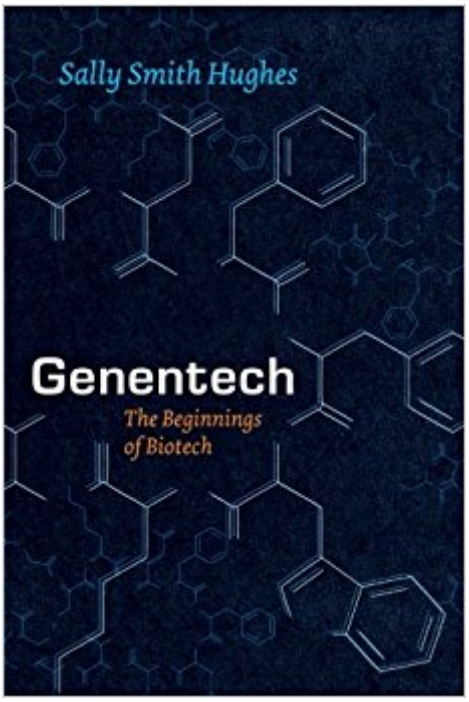
Genentech: The Beginnings Of Biotech (Synthesis)



Synopsis

In the fall of 1980, Genentech, Inc., a little-known California genetic engineering company, became the overnight darling of Wall Street, raising over $38 million in its initial public stock offering. Lacking marketed products or substantial profit, the firm nonetheless saw its share price escalate from $35 to $89 in the first few minutes of trading, at that point the largest gain in stock market history. Coming at a time of economic recession and declining technological competitiveness in the United States, the event provoked banner headlines and ignited a period of speculative frenzy over biotechnology as a revolutionary means for creating new and better kinds of pharmaceuticals, untold profit, and a possible solution to national economic malaise.Â Drawing from an unparalleled collection of interviews with early biotech players, Sally Smith Hughes offers the first book-length history of this pioneering company, depicting Genentechâ ™s improbable creation, precarious youth, and ascent to immense prosperity. Hughes provides intimate portraits of the people significant to Genentechâ ™s science and business, including cofounders Herbert Boyer and Robert Swanson, and in doing so sheds new light on how personality affects the growth of science. By placing Genentechâ ™s founders, followers, opponents, victims, and beneficiaries in context, Hughes also demonstrates how science interacts with commercial and legal interests and university research, and with government regulation, venture capital, and commercial profits.Â Integrating the scientific, the corporate, the contextual, and the personal, Genentech tells the story of biotechnology as it is not often told, as a risky and improbable entrepreneurial venture that had to overcome a number of powerful forces working against it. Â

Book Information

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Customer Reviews

â œHughes has crafted an engaging historical account of Genentech from its beginnings as a small laboratory at the University of California, San Francisco to the 2009 merger with Roche for 47 billion dollars. . . . [Her] account will appeal to a broad audience and is a must read for scholars interested in the history of biotechnology. Highly recommended.â • (J. A. Hewlett Choice)â œ[A]n important addition to the history of biotech.â • (Phillip A. Sharp, Massachusetts Institute of Technology Nature Medicine)â œOver the past 20 years Sally Smith Hughes has done a great service to science studies by conducting in-depth oral-history interviews with prominent scientists, venture capitalists, corporate leaders, and attorneys in the history and business of early biotechnology. She drew on her unprecedented access to corporate records and a large number of actors and their oral histories to write Genentech, the first comprehensive account of the creation and early development of the Genentech Corporation.â • (Doogab Yi Chemical Heritage Magazine)â œThe author skillfully reveals the practical, day-to-day, hands-on roles played by venture capitalists focused on fiscal gain and scientists focused on scientific breakthroughs. . . . [A] fascinating read.â • (Valerie McGurk Nursing Standard)â œ[A]n eminently readable (and, for classes, eminently assignable) story . . . . Smith Hughes is one of the foremost oral historians of science today, and Genentech is filled with illuminating interview snippets woven artfully into a narrative that both engages and (somewhat surreptitiously) analyzes. . . . [F]or a case study that lays out in lively detail the ambiguities and exuberances of high-tech entrepreneurship, Smith Hughesâ ™s Genentech surely ranks among the very best.â • (Cyrus C. M. Mody, Rice University Bulletin of the History of Medicine)â œ[A] fascinating book, vividly recount[ing] the blood, sweat, and tears of the early days of â ˆgenetic engineersâ ™ working at the bench, designing new biomolecules, and capitalizing their promises on Wall Street.â • (Social History of Medicine)â œGenentech: The Beginnings of Biotech paints a wonderfully detailed picture of an important beginning in the history of biotechnology.â • (Nathan Crowe, Arizona State University Journal of the History of Biology)â œHughesâ ™s Genentech makes an invaluable international contribution to understanding how a period just short of a decade redefined â ˆbusiness as usualâ ™ for biologists.â • (Lisa Onaga, Nanyang Technological University Technology and Culture)"Sally Smith Hughes skillfullyÂ describes the improbable creation, difficult adolescence, immense prosperity, and eventual foundering of Genentech, the first biotech behemoth. Itâ ™s a great tale, with a cast of fabulous characters and surprising episodes, ranging

from Palo Alto to Wall Street. This is an outstanding book that should appeal to Nobel laureates as well as hedge-fund barons and ordinary citizens.â • (Daniel S. Greenberg, author of Science for Sale and Tech Transfer)â œDrawing extensively on oral histories, Hughes reveals the day-to-day hands-on roles of both the venture capitalists and the scientists, their eyes fixed at once on scientific triumphs and corporate riches, who brought Genentech to life. Hughes vividly recounts the tough-minded deals, buccaneering strategies, laboratory struggles, and relentless patent arrangements that not only made for Genentechâ ™s success but that pioneered the new biotechnology industryâ ™s operational model.â • (Daniel Kevles, Yale University)â œSally Smith Hughesâ ™s book on the formative years of Genentech helps fill a gaping hole in the history of biotechnology, as it grew out of the recombinant DNA technology in the 1970s and 1980s. This book covers the quake from its epicenter. It draws on two decades of research, thousands of conversations, hundreds of documents, and dozens of oral history interviews. This zippy read will be welcomed by those who care about the San Francisco Bay area, biotechnology, the history of molecular biology, and high-tech economic development. Genentech has long had its legends, statues, buildings, and view of Candlestick Park; now it has a book about its beginnings.â • (Robert Cook-Deegan, Duke University)â œMy first job out of my postdoc was at Genentech in early 1981. At the time, I had no idea that all those guys in suits were doing something that had never been done before. But I did know the science was amazingâ ”and Bob Swanson was the clear leader in creating an environment that supported that science. Sally Smith Hughes has brought to life the details of what the key players were up toâ ”they werenâ ™t playing it safe, and they created a catalytic environment that generated a whole new industry.â • (Cynthia Robbins-Roth, author of From Alchemy to IPO)

Sally Smith Hughes is a historian of science at the Bancroft Library at the University of California, Berkeley. She is the author of The Virus: A History of the Concept and the creator of an extensive collection of in-depth oral histories on bioscience, biomedicine, and biotechnology.

My reading of Genentech follows my reading Science lessons abotu Amgen and this is a review I published elsewhere (my blog) os apologies for any inconsistency...I have to admit I had never heard of the Bancroft LibraryÃ¢Â Â™s website (http://bancroft.berkeley.edu/ROHO/pro...) for the Program in Bioscience and Biotechnology Studies, Ã¢Â Âœwhich centerpiece is a continually expanding oral history collection on bioscience and biotechnology [with] in-depth, fully searchable interviews with basic biological scientists from numerous disciplines; with scientists, executives,

attorneys, and others from the biotechnology industry.Ã¢Â Â•The invention of new research and business practices over a very short periodSwanson was captivated: Ã¢Â ÂœThis idea [of genetic engineering] is absolutely fantastic; it is revolutionary; it will change the world; itÃ¢Â Â™s the most important thing I have ever heard.Ã¢Â Â• [Ã¢Â Â| But Swanson was nearly alone.] Ã¢Â ÂœCetus was not alone in its hesitation regarding the industrial application of recombinant DNA technology. Pharmaceutical and chemical corporations, conservative institutions at heart, also had reservations.Ã¢Â Â• [Page 32] Ã¢Â ÂœWhatever practical applications I could see for recombinant DNAÃ¢Â Â| were five to ten years away, and, therefore, there was no rush to get started, from a scientific point of view.Ã¢Â Â• [Page 32] Ã¢Â ÂœI always maintainÃ¢Â Â• Boyer reminisced, Ã¢Â Âœthat the best attribute we had was our naÃƒÂ vetÃ©Ã¢Â Â| I think if we had known about all the problems we were going to encounter, we would have thought twice about startingÃ¢Â Â| NaÃƒÂ vetÃ© was the extra added ingredient in biotechnology.Ã¢Â Â• [Page 36]The book shows the importance of scientific collaborations. Not just Boyer at UCSF but for example with a hospital in Los Angeles. A license was signed with City of Hope Hospital with a 2% royalty on sales on products based on the licensed technology. Ã¢Â Âœ[Ã¢Â Â‖] negotiated an agreement between Genentech and City of Hope that gave Genentech exclusive ownership of any and all patents based on the work and paid the medical center a 2 percent royalty on sales of products arising from the research.Ã¢Â Â• [Page 57]Even if in 2000, City of Hope had received $285M in royalties, it was not happy with the outcome. After many trials, the California Supreme Court in 2008 awarded another $300M to City of Hope. So the book shows that these collaborations gave also much legal litigation. [Page 58]In a few years, Genentech could synthesize somatostatin, insulin, human growth hormone and interferon. It is fascinating to read how intense, uncertain, stressful these years were for Swanson, Perkins, Boyer and the small group of Genentech employees and academic partners (Goeddel, Kleid, Heyneker, Seeburg, Riggs, Itakura, Crea), in part because of the emerging competition from other start-ups (Biogen, Chiron) and academic labs (Harvard, UCSF).Ã¢Â ÂœOn August 25, 1978 Ã¢Â Â“ four days after GoeddelÃ¢Â Â™s insulin chain-joining feat Ã¢Â Â“ the two parties signed a multimillion-dollar, twenty-year research and development agreement. For an upfront licensing fee of $500,000, Lilly got what it wanted: exclusive worldwide rights to manufacture and market human insulin using GenentechÃ¢Â Â™s technology. Genentech was to receive 6 percent royalties and City of Hope 2 percent royalties on product sales.Ã¢Â Â• [Page 94] They managed to negotiate a contractual condition limiting LillyÃ¢Â Â™s use of GenentechÃ¢Â Â™s engineered bacteria to the manufacture of recombinant insulin alone. The technology would remain GenentechÃ¢Â Â™s property, or so they expected. As it turned out, the contract, and that clause in

particular, became a basis for a prolonged litigation. In 1990, the courts awarded Genentech over $150 million in a decision determining that Lilly had violated the 1978 contract by using a component of GenentechÃ¢Â Â™s insulin technology in making its own human growth hormone product. [Page 95] Perkins believed that the 8 percent royalty rate was unusually high, at a time when royalties on pharmaceutical products were along the lines of 3 or 4 percent. Ã¢Â Âœit was kind of exorbitant royalty, but we agreed anyway Ã¢Â Â“ Lilly was anxious to be first (with human insulin)Ã¢Â Â• [Ã¢Â Â]The big company Ã¢Â Â“ small company template that Genentech and Lilly promulgated in molecular biology would become a prominent organizational form in a coming biotechnology industry. [Page 97]The invention of a new cultureYoung as Swanson was, he kept everyone focused on product-oriented research. He continued to have scant tolerance for spending time, effort, and money on research not tied directly to producing marketable products. Ã¢Â Âœwe were interested in making something usable that you could turn into a drug, inject in humans, take to clinical trials.Ã¢Â Â• A few year before his premature death, Swanson remarked, Ã¢Â Âœi think one of the things I did best in those days was to keep us very focused on making a product.Ã¢Â Âœ His goal-directed management style differed markedly from that of GenentechÃ¢Â Â™s close competitors. [Page 129]But at the same time Boyer would guarantee a high quality research level by encouraging employees to write the best possible scientific articles. This guaranteed the reputation of Genentech in the academic world.A culture was taking shape at Genentech that had no exact counterpart in industry or academia. The high-tech firms in Silicon Valley and along Route 128 in Massachusetts shared its emphasis on innovation, fast-moving research, and intellectual property creation and protection. But the electronics and computer industries, and every other industrial sector for that matter, lacked the close, significant, and sustained ties with university research that Genentech drew upon from the start and that continue to define the biotechnology industry of today. Virtually every element in the companyÃ¢Â Â™s research endeavor Ã¢Â Â“ from its scientists to its intellectual and technological foundations Ã¢Â Â“ had originated in decade upon decade of accumulated basic-science knowledge generated in academic labs. [Ã¢Â Â] At BoyerÃ¢Â Â™s insistence, the scientists were encouraged to publish and engage in the wide community of science. [Page 131]But academic values had to accommodate corporate realities: at SwansonÃ¢Â Â™s insistence, research was to lead to strong patents, marketable products, and profit. GenentechÃ¢Â Â™s culture was in short a hybrid of academic values brought in line with commercial objectives and practices. [Page 132]Swanson was the supportive but insistent slave driver, urging on employees beyond their perceived limits: Ã¢Â Âœbob wanted everything. He would say, If you donÃ¢Â Â™t have more things on your plate than you can accomplish, then

youÃ¢Â Â™re not trying hard enough. He wanted you to have a large enough list that you couldnÃ¢Â Â™t possibly get everything done, and yet he wanted you to try.Ã¢Â Â• [Ã¢Â Â‖] Fledging start-ups pitted against pharmaceutical giants could compete mainly by being more innovative, aggressive, and fleet of foot. Early Genentech had those attributes in spades. Swanson expected Ã¢Â Â“ demanded Ã¢Â Â“ a lot of everyone. His attitude was as Roberto Crea recalled: Ã¢Â ÂœGo get it; be there first; we have to beat everybody elseÃ¢Â Â| We were small, undercapitalized, and relatively unknown to the world. We had to perform better than anybody else to gain legitimacy in the new industry. Once we did, we wanted to maintain leadership.Ã¢Â Â• [Ã¢Â Â‖] As Perkins said Ã¢Â ÂœBob would never be accused of lacking a sense of urgency. Ã¢Â Âœ [Ã¢Â Â‖] Even Ullrich, despite European discomfort with raucous American behavior, admitted to being seduced by GenentechÃ¢Â Â™s unswervingly committed, can-do culture. [Page 133]New exit strategiesInitially Kleiner thought Genentech would be acquired by a major pharma company. It was just a question of when. He approached Johnson and Johnson and Ã¢Â Âœfloated the idea of a purchase price of $80 million. The offer fell flat. Fred Middleton [GenentechÃ¢Â Â™s VP of finance], present at the negotiations, speculated that J&J didnÃ¢Â Â™t have Ã¢Â Âœa clue about what to do with this [recombinant DNA] technology Ã¢Â Â“ certainly didnÃ¢Â Â™t know what it was worth. They couldnÃ¢Â Â™t fit it in a Band-Aid moldÃ¢Â Â•. J&J executives were unsure how to value Genentech, there being no standard for comparison or history of earnings.Ã¢Â Â• [Page 140]Perkins and Swanson made one more attempt to sell Genentech. Late in 1979, Perkins, Swanson, Kiley and Middleton boarded a plane for Indianapolis to meet with Eli LillyÃ¢Â Â™s CEO and others in top management. Perkins suggested a selling price of $100 million. MiddletonÃ¢Â Â™s view is that Lilly was hamstrung by a conservative Ã¢Â Âœnot invented hereÃ¢Â Â• mentality, an opinion supported by the drug firmÃ¢Â Â™s reputation for relying primarily on internal research and only reluctantly on outside contracts. The companyÃ¢Â Â™s technology was too novel, too experimental, too unconventional for a conservative pharmaceutical industry to adopt whole-heartedly. [Page 141]When Genentech successfully developed interferon, a new opportunity happened. Interferon had been discovered in 1957 and thought to prevent virus infection. In November 1978, Swanson signed a confidential letter of intent with Hoffmann Ã¢Â Â“ La Roche and a formal agreement in January 1980. They were also lucky: Ã¢Â ÂœHeyneker and a colleague attended a scientific meeting in which the speaker Ã¢Â Â“ to everyoneÃ¢Â Â™s astonishment given the fieldÃ¢Â Â™s intense competitiveness Ã¢Â Â“ projected a slide of a partial sequence of fibroblast interferon. They telephoned the information to Goeddel, who instantly relay the sequence order to Crea. [Ã¢Â Â‖] Crea started to construct the required probes. [Ã¢Â Â‖]

Goeddel constructed a Ã¢Â Âœlibrary Ã¢Â Â• of thousands upon thousands of bacterial cells, seeking ones with interferon gene. Using the partial sequence Pestka retrieved, Goeddel cloned full-length DNA sequences for both fibroblast and leukocyte interferon. [Ã¢Â Â] In June 1980, after filing patent protection, Genentech announced the production in collaboration with Roche.Ã¢Â Â• [Page 145] Genentech could consider going public and after another fight between Perkins and Swanson, Genentech decided to do so. Perkins had seen that the year 1980 was perfect for financing biotech companies through a public offering but Swanson saw the challenges this would mean for a young company with nearly no revenue or product.New role modelsThe 1980-81 period would see the creation of a fleet of entrepreneurial biology-based companies Ã¢Â Â“ Amgen, Chiron, Calgene, Molecular Genetics, Integrated Genetics, and firms of a lesser note Ã¢Â Â“ all inspired by GenentechÃ¢Â Â™s example of a new organizational model for biological and pharmaceutical research. Before the IPO window closed in 1983, eleven biotech companies in addition to Genentech and Cetus, had gone public*. [Ã¢Â Â] But not only institutions were transformed. GenentechÃ¢Â Â™s IPO transformed Herb Boyer, the small-town guy of blue-collar origins, into molecular biologyÃ¢Â Â™s first industrial multimillionaire. For admiring scientists laboring at meager academic salaries in relative obscurity, he became a conspicuous inspiration for their own research might be reoriented and their reputation enhanced. If unassuming Herb Ã¢Â Â“ just a guy from Pittsburgh, as a colleague observed Ã¢Â Â“ could found a successful company with all the rewards and renown that entailed, why couldnÃ¢Â Â™t they? [Page 161]*: According to one source, the companies staging IPO were Genetic Systems, Ribi Immunochem, Genome Therapeutics, Centocor, Bio-Technology General, California Biotechnology, Immunex, Amgen, Biogen, Chiron, and Immunomedics. (Robbins-Roth, From Alchemy To Ipo: The Business Of Biotechnology)

The title pretty well explains the subject of Genentech. Hughes does not spare scientific detail, but she writes about it deftly, blending the science into the narrative. Readers with even the most basic understanding of genetics will hardly notice that they have gotten a short lesson on recombinant technology along with a great story.

Vivid account of Genentech’s founding and the early travails of the biotech industry.Things that would not immediately spring to mind today, like the deep suspicion or outright hostility of academic scientists to scientists who had an interest in business, or the paranoia surrounding the early days of genetic engineering, even in the scientific community.Somewhat uncritical acceptance of a

"testosterone-charged atmosphere" as a key component of their success. Anybody who's worked with accomplished women scientists knows drive and ambition do not depend on one hormone!

The story of Genentech is pretty astounding. I have followed this company for a number of years. This company warranted the book, duly named. It was somewhat sensationalized, but easy to read and understand, even for someone with no ties or connection to the industry. I literally read it on a flight from la to san francisco including the time spent in the airport before takeoff. It was a great flight.

i really like the story about the world's most successful biotech company. Also, as a Chinese reader, I think the shipping and arriving speed is really fast.

A well-paced and thoughtful history that successfully balances the personalities, drama, economics and science of the topic.

I enjoyed reading this book now in my early 20's because I'm part of the research/biotechnology field and I admire California's initiative to start companies. After Genentech many others were created in the state and that's why this is a paradise to biologists.

Very well written. Good intro to the biotech world if new and/or curious how everything got started.Fairly easy and light read.

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