STAT

Ego, ambition, and turmoil: Inside one of biotech's most secretive startups

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By Damian Garde Sept. 13, 2016

Stéphane Bancel spent most of his career in sales and operations before becoming CEO of biotech startup Moderna Therapeutics. *Aram Boghosian for STAT*

CAMBRIDGE, Mass. — At first glance, Moderna Therapeutics looks like the most enviable biotech startup in the world. It has smashed fundraising records and teamed up with pharmaceutical giants as it pursues a radical plan to revolutionize medicine by transforming human cells into drug factories.

But the reality is more complicated.

A STAT investigation found that the company's caustic work environment has for years driven away top talent and that behind its obsession with secrecy, there are signs Moderna has run into roadblocks with its most ambitious projects.

At the center of it all is Stéphane Bancel, a first-time biotech CEO with an unwavering belief that Moderna's science will work — and that employees who don't "live the mission" have no place in the company. Confident and intense, Bancel told STAT that Moderna's science is on track and, when it is finally made public, that it will meet the brash goal he himself has set: The new drugs will change the world.

But interviews with more than 20 current and former employees and associates suggest Bancel has hampered progress at Moderna because of his ego, his need to assert control and his impatience with the setbacks that are an inevitable part of science. Moderna is worth more than any other private biotech in the US, and former employees said they felt that Bancel prized the company's ever-increasing valuation, now approaching $5 billion, over its science.

As he pursued a complex and risky strategy for drug development, Bancel built a culture of recrimination at Moderna, former employees said. Failed experiments have been met with reprimands and even on-the-spot firings. They recalled abusive emails, dressings down at company meetings, exceedingly long hours, and unexplained terminations.

At least a dozen highly placed executives have quit in the past four years, including heads of finance, technology, manufacturing, and science. In just the past 12 months, respected leaders of Moderna's cancer and rare disease programs both resigned, even though the company's remarkable fundraising had put ample resources at their disposal. Each had been at the company less than 18 months, and the positions have yet to be filled.

Lower-ranking employees, meanwhile, said they've been disappointed and confused by Moderna's pivot to less ambitious — and less transformative — treatments. Moderna has pushed off projects meant to upend the drug industry to focus first on the less daunting (and most likely, far less lucrative) field of vaccines — though it is years behind competitors in that arena.

The company has published no data supporting its vaunted technology, and it's so secretive that some job candidates have to sign nondisclosure agreements before they come in to interview. Outside venture capitalists said Moderna has so many investors clamoring to get in that it can afford to turn away any who ask too many questions. Some small players have been given only a peek at Moderna's data before committing millions to the company, according to people familiar with the matter.

"It's a case of the emperor's new clothes," said a former Moderna scientist. "They're running an investment firm, and then hopefully it also develops a drug that's successful."

Like many employees and former employees, the scientist requested anonymity because of a nondisclosure agreement. Others would not permit their names to be published out of fear that speaking candidly about big players in the industry would hurt their job prospects down the road.

Moderna just moved its first two potential treatments — both vaccines — into human trials. In keeping with the culture of secrecy, though, executives won't say which diseases the vaccines target, and they have not listed the studies on

the public federal registry, ClinicalTrials.gov. Listing is optional for Phase 1 trials, which are meant to determine if a drug is safe, but most companies voluntarily disclose their work.

Investors say it'll be worth the wait when the company finally lifts the veil.

"We think that when the world does get to see Moderna, they're going to see something far larger in its scope than anybody's seen before," said Peter Kolchinsky, whose RA Capital Management owns a stake in the company.

Bancel, meanwhile, said he is aware of the criticism of him and has taken some steps to address it. After scathing anonymous comments about Moderna's management began showing up online, Bancel went to Silicon Valley to get tips on employee retention from the human resources departments of Facebook, Google, and Netflix. But he makes no apologies for tumult past or present, pointing to the thousands of patients who might be saved by Moderna's technology.

"You want to be the guy who's going to fail them? I don't," he said in an interview from his glassy third-floor office. "So was it an intense place? It was. And do I feel sorry about it? No."

The Moderna offices in Cambridge, Mass. *Aram Boghosian for STAT*

An ambitious CEO dreams big

Bancel, 44, had no experience running a drug development operation when one of biotech's most successful venture capitalists tapped him to lead Moderna. He'd spent most of his career in sales and operations, not science.

But he had made no secret of his ambition.

A native of France, Bancel earned a master's in chemical engineering from the University of Minnesota and an MBA from Harvard in 2000. As Harvard Business School classmates rushed to cash in on the dot-com boom, Bancel laid out a plan to play "chess, not checkers."

"I was always thinking, one day, somebody will have to make a decision about me getting a CEO job," he told an audience at his alma mater in April. "…

How do I make sure I'm not the bridesmaid? How do I make sure that I'm not always the person who's almost selected but doesn't get the role?"

He went into sales and rose through the operational ranks at pharmaceutical giant Eli Lilly, eventually leading the company's Belgian operation. And in 2007, at just 34, he achieved his goal, stepping in as CEO of the French diagnostics firm bioMérieux, which employs roughly 6,000 people.

The company improved its margins under Bancel's tenure, and he developed a reputation as a stern manager who got results, according to an equities analyst who covered bioMérieux at the time.

"He doesn't suffer fools lightly," the analyst said, speaking on condition of anonymity to comply with company policy. "I think if you're underperforming, you'll probably find yourself looking for another job."

Bancel's rise caught the eye of the biotech investment firm Flagship Ventures, based here in Cambridge. Flagship CEO Noubar Afeyan repeatedly tried to entice him to take over one of the firm's many startups, Bancel said. But he rejected one prospect after another because the startups seemed too narrow in scope.

Moderna was different.

The company's core idea was seductively simple: cut out the middleman in biotech.

For decades, companies have endeavored to craft better and better protein therapies, leading to new treatments for cancer, autoimmune disorders, and rare diseases. Such therapies are costly to produce and have many limitations, but they've given rise to a multibillion-dollar industry. The anti-inflammatory Humira, the world's top drug at $14 billion in sales a year, is a shining example of protein therapy.

Moderna's technology promised to subvert the whole field, creating therapeutic proteins inside the body instead of in manufacturing plants. The key: harnessing messenger RNA, or mRNA.

In nature, mRNA molecules function like recipe books, directing cellular machinery to make specific proteins. Moderna believes it can play that system to its advantage by using synthetic mRNA to compel cells to produce whichever proteins it chooses. In effect, the mRNA would turn cells into tiny drug factories.

It's highly risky. Big pharma companies had tried similar work and abandoned it because it's exceedingly hard to get RNA into cells without triggering nasty side effects. But if Moderna can get it to work, the process could be used to treat scores of diseases, including cancers and rare diseases that can be death sentences for children.

Bancel was intrigued. He knew it was a gamble, he told STAT, "but if I don't do it, and it works, I'm just going to kick myself every morning."

And so he became the company's CEO — and soon developed an almost messianic reverence for the mRNA technology.

Despite having never worked with RNA before, Bancel said he sat around the table with his core team in the early days of the company, dreaming up experiments. As a result, he is listed as a co-inventor on more than 100 of Moderna's early patent applications, unusual for a CEO who is not a PhD scientist.

Though he's been here several years now, Bancel stands out in the freewheeling startup hub of Kendall Square. He prefers tailored suits over the industry's fleece-heavy wardrobe, and he doesn't shy away from sweeping promises that might trouble CEOs more concerned with managing expectations.

Under Bancel, Moderna has been loath to publish its work in Science or Nature, but enthusiastic to herald its potential on CNBC and CNN, taking part in segments on the world's most disruptive companies and the potential "cure for cancer."

Bancel lays out those grand ambitions in an accent that bends his own company's name into something more akin to the Italian city. In conversation, Bancel has a salesman's skill of making complex concepts seem simple, but with an earnestness that keeps his spiel from feeling like a con.

He peppers his speech with Silicon Valley buzzwords, many of which are scrawled on a giant whiteboard in his spacious office. Messenger RNA "is like software," he explained: If it works in one disease, it should work for thousands.

Most biotech startups focus on one or two leading drug candidates at first, pushing them through human trials before turning to another target. Moderna, by contrast, has nearly 100 projects going at once. With mRNA, "you can just turn the crank and get a lot of products going into development," Bancel explained, flashing a smile as though he himself was bemused by the idea's simplicity.

Resignations, dismissals, and churn

From the beginning, Bancel made clear that Moderna's science simply had to work. And that anyone who couldn't make it work didn't belong.

The early Moderna was a chaotic, unpredictable workplace, according to former employees. One recalls finding himself out of a job when a quick-turnaround experiment failed to pan out. Another helped train a group of new hires only to realize they were his replacements.

"There was a kind of Jack Welch-ian, 'We fire the bottom 10 percent' from the

very beginning," said a former Moderna manager. "That's probably the biggest HR difference between Moderna and virtually any other biotech, where they talk so much about developing their people."

Moderna went through two heads of chemistry in a single year, according to former employees, and its chief scientific officer and head of manufacturing left shortly thereafter. Those who fell out of favor with Bancel would find themselves excluded from key meetings, pushed aside until they resigned or ultimately got dismissed, employees said.

Most stunning to employees was the abrupt departure of Joseph Bolen, who came aboard in 2013 to lead Moderna's R&D efforts.

Bolen was a big-name hire in biotech circles, an experienced chief scientific officer who had guided Millennium Pharmaceuticals to FDA approval for a blockbuster cancer drug. He'd been profiled in The Scientist, which dubbed him "the people's CSO" for his ability to keep morale high and research focused. Landing him was a coup.

But two years into his tenure at Moderna, he abruptly stepped down last October, making no public statement save for changing his LinkedIn status to "resigned."

"No scientist in his right mind would leave that job unless there was something wrong with the science or the personnel," said a person close to the company at the time.

Insiders said Bancel had effectively pushed Bolen out, hiring parallel executives until Bolen was in charge of just "a postage stamp" worth of territory, as one former Moderna manager put it. Bolen declined to comment.

For his part, Bancel acknowledged the changes that limited Bolen's power but insisted the parting was friendly. Bancel said he tried to convince Bolen to

stay, but the scientist "voted himself off the island."

Bolen wasn't alone. Chief Information Officer John Reynders joined in 2013 to make Moderna what he called the world's "first fully digital biotech," only to step down a year later. Michael Morin, brought in to lead Moderna's scientific efforts in cancer in 2014, lasted less than 18 months. As did Greg Licholai, hired in 2015 to direct the company's projects in rare diseases. The latter two key leadership positions remain unfilled.

"You wonder," influential biotech blogger Derek Lowe wrote last year, "if Moderna really is a rocket ship getting ready to launch and spray a formation of new drugs across the sky, then why are these people leaving?"

The company has a simple explanation: Moderna lives in dog years compared with other biotechs.

"We force everyone to grow with the company at unprecedented speed," Moderna Chief Financial Officer Lorence Kim said. "Some people grow with the company; others don't."

Bancel is sprightly in describing the company's future, but his tone hardens on the topic of its formative years — Moderna 1.0, as he calls it.

"The people in the 1.0 team who did not really live the mission ended up either leaving or being asked to leave because they were not accomplishing what we needed them to accomplish," he said.

Moderna's internal turmoil came spilling messily into public view starting in late 2012, as more than a dozen harsh critiques popped up on Glassdoor, a website that allows a company's employees — or anyone, for that matter — to write anonymous reviews of management and workplace culture.

The posts, full of invective for company leaders, eventually came to the attention of the board. "And you'd be lying to say it didn't affect you

emotionally," said the company's president, Dr. Stephen Hoge, a former emergency medicine physician whose tendency for self-deprecation cuts a disarming contrast to Bancel's intensity. "Like, what if my dad sees that?"

The company sought to improve its workplace, and Hoge said the once-high turnover rate has fallen to within industry standards, though he declined to disclose specifics.

Moderna — which now offers Silicon Valley-style perks like a daily catered lunch and iPhones for all employees — has roughly doubled in size each year, meaning most of the company's current workforce of about 450 has joined since 2013. They're spread out among three locations, and many are siloed off from top executives. Survey data from such junior employees helped vault Moderna to Science magazine's list of top employers of 2015.

Those who buy in are all in: Some employees speak with respect bordering on awe about Moderna's promise, with one likening the technology to "magic."

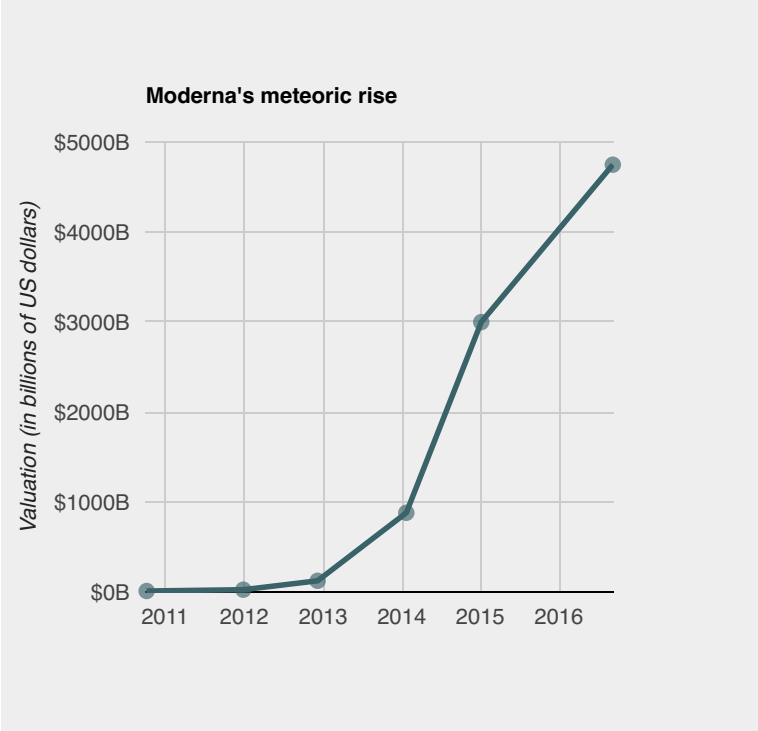
The two current employees put forward by the company to talk with STAT sounded a note of pride at Moderna's reputation for driving its staff hard.

"In a way, it's a blessing in disguise," said Edward Miracco, a senior scientist who started at Moderna in 2014. "It separates the wheat from the chaff."

Not everyone is cut out to work at Moderna, where "things change daily, hourly," said Dan Brock, an associate director who joined the company in February. "Everyone who comes here already kind of gets it."

But the recent departures and vacancies suggest that turmoil continues in the top ranks — those who most closely deal with upper management, including Bancel.

"He believes in a bigger stick than carrot," a former manager said. "Moderna has some growing up to do, no question about it."



STAT *Talia Bronshtein/STAT* Source: PitchBook Data

A gold rush for Moderna

Hoge, who joined the company in 2012, describes the early days of Moderna as "when we were living in the caves." The company often had only enough cash to keep the lights on for six months at a time, he said. "The strategy was just to survive."

Moderna 1.0, and life in the caves, came to a close in 2013, according to company lore.

That's when Moderna — which had just 25 employees — signed a staggering $240 million partnership with UK pharmaceutical giant AstraZeneca. It was the most money pharma had ever spent on drugs that had not yet been tested in humans.

The agreement is commemorated in one of Moderna's offices by a framed clipping from the New York Times. Page B7 of the March 21, 2013 edition: "AstraZeneca Makes a Bet On an Untested Technique."

For AstraZeneca, the unprecedented deal came at a time of uncertainty. A series of clinical failures had led the firm to fire its head of research and lay off 1,600 scientists. Pascal Soriot, just six months into his tenure as CEO, was under pressure from investors to chart a new course. And Moderna, with its brash ambition to bring 100 drugs to clinical trials within a decade, gave Soriot a way forward.

The rich deal started a gold rush for Moderna. Everyone, it seemed, wanted in.

Before the end of 2013, Moderna would turn heads again with a $110 million investment round, followed by a high-dollar partnership with biotech giant Alexion.

In early 2015, Moderna disclosed a $450 million financing round, the largest ever for a private biotech company. This month, the company broke its own record, raising another $474 million.

The run-up was “biotech fervor to the extreme,” according to a venture capitalist not involved with the company, requesting anonymity to speak candidly. While bigger investors got to see all the company’s data from animal experiments, some of Moderna’s smaller investors put in funds based on just a peek, according to people familiar with the process. Moderna’s fundraising success had created a seller’s market: Why deal with the questions of one potential investor when it had 10 more lined up?

Afeyan, Moderna’s chairman and cofounder, insists the company’s investors have done their homework. To say they bought in without due diligence “would be a bit of an insult to these people,” he said.

Though it has yet to reveal data from a single clinical trial, Moderna is now valued at $4.7 billion, according to Pitchbook.

That’s twice as much as Spark Therapeutics, the company widely expected to

market the United States's first gene therapy, which has shown signs in clinical trials that it can reverse blindness caused by a rare genetic disorder. Moderna is also worth billions more than Juno Therapeutics and Kite Pharma, startups developing novel treatments for cancer that have demonstrated promising results in early human trials.

Moderna has long shaken off rumors that it is soon to market its shares on Wall Street, with Hoge likening the company to a child star: "You don't want to go through your adolescence publicly," he told STAT.

But that's about to change. Moderna's next planned step is an initial public offering, according to a person close to the company. Bancel declined to say just when Moderna might go public, but the company has already prepared: In its latest filings with the Securities and Exchange Commission, Moderna changed its business structure from an LLC to a C corporation, completing a necessary step before mounting an IPO.

Moderna's mission statement, which is painted on various walls throughout its Cambridge, Mass., offices. *Aram Boghosian for STAT*

A strategic shift to less ambitious targets

With a public listing come required disclosures, and many are eager to see what Moderna's been keeping under wraps all these years.

Outsiders and competitors, looking only at Moderna's public statements, have noted a shift in strategy that might signal undisclosed setbacks.

From the start, Moderna heralded its ability to produce proteins within cells, which could open up a world of therapeutic targets unreachable by conventional drugs. The most revolutionary treatments, which could challenge the multibillion-dollar market for protein therapy, would involve repeated doses of mRNA over many years, so a patient's body continued to produce proteins to keep disease at bay.

But Moderna's first human trials aren't so ambitious, focusing instead on the crowded field of vaccines, where the company has only been working since 2014.

First are the two vaccine trials for undisclosed infectious diseases. Coming next is a one-time treatment for heart failure, developed in partnership with AstraZeneca, followed by another experimental vaccine, for Zika virus, which several other pharma companies are also working to develop. And after that, Moderna is planning a human trial of a personalized cancer vaccine using mRNA, something it just came up with last year.

The choice to prioritize vaccines came as a disappointment to many in the company, according to a former manager. The plan had been to radically disrupt the biotech industry, the manager said, so "why would you start with a clinical program that has very limited upside and lots of competition?"

The answer could be the challenge of ensuring drug safety, outsiders said.

Delivery — actually getting RNA into cells — has long bedeviled the whole field. On their own, RNA molecules have a hard time reaching their targets. They work better if they're wrapped up in a delivery mechanism, such as nanoparticles made of lipids. But those nanoparticles can lead to dangerous side effects, especially if a patient has to take repeated doses over months or years.

Novartis abandoned the related realm of RNA interference over concerns about toxicity, as did Merck and Roche.

Moderna's most advanced competitors, CureVac and BioNTech, have acknowledged the same challenge with mRNA. Each is principally focused on vaccines for infectious disease and cancer, which the companies believe can be attacked with just a few doses of mRNA. And each has already tested its technology on hundreds of patients.

“I would say that mRNA is better suited for diseases where treatment for short duration is sufficiently curative, so the toxicities caused by delivery materials are less likely to occur,” said Katalin Karikó, a pioneer in the field who serves as a vice president at BioNTech.

That makes vaccines the lowest hanging fruit in mRNA, said Franz-Werner Haas, CureVac’s chief corporate officer. “From our point of view, it’s obvious why [Moderna] started there,” he said.

Moderna said it prioritized vaccines because they presented the fastest path to human trials, not because of setbacks with other projects. “The notion that [Moderna] ran into difficulties isn’t borne in reality,” said Afeyan.

But this is where Moderna’s secrecy comes into play: Until there’s published data, only the company and its partners know what the data show. Everyone outside is left guessing — and, in some cases, worrying that Moderna won’t live up to its hype.

“Frankly, I hope that there’s real substance and I hope they solve those challenges, because it’s not going to be good for the broader biotech industry in general if this thing implodes,” said one investor not involved with Moderna.

And it could still go either way, former employees said. If Moderna’s promises come to fruition, it could be a pillar of the biotech industry. If they don’t, it could find a place among a short list of companies that have cast a shadow over the entire industry and left investors disillusioned.

“Either we’ll be talking about it as the next Genentech,” a former Moderna manager said, “or we’ll think, ‘Well, back then, first there was Turing, then there was Valeant, and then there was Moderna.”

Enough cash to absorb some setbacks

Moderna's management and its investors are keeping the faith, pointing to the company's pipeline of 11 drug candidates and more than 90 preclinical projects.

And with Moderna's huge cash reserves — estimated at $1.5 billion — it can afford a few setbacks, proponents said. The company said it's pouring money into its manufacturing operation, planning to spend $100 million this year on a new plant. Moderna has pioneered an automated system modeled on the software Tesla uses to manage orders, Bancel said: Scientists simply enter the protein they want a cell to express, and testable mRNA arrives within weeks.

"If we have a bump in the road in the clinic, we will not have to wait years to go back to the drawing board," Bancel said.

That has always been part of the plan, former employees said, pointing to Bancel's fascination with the tech industry. Uber and Amazon were not the first to come up with their respective business ideas, but they were the ones that built enough scale to ward off competition. And Moderna is positioning itself to do the same in mRNA.

"Now, as we're going to human [trials], it's pretty clear no one else is going to catch us," said Dr. Kenneth Chien, a professor at Karolinska Institutet working with Moderna and AstraZeneca.

Dr. Tal Zaks, Moderna's chief medical officer, promises that the company will soon break its silence on the publishing front. He said next year Moderna will disclose the animal data that helped get its two vaccines into the clinic. The company has also committed to publishing full results from all of its human trials, starting with the vaccine studies next year.

Moderna's reticence to share data earlier is "not because we decided to be secret," Zaks said. "This is the natural evolution of a platform. As we go into the clinic, we will be very transparent."

For all the tumult at Moderna these past few years, Bancel said the company remains true to its mission statement: “Deliver on the promise of mRNA science to create a new generation of transformative medicines for patients.”

The message, which adorns the walls of Moderna’s offices, was first to be printed on posters, but Bancel insisted it be inscribed in paint.

“Because that,” he said, pointing to the first word, “is not ever going to change.”

Correction: A previous version of this story misstated the age at which Bancel became CEO of bioMérieux.

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