‘Nothing is impossible,’ says lab ace Nita Patel

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standing in front of reporters recently after showing Maryland Governor Larry Hogan (R) through the company’s Gaithersburg, Maryland, labs, Novavax CEO Stanley Erck touted everything from the company’s manufacturing plans to the long hours its scientists are logging. But he praised only one staffer by name: Nita Patel, a diminutive 56-year-old wearing jeans and a black mask. “Nita,” Erck said to the governor, “has done all the work that you saw today.”

Patel is a senior director in the vaccine development program at Novavax, a small firm among giant pharma companies racing to test a vaccine for the pandemic coronavirus (see main story, p. 649). Her all-female crew is an essential part of Novavax’s lab team. Their sophisticated tests verified that the heart of the company’s vaccine—it’s version of the virus’ spike protein—performed as it should in cells and generated virus-neutralizing antibodies in animals. “Nita is absolutely invaluable,” says her boss, chief scientist Gale Smith. “She’s a genius.”

Patel has come a long way from her beginnings in Sojitra, a farming village in India’s Gujarat state. There, when she was 4 years old, her family fell into poverty after her father nearly died from tuberculosis (TB). He never worked again and told Patel she should become a doctor and find a cure.

Patel set about doing that, wearing the same ragged dress to school day after day. She had no shoes. She begged bus fare from a neighbor—at whose house she also devoured the newspaper because her family couldn’t afford a subscription.

Her academic excellence propelled her through college on government scholarships. She later picked up two master’s degrees, in India and the United States, in applied microbiology and biotechnology. Her memory is photographic: When driving, she has to be careful not to look at license plate numbers, or she’ll memorize them.

Patel married a U.S. biochemist and then moved to Gaithersburg and started job hunting. One small company offered her less than others—but she would work on a TB project. In 1990, Patel became the 16th employee at MedImmune. One of her bosses there, Herren Wu, now a senior vice president at AstraZeneca, remembers her skill with a difficult assay that bedeviled others.

“She was the one [whose data] I believed,” he says. “She’s a very good bench scientist.”

But Patel also understands setbacks: A MedImmune Lyme disease vaccine failed in its first clinical trial, and another therapy, against respiratory syncytial virus (RSV), was rejected by the Food and Drug Administration. In 2015, attracted by Novavax’s RSV vaccine work, she jumped to the firm.

After Novavax got the gene for the SARS-CoV-2 spike protein in February, Patel’s team tested more than 20 engineered variants of the protein, identifying the version most likely to elicit a protective immune response. Now, she’s characterizing details of that protein, identifying the precise locations where neutralizing antibodies vigorously bind to it, and creating a test to ensure the spike is consistent from one manufacturing plant to another.

Since the pandemic arrived, she says, “my day just doesn’t end. And it’s the same with everyone else here.” Yet Patel, who prays and meditates daily at a temple in her home, projects serenity and good cheer. “To me, nothing is impossible. So, having that mindset, nothing stresses me out, being honest.”

Scientist Sonia Maciejewski, who works for Patel, agrees. “She has a very strong work ethic ... yet somehow doesn’t put that sort of pressure or stress on us.”

Patel’s serenity gets a boost because she doesn’t see the firm as competing with others. “We are [all] working towards, together, the world’s problem,” she says. —M.W.

IN EARLY AUGUST, the big investors in the tiny company won an initial vindication when Novavax announced strong results from the Australian trial. After two injections, “the antibody responses in the Novavax paper were markedly stronger than any of the other vaccines that have been reported,” and participants had experienced no severe adverse events, says Moore, who recently published a Journal of Virology review of the leading vaccine candidates.

The government of the United Kingdom soon signed up to buy 60 million doses of Novavax’s vaccine, and the big drugmaker Takeda licensed it to manufacture at scale with funding from the Japanese government. Other scientists noted strong results in a dozen monkeys injected with various doses of Novavax’s vaccine and then infected with live coronavirus. The virus failed entirely to multiply in the animals’ noses and replicated in the lungs of just one monkey that received the lowest dose; that animal shut down the infection after 4 days.

“It’s the only vaccine I’ve seen out of all the candidates that are further down the pipeline that actually had no viral replication in the nasal swabs of vaccinated animals,” says Angela Rasmussen, a virologist at Columbia University. That’s important, she says, because stopping viral replication in the nose can reduce the spread of infection among people who may be unaware they are sick. But she cautions that

Ward’s work won over some scientific doubters. John Moore, an immunologist at Weill Cornell Medicine, had been skeptical of Novavax’s moth cell system because in the 1990s it had conspicuously failed to produce an HIV spike protein with the right characteristics to make an AIDS vaccine. But in August, when Ward’s work was posted as a preprint, “I looked at that paper and was impressed,” Moore says. “It changed my perception of the quality of the protein. The concerns I had were eliminated by data, which is as it should be.”

By late May, Novavax had launched its first human safety trial in 131 volunteers in Australia and used the CEPI funding to buy, for $167 million in cash, a state-of-the-art vaccine manufacturing facility in the Czech Republic that the company said would deliver more than 1 billion doses in 2021. And in early July, Operation Warp Speed granted the company up to $1.6 billion, with $800 million available immediately, for a phase III clinical trial and for manufacturing 100 million doses of vaccine.

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