities. For instance, I told our law firm in San Francisco that if they didn't open up a San Diego office we were going to take our business elsewhere. We started CONNECT to focus on getting people to understand the importance of Biotech in San Diego, and to support the nexus of entrepreneurs and scientists. Then, in the early nineties, we started Biocom, and held the first meeting in my conference room. The idea again was to focus on building the Biotech community in San Diego.

**Bill: So your mission was both entrepreneurial and civic-minded.**

**David:** For a variety of reasons, I thought it was possible to create a Biotech hub in San Diego. All the necessary ingredients were present. San Diego had great research institutes like Scripps and Salk and UCSD. Furthermore, we made the most of locale, this wonder-



## WILLIAM A. HOLODNAK

### President

#### J. ROBERT SCOTT

William A. Holodnak is founder and President of J. Robert Scott, a retainer-based executive search firm and wholly owned subsidiary of Fidelity Investments. In addition to managing the firm since its inception in 1986, Bill conducts senior level search assignments in a variety of industries including Biotechnology, Medical Devices, Financial Services, and Information Technology. His practice emphasizes assignments for Chief Executive Officers and Members of the Board of Directors.

Prior to joining J. Robert Scott, Bill was a Vice President of a retainer-based executive search firm which serviced the Venture Capital and High Technology industries on a national basis. Previously, he was a member of the professional audit staff of PricewaterhouseCoopers' Boston office and holds a CPA certificate in Massachusetts. Before joining PWC, Bill successfully managed the Brattle Theatre in Cambridge, Massachusetts.

Mr. Holodnak holds an MBA from Boston University (1976) as well as a graduate degree in Medieval History from The Johns Hopkins University (1971). His undergraduate degree is from Canisius College (1968) in New York. He has taught courses in History and Film Criticism at both Johns Hopkins and Boston University respectively. Bill also serves as a Trustee of the Berklee College of Music.

ful climate. People like to live here. The third thing was that we had all these entrepreneurs that had spun out of Hybritech, and wanted to build additional companies. The fourth factor was that, despite the fact that we didn't have a lot of venture capital located in San Diego, we had access to the financial resources of the venture capital in the Bay Area. A number of investors in Hybritech came down to do additional deals in San Diego.

**Bill: What defines success in a Biotech company today? Does this definition differ from what pertained in the past?**

**David:** Success can be defined in different ways. For some, it's market capitalization, or what you sell the company for. At Hybritech we were somewhat idealistic. For us, success, above all, resided in building a real company out of a new technology. The development of the PSA test for prostate cancer has saved the lives of a lot of men all over the world. Before Hybritech, point-of-use diagnostics were not very prevalent, because they weren't very sensitive or specific. At Hybritech, we developed technology that ended up becoming the standard in the industry.

**Bill: Valuation models in the capital markets, and even those of venture capitalists, have changed in their priorities. It used to be that companies could get funded on the basis of great science, but that seems less and less the case these days. Everybody, and certainly the executives I contact, all want to get associated with a company that has Phase II products. A certain conservatism and rigidity seems clearly in evidence across the board.**

**David:** That's true and it poses a fundamental question of whether or not in today's environment, a Hybritech or a Genentech could have gotten funded. I think that's questionable. Both companies had broad, fundamental technologies. At the time, there were some venture capitalists willing to take on those risks. We are in a different cycle today, one focused on late stage technology. I've seen a number of different biotech cycles over the last twenty-five years. Right now, the focus is on companies that have products with clinical validation and primarily Phase II clinical validation. And part of the reason for this narrowness is that the venture capitalists are so driven by the capital markets. Five years ago, tool companies were the hottest thing. They commanded huge valuations and so on, but that all went away. Stock prices came way down, and then nobody wanted to invest in a tools company. There have been exceptions.

## INTERVIEW WITH DAVID HALE, PRESIDENT &amp; CEO, CANCERVAX CORPORATION

**Bill:** As an Angel Investor, would you put money in an exciting enabling technology, something that might, for example, facilitate efficient judgment regarding which candidates should be brought into the clinic, thus making the preclinical selection process more effective?

**David:** Yes, because I think that this is an area very important for Big Pharma. The real money starts to be invested in products the further they move along in the clinic. And so if you can make the correct judgment at an earlier stage, it can be extremely valuable.

**Bill:** How has the world of venture capital changed? Just a moment ago I accused the industry of creeping conservatism.

**David:** I agree with this tendency. However, things are complicated by the fact that there are so many more venture capital funds out there today than there were ten or twenty years ago. There's more money chasing deals. Thus, deals that sometimes shouldn't get funded do. The second thing is that now, although there's a lot more money available, it seems to be much harder to get. And it's harder to get because the venture investors are more conservative. They're more risk-averse, less willing to invest in earlier stage companies five years away from the clinic or a liquidity event. The general desire is to get into later stage deals. Market forces and human nature compound one another.

**Bill:** Are there any firms doing it in a particularly enlightened way, a far-sighted way? Is there any firm that you work with going against the grain?

**David:** Locally, Forward Ventures has gone against the grain in terms of some of their earlier stage technology investments. Domain Associates is doing the other side of it very well at the later stage. Cam Garner, Scott Glenn, and I have started five or six companies over the last couple of years, and they've all been later-stage deals.

**Bill:** So as an angel investor, you seem to be a victim of this new conservatism yourself.

**David:** Guilty as charged. Right now there are some real opportunities, good products coming out of Big Pharma or out of academic institutions. There are some areas that have not been exploited well by Big Pharma or Big Bio.

**Bill:** Angel investing seems to have a greater degree of importance of getting new companies funded these days, given the fact that the venture capitalists appear less inclined to engage at the very early stage. How do you approach angel investing?

**David:** We basically take people that we've known in the past, those with whom we worked well in the past, and put them together with the products or the technology.

**Bill:** Philosophically, then, do the people or the science come first in your investing decisions?

**David:** You know, it's been interesting. In the end, it's about half and half. We started Verus Pharmaceuticals with people known to us. We actually funded the company for a year while we were deciding what specific area and products we were going to pursue. In that case, it was clearly the people first. The same thing applied to Somaxon. In other instances, products and technology came to us and we've put people around those opportunities.

**Bill:** Was Metabasis a combination of the two?

**David:** Metabasis was different in that it was a spinout from Gensia. It has great people, a lot of whom have been working with the same basic technology for ten years. The company was in my opinion a natural, because you had some great scientists and you had products that were in the clinic. That company has both things going for it.

**Bill:** Do you have any general rules or wisdom on who makes a great Biotech CEO?

**David:** You know, I don't. I've seen people from all backgrounds be successful. People coming out of R&D have been successful. Having the capability and being willing to make the commitment to understand the science is very, very important to a Biotech CEO. It's either earning a Ph.D. or an M.D. or having a real intellectual curiosity. I think it's very difficult for a straight businessperson in the Biotech industry because so much of the content of this business is scientific.



**Bill: What's the most important hire that the CEO makes?**

**David:** I think that it really depends on the company. In a straight Biotech company, there are probably two – the person you hire as Head of Research and Development, and your CFO. If you've got a clinical candidate, a product – the Clinical and Regulatory person may be your most critical hire. The CFO is always important because you're always raising money.

**Bill: You didn't mention the Business Development executive. I do BD searches from time to time and I find them daunting because most of the most appealing people are generally those with success in both Big Pharma and Biotech, executives who have done deals in an autonomous way. The rub is that people with such lineage and credentials generally don't want to be Vice President of Business Development. They want to be CEO.**

**David:** I don't wish to diminish the importance of the position, because having the right person running BD can be critical. There are people who are really good at Business Development who I'm not sure would necessarily be capable CEOs. The key lies in finding those people who really enjoy Business Development and building the relationships and the collaborations and so on, such as Susan Dubé at Somaxon, Paul Cayer at Verus, or Diane Goostree at SkinMedica. At Santarus, we just hired Mike Step, who was Business Development Head at Amylin and before that was in Business Development at Dura. He is a dedicated guy.

**Bill: How important is improvisatory intelligence in a Biotech CEO?**

**David:** In fact, very few companies that start out end up staying with the original business plan. As a CEO, you've got to continually work with your Board to evaluate your strategy and determine whether it's on the road to success or whether you must course-correct.

**Bill: Speaking of Boards, has the role of the Board or the content of the Board membership changed for Biotech companies?**

**David:** I certainly think the role of the Board has definitely changed in the wake of Sarbanes-Oxley. A lot of the Biotech companies that have gone public have had to implement 404(b), which has really changed the role of the Board and the committee structure. The Audit, Compensation and Corporate Governance Committees all are much more active than they used to be. The Audit Committee meetings used to be a perfunctory thirty minutes; they're no longer perfunctory. It requires a two or three hour meeting, with a

## INTERVIEW WITH DAVID HALE, PRESIDENT &amp; CEO, CANCERVAX CORPORATION

real review of the financials and the issues facing the company. In general, Boards understand today that they need to take a more active role, not a management role, to be sure, but a more active oversight role than was the case in the past.

**Bill: Do you see the Board becoming more aggressive in recruiting seasoned executives to its Membership, whether that's on the commercial side, the clinical side, or the financial side, in anticipation of a public offering and to buttress management in anticipation of the kind of complexity that public companies experience?**

**David:** It's a topic of discussion pretty much at every private Board now. There is a felt need to look at and recruit independent directors, non-venture capital directors, people that you can get usefully involved at an early stage. The Board starts to look at its structure very early. As a result, I've seen membership go from what had been the norm of five to now seven or nine Board Members. Many venture capital funds have mandated that their partners start transitioning off Boards as soon as the companies are public, or as soon as possible thereafter. The transition, which used to take place over two or three years, is now occurring more quickly. This is going to be the standard for the industry.

**Bill: What about Board compensation?**

**David:** I think companies are going to have to start paying Board members more. In the past, Board compensation almost exclusively involved stock. In fact, I can't remember up until just in the last few years getting any cash compensation for being on a Board. Now it's the norm, when you talk to prospective Board members, they're not only interested in the stock portion, they're also interested in cash compensation because of the significant amount of time that must be devoted to Board matters.

**Bill: I see that CancerVax has signed a tech transfer deal in Cuba. We do a lot of work with Technology Transfer jobs at major universities and Medical Research Institutes. Give us a little bit of history on how this deal with Cuba happened. Is the globalization of technology transfer on the way?**

**David:** This was a very interesting transaction. It started at the ASCO (American Society of Clinical Oncology) meeting in 2001, when there was a significant amount of focus on Erbitux®, which targeted the EGFR pathway. I happened to be walking in the poster sessions, which I like to do to get a focus on what's going on with the science, and I saw this poster on a novel approach to targeting

the EGFR signaling pathway, and it turned out to be two Cuban scientists who were presenting the results of their work. At the time, I had no idea that Cuba had any Biotechnology industry. This inspired a conversation. Our scientists felt this was an interesting approach, and the patents were issued in the U.S. and Europe. However, there was a major problem because of the Embargo. We persisted and found a precedent with SmithKline Beecham with a vaccine product for meningitis which was originally developed in Cuba. We put a plan of action in place and got a number of scientists to write letters about why this novel technology could be important for the American people. The early work on this product was targeted at the treatment of non-small cell lung cancer. We hired a lobbyist and a specialist law firm. We then applied for and obtained a license from the Office of Foreign Asset Control in the Treasury Department and then negotiated an agreement with the Cubans. A little over three years after we started the process, we got a license from OFAC to allow us to bring EGFR products into the U.S. for development. One of these, the EGFR product, is now in Phase II clinical trials.

**Bill: Do you think there are other pockets of accomplishment around the world that U.S. Biotech could tap into or was this just an opportunity right in your line of expertise?**

**David:** You know, I didn't go looking for it. This one just kind of just presented itself to us. Cuba has about 22 institutes of Biotechnology. Their scientists are extremely well-trained at the best institutes. But the investment opportunities don't end there. There are other pockets out there with good science, in India, China, and Russia.

**Bill: That's great. Thanks again. Glad to see that your stomach's still settled!**



## STELIOS PAPADOPOULOS, PHD

### Managing Director

#### SG COWEN

Dr. Stelios Papadopoulos is a Managing Director in the investment banking division at SG Cowen focusing on the biotechnology and pharmaceutical sectors. Prior to joining SG Cowen in February 2000, he spent 13 years as an investment banker at PaineWebber, where he was most recently Chairman of PaineWebber Development Corp., a PaineWebber subsidiary. He joined PaineWebber in April 1987 from Drexel Burnham Lambert where he was a vice president in the Equity Research Department covering the biotechnology industry. Prior to Drexel, he was a biomedical technology analyst at Donaldson, Lufkin & Jenrette.

Before coming to Wall Street, Dr. Papadopoulos was on the faculty of the Department of Cell Biology at New York University Medical Center. He continues his affiliation with NYU Medical Center as an Adjunct Associate Professor of Cell Biology. Dr. Papadopoulos holds a Ph.D. in biophysics and an MBA in finance, both from New York University.

Dr. Stelios Papadopoulos is a founder and Chairman of the Board of Exelixis, Inc., he is a member of the Board of Directors of Diacrin, Inc., and sits on the boards of several private companies in the biotechnology sector. In the not-for-profit sector, Dr. Papadopoulos is a founder and Chairman of Fondation Santé and a member of the National Board of Advisors of BioLab.

**Bill: A little personal history, if you wouldn't mind. How'd you get into this business? You looked to be a respectable academic at one time.**

**Stelios:** Poetic coincidence. The week of the Genentech IPO in October of 1980 I defended my Ph.D. thesis. At the time, I was contemplating a post-doc position but found myself distracted by the lively discussions in the lab about that IPO. It was a time when academics really didn't know what an IPO was. This was the end of blissful ignorance for many of us. Increasingly I contemplated doing something more commercial than just straight science. All the hubbub among my academic colleagues gave me the idea to become a Biotech analyst. I thought about it, and went to business school at night.

**Bill: How did you proceed from there?**

**Stelios:** I stayed on at the New York University Medical Center for five years, all the while planning for my exit. The MBA came at night. I tried to see myself in industry and set about meeting people. While at business school, I wrote "The Investor's Guide to Biotech." After a long period of looking, I got a job as DLJ's first Biotech analyst in '85. A little more than a year later, the "offer you can't refuse" came my way from Drexel. The money was substantial. This deal got a lot of attention, but the new assignment lasted only eight months. Shortly after arriving at Drexel, the trouble started. A whole bunch of us left in April of '87 and went to PaineWebber. I became an Investment Banker, and never looked back.

**Bill: In doing your job, is it all about the numbers? How much of a role does human capital play in your willingness to work with companies and your process of evaluating them?**

**Stelios:** Human capital is the key. The reality is you can eliminate a number of companies on numbers and on science alone. These, in effect, become exclusion criteria. And then you've got a bunch of companies and they all seem to have reasonable science, reasonable expectations, and are reasonably well financed by the right people. So you have to make some choices and they frequently come down to the quality of leadership.

**Bill: What is the critical factor in your mind? Is it the leadership of the CEO, is it the Chief Scientific Officer? Is it the composition and richness of the Board?**

**Stelios:** Mostly the CEO. That individual has got to be a leader. And it's hard to find a company with a great Chief Scientific Officer and then a nothing CEO. Even if you do, it's just not a stable condition.

## INTERVIEW WITH STELIOS PAFADOPOULOS, MANAGING DIRECTOR, SG COWEN

**Bill: So let's talk a little bit more about what makes excellence in a CEO. Who are the executives you admire the most? Is there any continuity in their backgrounds or qualities that inspire confidence?**

**Stelios:** That's an excellent question, because the industry has gone through a number of fads, especially in the early years. I call them fads because they never seemed to have been based on thoughtfulness. For a while, the prevailing concept (now passé) went something like this. The entrepreneur started the company, but now's the time to bring the big boys from Pharma to turn the place into an orderly organization. More often than not, this proved to be a bad decision. Back in the late eighties, early nineties, I framed the question as follows: "Let's consider the most successful Biotech companies to date – Genentech, Amgen, Centocor, Genzyme and Chiron. Let's look at the Chief Executive." Genentech – Bob Swanson was a young, unproven venture capitalist. Chiron had Ed Penhoet, a bona fide academic. With Henri Termeer, Genzyme was led by a hardcore marketing-driven executive from Baxter. At Amgen, George Rathmann was Head of R&D at Abbott. Centocor had Hubert Schumacher, a young scientist with modest commercial experience at Corning. The one thing all these individuals did have in common, however, was intellect.

Biotechnology is not a business for stupid people. You've got to be very smart. Second, I would say you must be scientific, especially for the younger companies. If not a scientist, you must love science.

**Bill: Or, at the very least, be intellectually curious?**

**Stelios:** Absolutely. And you've got to be somebody people are prepared to follow. You have to have leadership skills. If you have all that, and bring scientific authority and charisma, you have a chance of success. Richard Pops is one of the most impressive CEOs in the business. He's not a trained scientist. Nonetheless, he's so smart, so well versed in science that you would never know that he is not a faculty member at some medical school. Richard is very capable, one of the better CEOs in the industry. And then there's George Scangos at Exelixis.

**Bill: He is a scientist?**

**Stelios:** He is a scientist by training, but more to the point, he's a great leader. The successful ones create positive environments. The one thing about George Rathmann is that he created an environment in which excellence was encouraged.

**Bill: In general do these people recruit great people under them?**

**Stelios:** They do and they should, but more importantly, a great CEO is one who quickly recognizes recruiting errors. We all make them, but the good CEO fixes these mistakes promptly. You don't

always hire the best guy right away. But if you make a mistake and recognize it, you can fix it, and have to.

**Bill: In last year's interviews, I asked George Whitesides a similar question, "What makes a great Biotech CEO?" In essence, his view was that great improvisational intelligence was a necessary element of success. To survive and prosper in Biotech, you must adapt and adjust. Part of that may well be hiring and firing in a decisive way, but many companies that start out with a certain science wind up doing something totally different to earn their success. Have you observed that tendency?**

**Stelios:** Yes and no. First of all, I don't really believe that intelligence comes in bursts. Either you're smart or you're not. If you're smart, you can apply yourself to problems and solve them. Correct decision making is not so much about improvisation, because you are not called upon to make those decisions while dancing on the stage. Key decisions are often made over some months. If something doesn't work in the company, you don't decide to change over dinner. It is true that many companies ultimately become successful on the basis of accomplishments that were not part of their original objectives. It absolutely happens, but I can give you counterexamples as well. Constancy and adjustment both have their value in steering the course of the Biotech company. Look at Genentech, you could argue that their basic competitive advantage was recombinant DNA technology, and they stuck to their guns. The company delivered a bunch of products out of that core technology. Genentech still hasn't excelled in small molecules, which have become so important to Biotech companies over the last ten to fifteen years. Amgen also is a company focused on Biotherapeutics from its very beginnings. Back in '85, however, the most exciting product wasn't EPO. It was all alpha-interferon, Hepatitis B vaccine, or interleukin-2. EPO, however, became the basis of the company's success. So when you boil it down, Amgen was the company that cloned the gene, protected the attendant intellectual property, and created the product that established its economic foundation. So, Amgen was essentially true to itself, but also openly opportunistic. Then look at Cephalon, a company which began in neuroscience, focused on ALS. Its claim to fame now is Provigil, an in-licensed compound for narcolepsy. The departure from its core science was significant, not done overnight, but over a long period of time for subtle reasons. Success comes in all these different ways.

**Bill: Is Frank Baldino somebody whom you admire as well?**

**Stelios:** I do. I find him to be very competent as a CEO. He has also shown how a scientist can become a very effective manager with a Marketing sense. In the end, the success of Cephalon is less scientific and more commercial.



**Bill: We've mentioned Boards of Directors. Do you see Boards of Directors changing or being enriched at an earlier time in the company's existence or in a more disciplined fashion now than before?**

**Stelios:** I've got revolutionary views on this subject. I believe the Board composition of private companies is all wrong. The standard team is three venture capitalists, a CEO and a scientist, and perhaps a couple of industry guys. To be honest, when push comes to shove, money speaks. Under duress, these Boards behave more as investor committees than Boards of Directors. Venture capitalists bring along the point of view of their fund, and, in a fundamental way, that's okay because it's a private company, with limited ownership. So, if you represent your fund, you represent these interests. Why bother having those poor outsiders?

**Bill: Are there ever any well-chosen outsiders?**

**Stelios:** The outsiders are not bad. When things get tough, however, the guys with the money start voting their money. Let's assume that there's a private company that's confronted with a whole new challenge. For example, if they were to raise another \$20 million, there's a really good chance they will be in a position to sell the company for \$300 million. But that financing of \$20 million basically represents a re-cap of the company. One of the venture guys on the Board may be out of money in this cycle in his fund and just cannot ante-up. The alternative to dilution is to sell the company for \$60 million tomorrow. If I am the guy with no more money myself I would take the sure \$60 million, something tangible and positive. Going through a re-cap would leave me pretty much out of the picture. Even though there would be a \$300 million opportunity for the other shareholders, I will choose the \$60 million.

**Bill: Has venture capital changed over the last five years? Has it become more conservative?**

**Stelios:** No. As a matter of course, venture capital goes through a cyclical re-invention of itself in the following ways. People come into the venture business full of dreams, full of vision, and with no experience. They follow their intuition. Some fail and disappear. Some become very successful. The ones who become successful now three, four, or five years down the line look at their portfolio of investments and say, "Oh God. Was I crazy or what? What was I thinking when I made this decision to fund that company? Had it not been for certain fortunate events I would still be struggling, I would never do it now." This reaction often leads to the decision to introduce more structure into their thinking and investment process. The desire now is to systematize something which is inherently idiosyncratic and instinctive. So those who fundamentally understand that

all they can really do over time is simply become more instinctive are the ones who do well over the long term. Those who arbitrarily embrace structure because of their fear of their early successes, fear that they were too intuitive and took too much risk, are often driven into mediocrity, and at some point out of the business.

**Bill: Nonetheless, you must agree that there's a greater tendency now to fund companies with Phase II products, as opposed to enabling technology or tools, despite all the difficulty that Pharma has in picking the right pre-clinical candidates and other inefficiencies in the research process. There doesn't seem to be a willingness to invest in technology with longer term prospects. That was what I meant by conservatism.**

**Stelios:** There is actually a cyclical thing happening here as well. Since the eighties, VCs have oscillated between enthusiasm for products and enthusiasm for technology, such as combinatorial chemistry, automated high throughput screening, and genomics. Investors have won on both swings of the pendulum. But please understand that I never suggested that investing in tools was a good proposition. Companies that manufacture products that are sold at marginal profit offer little justification for huge venture investment. People confuse the technology platform with tools. In fact, I will tell you my own definition of the only way to start a viable and sustainable biotech company. The enterprise must be centered on a broadly enabling technology platform, with a clear product definition and multiple opportunities at product generation.

**Bill: In your opinion, what company meaningfully exemplifies that definition right now?**

**Stelios:** Amongst the younger companies, without a doubt, Exelixis. The company has based itself on a broadly enabling platform of using comparative genetics and model systems, state of the art chemistry, and screening capabilities, focused extensively on kinases. Exelixis has several global products in the clinic, and another three later this year.

**Bill: On the other side of the ledger, who is doing Venture Capital best these days?**

**Stelios:** Well, I will pick two examples. One is Tony Evnin - he does venture capital very well always. Flexible, pragmatic, patient, intelligent, thoughtful, and not swayed by the fad of the moment. So he's an example of what "steady as she goes" means. I also think a guy like Christoph Westphal at Polaris who is thinking out of the box. Chris represents another extreme, a guy who embraced RNAi and then started a company with the highest quality individuals, Anlylam. Christoph's an excellent recruiter as well.

## INTERVIEW WITH STELIOS PAFADOPOULOS, MANAGING DIRECTOR, SG COWEN

**Bill:** Those are good examples, Stelios, and ones that are radically different from one another. What is the nature of the capital markets at the moment? Is the window open? Is it going to stay open? Give me access to your crystal ball here for the next year.

**Stelios:** I will offer a counterintuitive point. We've had a good number of IPOs since October of '03. With that number of deals in eighteen months, the positive feeling in the market has been sustainable. What we did not have this time is craziness. So this has been a different kind of market. In my view, "windows" by their nature involve some degree of excess. There really has not been any excess in the last year and a half.

**Bill:** You mentioned RNAi. Alnylam's a company with far-sighted technology but years and years away from product. Were you surprised that it got funded at all?

**Stelios:** My view is that there is always room for an aspiration to greatness. When you invest in Biotech, it is ultimately about an opportunity to touch greatness. It's not about a better opportunity to touch the mundane stuff. If you want mundane stuff, go invest in one of a number of pharmaceutical companies. They have been practicing the mundane very well for some time.

So I think we have done ourselves a disservice in the business of Biotechnology. In the last couple of years, we funded a lot of Specialty Pharma companies, whose frequent focus is on resuscitating comatose compounds. I have been saying this for some time now and it's an alarming statement. We began this industry years ago trying to do what Pharma couldn't do. We are now doing what Pharma does not want to do because they don't consider it worthy. The Specialty Pharma model is largely based on rejected Pharma compounds.

**Bill:** Drugs too small for distribution?

**Stelios:** Allegedly, but most of the time it is not the markets that are too small. More fundamentally, these drugs have inherently limited prospects for success. There's no rule that says small market products take less money to develop than big market products. So what we are doing? Picking up marginal products. We build up the excitement. Over what? These in-licensed products often fail.

**Bill:** So what will happen to Pharma finally? Will it just become exclusively a distribution conduit?

**Stelios:** Absolutely not. In my view, distribution is not a sustainable business. Nor is late stage development. You have to have discovery. That discovery has to be practiced in-house. Ultimately, commercial effectiveness in therapeutics must be rooted in science.

**Bill:** Just to argue with you for a moment here. Why couldn't the Pharmaceutical industry assume the shape of the Device business, an oligopolistic market structure in which three or four big companies buy up the small companies to get new product ideas? Perhaps you're saying something different, that Biotechnology will become a bigger business than Pharma?

**Stelios:** The point is that new drugs have a transformative ability. If you have a big drug, you can integrate vertically in no time; this has been done many times in the past. If I'm Amgen, why do I have to sell my birthright? They sold it once; the second time they didn't. And they moved on from there. So if you think about it, the big companies like Amgen, Genentech, Genzyme and Biogen Idec are fully integrated Pharmaceutical companies. Some are bigger than Big Pharma today, but most are bigger than the biggest Pharma companies ten years ago. This has happened literally overnight.

**Bill:** Will the Big Pharma companies as we know them today ever re-invent themselves?

**Stelios:** Well, I guess the re-invention for them would have to come in two places. Will any of them be sufficiently gutsy to change the way they market drugs? You look at SG&A for most Pharma companies and it's 35% of sales – a lot of money and half of it is marketing. Is there a way to radically reduce marketing expenses? That would be a major breakthrough. The other question is, can you get more out of R&D?

**Bill:** How much of your business is international now and how international is the whole sector? Is Biotechnology still essentially a U.S. industry?

**Stelios:** I don't know if my European friends like to hear it, but Biotechnology is still a U.S. business. No doubt it will remain so for a long time. As we are a global firm, I go to Europe about once a month. I enjoy it – there's good science in Europe and great people. There are even entrepreneurs in Europe. Finally, however, two decisive differences exist. Europe lacks robust capital markets. In order to grow, European Biotech companies have to take it to the U.S. Furthermore, it's about culture. There are no role models, no George Rathmann's, in Europe. In Boston, you go to a bar and meet people who did the entrepreneurial thing or are doing it now. Americans are very "can do," on the spot, think on your feet. In Europe, you think about it, you contemplate, and proceed in a definite and controlled way. For the Biotech industry, the American ethos is more conducive to success.

**Bill:** So *Huckleberry Finn* should be required reading for your European friends.



## LITA NELSEN

### Director, Technology Licensing Office

#### MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Lita Nelsen is the Director of the Technology Licensing Office at the Massachusetts Institute of Technology, where she has been since 1986. This office manages over 400 new inventions per year from M.I.T., the Whitehead Institute, and Lincoln Laboratory. Typically, they negotiate over 100 licenses, and start up over 20 new companies per year.

Ms. Nelsen earned B.S. and M.S. degrees in Chemical Engineering from M.I.T. and an M.S. in Management from M.I.T. as a Sloan Fellow.

Prior to joining the M.I.T. Technology Licensing Office, Ms. Nelsen spent 20 years in industry, primarily in the fields of membrane separations, medical devices, and biotechnology, at such companies as Amicon, Millipore, Arthur D. Little, Inc., and Applied Biotechnology.

Ms. Nelsen was the 1992 President of the Association of University Technology Managers and serves on the board the Mount Auburn Hospital, and the Scientific Advisory Board of the Children's Hospital Oakland Research Foundation. She serves as the intellectual property advisor to the International AIDS Vaccine Initiative and is a founding and current board member of the Center for Management of Intellectual Property in Health Research.

Ms. Nelsen is widely published in the field of technology transfer and university/industry collaborations and was a CMI Fellow at the University of Cambridge with the Cambridge MIT Institute studying university/industry/government partnerships in technology transfer and local economic development. She is a co-founder of Praxis, the UK University Technology Transfer Training Programme.

#### **Bill: Let's begin with your earlier career and how you wound up in something as unusual as Technology Transfer.**

**Lita:** As I think about it, my story sounds quite contemporary - I got a Bachelor's and Master's degrees in Chemical Engineering from MIT and then promptly joined my professor's start-up. No doubt part of my commitment to small companies can be traced to that early decision. We created a brand new technology and then tried to missionary-sell it to the world - and in fact nowadays it's a standard technology in every biology lab. Then I went on to Arthur D. Little and learned how big companies work, and from there I joined a big company - Millipore. Mine was a fairly typical Engineer's career: you start in R&D, move into Product Management, and end up in Marketing and Venture Management. The adventure continued with an episode in a biotech start-up that went nowhere, followed by a couple of other bounces without any real result.

#### **Bill: When did MIT come back into the picture?**

**Lita:** I had dealt with what was then MIT's Patent and Licensing Office once from the other side of the table. When for some unknown reason someone mentioned a role in the office to me, I said, "They want a lawyer!" But the response was, "No, they don't want a lawyer at this time." That was in 1986, when Niels Reimers, who was on sabbatical from Stanford's Office of Technology Licensing, had just been brought in to turn the MIT office around. The new model was to recruit engineers and other technical people with industrial backgrounds and some marketing savvy. We've been doing it that way ever since in the renamed Technology Licensing Office.

#### **Bill: Without getting too far afield here, what's the institutional structure of MIT and how does Technology Transfer relate to it?**

**Lita:** Organizationally, there's MIT and Lincoln Laboratories, which is a large laboratory owned by the Air Force but run by MIT. Our different schools - Engineering, Science, Management, Architecture and Humanities - are not really separate entities; they're all organized beneath one umbrella. MIT and Lincoln Laboratories each spend about a half a billion annually in terms of sponsored research. At Lincoln Labs, however, so much of it is "behind the black door" (that is, classified) that even though they have the same research budget as MIT, we only get about 10% of our patents from there.

#### **Bill: What about the Media Lab and the Whitehead Institute?**

**Lita:** The Media Lab, despite its high profile, is simply an academic department of MIT. The Whitehead Institute, however, is a com-

## LITA NELSEN, DIRECTOR, TECHNOLOGY LICENSING OFFICE, MIT

pletely different corporation, although their senior researchers are tenured members of our Biology faculty; they own their own patents, but we actively function as their licensing agent. For Lincoln Labs, the patents are all owned by MIT. Our licensing is not dominated by any one technology, although since MIT has four Nobel laureates in Biology and more on the way, we do have a strong biomedical presence; biology and medical devices make up 35-40% of what we do. But unlike the universities dominated by their medical schools (we don't have one), electrical engineering, telecom, software, and material science are all well represented.

**Bill: Is your staff organized to serve particular faculties?**

**Lita:** The effort is structured according to technology rather than department. Our software person will do software for any professor - although if it came out of Biology, the individual might work with one of our Biology people because Biology-related software is such a different market. People tend to work with those who understand a specific technology, although perhaps the more important consideration in this regard centers on understanding the structure of the industry into which the technology is to be "sold."

**Bill: I'd like to hear a little more about the history of the Technology Transfer model.**

**Lita:** Well, you have to start with the fact that the vast majority of university research is funded by the Federal Government. That's the very large tail that wags the dog. And the watershed in terms of that relationship came in 1980, with the Bayh-Dole Act. The basic assumption prior to Bayh-Dole had been that if the government funded something, then the government ought to own the intellectual property, and they should give non-exclusive licenses to whoever wanted it. Bayh-Dole changed all that. The new premise was that patents could be used as an incentive for companies to invest in university-stage technology, by giving exclusive licenses to those willing to take on the risk of developing it. The universities were given the right to own the invention if they would file a patent on it, and could give exclusive licenses if they chose. But this involved learning the art of Technology Transfer, as well as learning how to communicate between academia and industry. And it took about ten years before more than half a dozen universities knew what they were doing, because you couldn't go to school to learn this stuff. People learned by doing and from each other. That's where the Association of University Technology Managers (AUTM) came from. But slowly, we caught on, and the number of patents filed began growing exponentially by the early 1990s.

**Bill: So the universities fed the environment and the environment nurtured them.**

**Lita:** The opportunity was there and we only had to take advantage of it, and fortunately our institutional environment at MIT was well-suited to the task. Unlike many of the Ivies, MIT did not derive from a medieval university set up to educate clergymen. That's how Harvard and Yale were established, and many of these universities had trouble coming to terms with letting the fingerprints of industry soil the ivory tower of academia. MIT was always more pragmatic. We were set up to bring "science and the useful arts" to "industry and agriculture," as you can read in our 1861 charter. And there was high-tech entrepreneurship going on here from at least the late 1950s.

**Bill: What is your staffing model at the Tech Transfer Office?**

**Lita:** We look for people with both technical and industrial experience, but the people coming from industry have to be willing to make the transition to the academic environment and also be psychologically and culturally able to do it. If they come in saying, "I'm going to turn this into a business," well, they've got it wrong; that's the tail wagging the dog. A better attitude is, "How do I engage in a 'by-product' industry and do it well in a business-like mode, but with different objectives?" Because Technology Transfer is a by-product of the academic process, not a purpose, and the money is a by-product of the Tech Transfer process, not its goal. You've got to get people who can psychologically accept that their previous value system is useful but not portable per se. In terms of personality, first of all you have to find people who are very smart. The faculty quickly picks up on whether you're bright or not. At the same time, our recruits have to know a lot more about business than the faculty do. And of course, since the faculty is the boss, you have to be deferential and court them a little bit. I hope no one takes offense at the metaphor, but it's a bit like raising teenagers: you have to walk on eggshells and bite your tongue at the same time.

**Bill: Has the Technology Transfer business changed since you joined MIT's office?**

**Lita:** The business has changed, not suddenly, but gradually through the late eighties to early nineties and even into the late nineties. Market pressures increasingly caused big companies to worry about quarterly earnings and cut back on basic research or in some cases even close down their labs. This change was compounded by trends in corporate governance. As we moved into the late nineties, executive compensation systems became very short-term-oriented. As a senior executive it would be hard to justify



investing today in something that wasn't going to pay off for a decade, since you wouldn't be around to reap the benefits. With no basic research, however, companies soon found they had no pipeline. So they went scouting for new prospects, and realized that anything coming out of universities wasn't going to pay off for six or eight years unless it was software. So then the model became: let venture capital fund spin-outs to produce prototypes, and then industry would buy this innovation from the start-up. Companies were then willing to pay a whole lot more because the risk has been reduced dramatically, as had the time-to-market. It was this "outsourcing" of R&D that led us to become more and more dependent on venture capital.

**Bill: 'We' meaning the corporations or you?**

**Lita:** Both. Because at MIT we also needed venture capital to get the little companies started and our technology out into the marketplace.

**Bill: Did venture capitalists develop an underlying philosophy in playing this bulked up intermediary role?**

**Lita:** Venture Capital, as we know, goes in fads. One year Biotechnology is in, the next year it is out. We had the dot.com boom, which in theory should have been good for us, but which was really not, because it drained capital out of investment in technology and into speculative investments that could be flipped in a few months. Then that bubble burst, which was followed by September 11th, 2001, and the venture community basically went into paralysis and was quivering in a corner. MIT rode the storm out surprisingly well, because we're diversified, unlike universities in which most of their technology comes from the Medical School. If Biotechnology's down, we can do Telecom or Materials Science; if Biotechnology's up, we can do Biotechnology. Even in the doldrums of 2002 we got companies started, because we know the venture community personally, and we've done enough companies in the past and made enough VCs wealthy that the few venture capitalists who were still investing came around to see what we had.

**Bill: Would you comment on the current state of the world, given your observation on the emergence of VCs in the wake of the withering of will and narrowing of perspectives on the part of corporations?**

**Lita:** I think it's the narrowing of time frames, not so much the withering of will. Nonetheless, Venture Capital is very central to us. We're making some effort now to try to go even further upstream in the funding game, and to actually get to know some

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of the angel investors. In March, we ran an event called “Hosts of Angels,” a meeting to introduce the Technology Licensing Office to members of organized angel investor networks; it went very well, and we hope to do more in this arena.

**Bill: And your purpose in organizing such a gathering comes from realizing that the venture people are becoming more conservative and wanting somebody to underwrite the very early risks?**

**Lita:** Yes, and because the venture funds have just gotten too big in many cases. It’s very hard for an \$800 million fund to place a seed round of \$2 million while they wait for the thing to grow. It would take forever to use up your millions.

**Bill: We find companies that are funded exclusively by individual angels create their own set of challenges. And it’s very difficult to recruit into them. Most of the executives who will take a chance on an early stage business won’t do it unless there’s professional backing involved.**

**Lita:** And I don’t blame them. If you’ve got Ray Stata as an angel, well, great! But such an angel is infrequent. The old kind of angels, the doctor and dentist angels, forget it. All they could bring was money. They didn’t have connections, they didn’t know what to do when the company ran into a speed bump, and we would try to keep inventors away from them. Now we’re looking at more of what I call the ‘second time around angels,’ people who made their money in the industries in which they’re investing. These individuals can bring wisdom, connections, as well as advice and committed time. In short, they can put in more than money.

But angels are now very reluctant to invest in a first round that will be followed by a professional venture round. They used to be quite willing to put in the first quarter million, and then go to some other fund for the next \$8 million. But following the dot.com fiasco, the VCs coming in at the B round were so brutal in terms of their cram-downs that the angel investors got killed. In a sense, the venture investors have poisoned their own seed corn.

**Bill: Have the last two decades of “public venture capital” produced anything that is promising for the future?**

**Lita:** Yes, and people just don’t understand how far the science has come. We are doing things that twenty-five years ago people thought would have taken a century. Nowadays the FDA will not approve a drug if you don’t know its mechanism of action. Fifteen years ago, the FDA couldn’t demand that because we just didn’t possess the knowledge! Then most drug discovery was purely Edisonian. If it cured the rat, it’ll cure the people; it was never “it interfered in this

pathway.” And now you have all these tools – cloning, sequencing and proteomics. Twenty-five years is a very short time in science. The revolution didn’t occur just because of Venture Capital or public money. It was the billions of dollars of federal funding that produced these wondrous methods. But NIH doesn’t fund development, and it takes hundreds of millions to bring a therapeutic product to market. That’s where the venture capitalists, the Pharmaceutical companies, and the investing public come in. And because of them, there are a lot of products out there now.

**Bill: Is that your primary measure of success?**

**Lita:** Our primary measure of success is how many deals we do, since each of those is an investment in developing our technology into products. We don’t keep an ROI, because if you look at the ROI on university research, it’s ridiculous; the “I” is so large that the numbers are dreadful. Fortunately, the bulk of that “I” is made by the Federal Government. In terms of “return,” if you’re talking dollars going back to the endowment, we’re doing okay. And we were still getting new companies off the ground in the coldest part of the venture freeze. I pride myself that we’re known as easy to work with and a good place to get deals done. People may tease that we’re tough, but they know they can get the deal done with us and get it done quickly, fairly, flexibly and efficiently.

**Bill: How would you differentiate yourself from the “competition” – Stanford, for instance?**

**Lita:** Other than geographically, we’re not that different from Stanford. They also have a diversified portfolio. The fact that they have Stanford Medical School, however, means they’re much more likely to end up with one of the blockbusters. A blockbuster is a technology that ends up earning you tens of millions a year, even if the royalty rate is low, because product sales are in the billions. Blockbusters are about as common as winning the lottery, and have almost all been Pharmaceuticals, an investment game of high risk, high reward.

**Bill: Among the major Technology Transfer offices, are there differences in incentives, psychological or economic, offered to the Technology Transfer staff?**

**Lita:** There are certainly some universities where the emphasis is on the money. And there are even some universities – you would know better than I – where incentive systems are built in for the Technology Transfer staff to concentrate on the dollars earned. I’ve always found incentive systems for this business too complex. From my earlier comments you know that I’ve lived in the real world. I understand that



if you mistune the incentive systems just a little, you're going to mistune your company a whole lot, because people game any system that's there. In my office I've tried to get salaries high enough to engage people in their mission. There are no bonuses. It's just salary, so we can concentrate on doing the "right thing" for each technology, rather than trying to maximize the return. In the same way, we try to be straightforward with the faculty on their choices of how they want to be involved in getting their technology developed. If we license out to an existing company, the faculty member and other inventors get a third of the net royalties and perhaps some opportunity for consulting or sponsored research, but their total involvement is somewhat limited. On the other hand, if you start a company, you have a nice chunk of the founders' equity, become involved in its strategy, and you probably will devote a lot more of your time to it.

**Bill: Who are the two or three most extraordinary faculty members?**

**Lita:** There are far too many to choose "two or three". But as examples: everybody's heard the Bob Langer story. You can't not hear it. And there is Yet Ming Chang, who was involved in American Superconductor and now he's involved in A-123. Look at Ron Rivest in software. If you've heard of RSA Data Security, public-key encryption, he's the "R" in RSA, and now he's one of the founders of Peppercorn. And Tom Leighton, the founder of Akamai - their product literature now says that 15% of the entire Internet traffic goes through their systems! All in all, a very creative bunch.

**Bill: Can you spot the great ones?**

**Lita:** No, I can't spot the great ones. I can, however, spot the impossible ones. And they are the big puzzle, the ones that have wonderful technology but just have the wrong personality to get on with people, or they are completely unrealistic about working with companies. But it usually takes me a good decade to give up on some of them, because their technology is so intriguing, and yet you know they're impossible because they've proven it to you a hundred times. On the other hand, there are wonderful stories of people who really understood what they have. Not long ago, I walked a senior professor, with a former post-doc, now a young professor, and the senior guy says: "We've got to do this one right. This is going to be one of the most important tools in molecular biology this decade or more." He's a Nobel laureate; he was a founder of Biogen; he hasn't gotten involved in any new company besides Biogen up until now, and he says that he'd be willing to get involved in a start-up. So you think, "You know, he could be right and he's certainly committed." And he was right - the technology is called RNAi, and it is indeed revolutionizing biology research.

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**Bill: Among the colleagues whom you respect in your business, are there any common features, any common aspects of background, any common psychological quality or motivational characteristics?**

**Lita:** The common characteristics are flexibility, understanding of the principles of universities, a sort of pragmatic idealism about research coupled with an understanding of what it takes to go from a discovery to a product on the market, and an ability to handle uncertainty. This is not a formulaic business. It's a surprisingly creative business. Every time you do it, it's new, and you've got to make it up as you go along. So you have to be able to juggle multiple variables. You have to be able to solve problems. Second is that one has to be able to deal with ambiguity. There are no right answers in this business. If you have to have an algorithmic solution, you can't do it. In hiring, bringing on people who need exact answers has probably been my single biggest mistake. Because you can't tell until you've got them inside. Their academic credentials are superb, they've got good business backgrounds, and then you find that they can't deal with our brand of complexity. One minute it's technical, another minute it's interpersonal, and the next minute it's political. You have to be willing to tackle all the various dimensions of a problem, knowing full well that a good fraction of the time you're going to make a mistake. If you want it perfect, you'll be paralyzed.

**Bill: You mentioned earlier that, given the nature of your office, you just can't get someone coming in who wants to run it like a business. But at the same time, there's an increasing economic dependence from the schools on these offices, an increasing anticipation around their output.**

**Lita:** And that is a dreadful mistake, an absolutely awful mistake. At the MIT Technology Licensing Office, we make money. We've been "profitable" for fifteen or sixteen years. Running it in the black represents a tremendous incentive for me, because then the administration leaves us alone. The truth is that if you look across the country, though, Tech Transfer is a lousy business if you see it only as a financial investment. If you set up a new office, it's going to take you probably ten years to break even. So universities really need to look at all the other advantages of such an operation. By the way, I'm not using this as an excuse – we're bringing in \$35 million a year in the average year, and more in those years in which there's an IPO and we cash in equity. Now that's not net, but still it's a healthy return. But I would not advise another university to try to do Tech Transfer because of the money.

You've really got to do it for other reasons: the economic good of the country; the economic good of the region; the good of the pub-

lic in terms of new medicines and other products; the happy faculty fulfilling their entrepreneurial ambitions, and, perhaps equally importantly, seeing their results become real beyond a journal article. Furthermore, at a macro level, successful Tech Transfer allows Congress to see that paying for professors to "play in their sandboxes" actually results in something useful in terms of new products and economic stimulus. And at MIT, we see the difference in student life. Our undergraduates are exposed throughout their four years to entrepreneurship in a very concrete way. Over the course of their career here, the students probably meet at least twenty people who have started a company or who have been involved in starting a company. So it occurs to them that you don't have to be Superman or Bill Gates to start a company. Pretty ordinary people do too. This in itself is a robust stimulus for healthy entrepreneurial endeavor.

**Bill: It introduces creative possibilities to the students who are not planning to be academics.**

**Lita:** The experience enriches them a lot, it changes their ambitions for the future. And at the same time we're not trying to alter or dilute their formal education. I mean you still need to get the basics of math, physics, chemistry and biology to graduate.

**Bill: I assume that as the intellectual property code becomes more standard across the world, your model of Tech Transfer will become more global as well.**

**Lita:** MIT does a lot outside the U.S. On the Tech Transfer side, because of MIT's alliance with the University of Cambridge, the Cambridge/MIT Institute, I've gotten involved with how they do Technology Transfer in the UK, and in fact we set up Praxis, a free-standing non-profit training company for UK Technology Transfer professionals, founded with David Secher, my counterpart at Cambridge. On the educational side, MIT is very international. We have students from all over the world. More formally, we're working with a number of countries. In Singapore, for example, through the Singapore/MIT Alliance, we've got research going back and forth; we're teleconferencing undergraduate classes; we're working with their Tech Transfer offices on inventions coming from the alliance. And we're getting involved in developing country issues. In Tech Transfer I'm also working with a Rockefeller-funded organization, which is concerned with intellectual property and health research in developing countries.

**Bill: Well, it seems that what's good for MIT is good for the world.**

**Lita:** I hope so.

## Wilmer Cutler Pickering Hale and Dorr LLP

60 State Street  
Boston, MA 02109  
617.526.6000  
2445 M Street  
Washington, DC 20037  
202.663.6000  
[www.wilmerhale.com](http://www.wilmerhale.com)

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### A. William Caporizzo

Co-Chair, Tax Department  
617.526.6411  
[william.caporizzo@wilmerhale.com](mailto:william.caporizzo@wilmerhale.com)

### Kimberly B. Wethly

Junior Partner, Tax Department  
617.526.6481  
[kimberly.wethly@wilmerhale.com](mailto:kimberly.wethly@wilmerhale.com)

## Ernst & Young LLP

200 Clarendon Street  
Boston, MA 02116  
617.266.2000  
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### Bryan Pearce

New England Area Leader,  
Venture Capital Advisory Group  
617.859.6199  
[bryan.pearce@ey.com](mailto:bryan.pearce@ey.com)

### Joseph Muscat

National Venture Capital Advisory Group Leader  
650-496-4517  
[joseph.muscat@ey.com](mailto:joseph.muscat@ey.com)

## J. Robert Scott

260 Franklin Street, Suite 620  
Boston, MA 02110  
617.563.2770  
[www.j-robert-scott.com](http://www.j-robert-scott.com)

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### Bill Holodnak

President  
617.563.2770  
[billh@j-robert-scott.com](mailto:billh@j-robert-scott.com)

