Life Science Leader

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Inside The Mind Of Life Science Innovator Mir Imran

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It should come as no surprise that, when given the choice, the majority of patients would choose taking a pill over getting a shot. The problem is that, in some cases, we do not have a choice. Biologics will break down when exposed to acid and enzymes in the stomach before they can reach the bloodstream and provide clinical benefit. Therefore, they cannot be administered in conventional pill or liquid form; they require an injection or IV infusion using a needle. Some see this as a limitation; Mir Imran saw it as an opportunity.

Imran, a serial medical-device inventor and entrepreneur who loves "to solve big problems," is chairman and CEO of Rani Therapeutics. "A casual conversation with a pharmaceutical executive led me to understand that during the last 50 years pharma companies, small and large, have made between 100 and 200 attempts at delivering biologic drugs orally," he says. "So, I thought I would reframe the problem, and that thinking led me to the set of solutions that became Rani Therapeutics." Reframing problems and finding innovative solutions are not new to Imran. In addition to leading Rani, he is also chairman and CEO of InCube Labs, which has deep experience in commercializing medical-device and drug-delivery innovations and has nine active startups in its portfolio and numerous companies that have been spun out or sold to other life sciences companies.

Imran explains that previous approaches to administering biologics have been hampered by the enzymes that break down proteins in the gut. From his medical background, he knew that the intestines don't have any pain receptors like the skin does. So, he wondered if he could make a pill that somehow would make its way to the intestines where it transforms itself into an injector, delivering the drug directly into the

intestinal wall, which is basically a muscle. The concept was further defined after developing a prototype and conducting some preclinical studies.

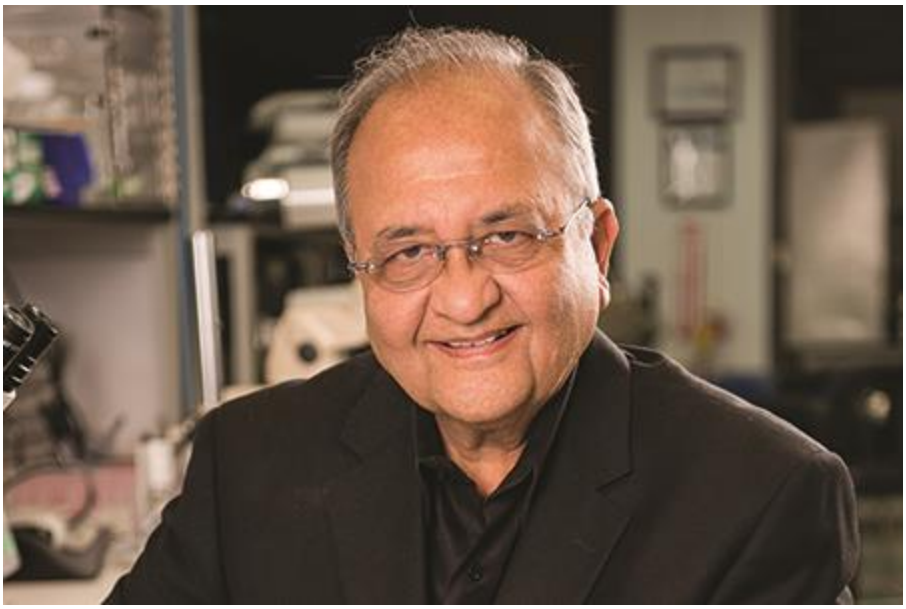
RAISING MONEY IS NEVER EASY, BUT SOMETIMES IT'S REALLY DIFFICULT

Imran had confidence in his prototype. He even obtained permission from his limited partners to have their internal venture fund, InCube Ventures, invest in the commercialization of the technology. But the best validation of a good idea comes from the outside, and Imran's courage was rewarded in 2013 when Google Ventures joined with InCube Ventures to provide a series B funding round of over $10 million for Rani Therapeutics.

"Funding always has been a challenge, not just for me, but for every entrepreneur, and the funding environment changes constantly with macroeconomic cycles. For instance, in 2008, the Lehman Brothers crash and the major adjustment that took place in the public markets led to almost a total shutdown of venture capital for several years. Even now, early-stage investment in the medical-device sector is still recovering, and many of the VCs that used to invest in medical devices have gone out of business."

Indeed, even with the backing of Google Ventures, Imran still found investors and many of his contacts in the pharmaceutical industry reacting with skepticism. They doubted the technology would work — even though their interest was high — and were unwilling to partner/invest until Rani had human data.

Eventually in 2015, Novartis decided to participate in a series C funding round with Rani. "We converted a couple of Novartis drugs into our platform and ran a series of preclinical studies to provide them with the necessary data. A few months later we ended up collaborating with AstraZeneca in the metabolic space," Imran says. All of these preclinical studies were promising, and the company's prediction about bioavailability was borne out with multiple drugs. In the meantime, Rani brought in three off-patent biologics for internal development and also did a third collaboration with Shire in the hemophilia space for oral delivery of factor VIII. "We have now demonstrated the oral delivery of half a dozen drugs, and the bioavailability is as good as a subcutaneous injection, if not better, because the intestinal wall is so highly vascularized and the absorption is more efficient. We plan to get into human studies with our drugs in the next year or so."



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Mir Imran
Chairman & CEO, Rani Therapeutics

THE COST OF NEW PRODUCT DEVELOPMENT

So often, in the early stages of a product development, just beyond the feasibility assessment, leaders begin to ask those diffi cult questions regarding scope, schedule, and budget. The most sensitive question (which is also a key for investors) is: How much is this going to cost? Imran has a good feel for the amount of money it takes, considering he has built nearly two dozen companies and been through numerous clinical trials. “I know that whenever you are bringing a new healthcare technology to market it’s going to be a long journey and require $100 million to $200 million. Early on it takes small amounts of money for the initial work, but then you have to invest heavily in a lot of areas like manufacturing, quality, regulatory, and clinical. In 2013 I had the notion that Rani would take north of $100 million to get approval. I knew it would be challenging and complex because there is really no precedent for what we are doing.”

START A DIALOGUE WITH THE REGULATORS

Given his company’s method for delivering biologics was new, Imran realized it would be imperative to engage with the FDA early in the development of the technology. “In taking a number of products through the FDA process during the last five to seven years,

I have seen the agency become less opaque and more transparent. You can actually have a dialogue and discussion with them," he says. In fact, Rani is planning to begin the dialogue with the FDA in the coming months, specifically around the technology's potential to improve patient compliance and outcomes. To the FDA, patient compliance is critical for disease management, and the agency has committed to helping novel technologies that can improve patient compliance and outcomes go through the approval process.

As an example of the kind of impact his company's technology could have on patients, Imran talks about basal insulin (long-acting), which is traditionally prescribed for type 2 diabetics when the disease is fairly advanced. But some endocrinologists would like to start their patients on basal insulin two, three, or four years earlier before their diabetes advances in an effort to try to change the progression of the disease. For instance, beta cells would not get as fatigued, and the life of the pancreas could be extended by putting the patient on basal insulin earlier. "The reason they don't do it is the stigma attached to getting started with insulin injections," Imran explains. "But if they were being prescribed a pill, patients and physicians would be more willing to start this therapy much earlier and bend the curve of the disease progression in a favorable way. That's one example where just the change in drug delivery could have a drastic impact on how we control and manage type 2 diabetes. It would not only expand the business for basal insulin, it would extend the quality of life for patients."

Imran adds that his company is also garnering a great deal of interest from biosimilar developers. And finally, in another development that further solidified the company's bright future, Rani raised an additional $53 million in February, which will go toward manufacturing costs and clinical trials that should start by the end of the year.