

MIT BIOENGINEER RAM SASISEKHARAN | MEETING THE MINDS

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He solves global medical puzzles

Ram Sasisekharan led the international team that turned the heparin contamination crisis in America into a rapid-response triumph.

By Billy Baker, Globe Correspondent | May 5, 2008

The last few weeks have been so crazy for MIT professor Ram Sasisekharan - so fast, so remarkable, so momentous - that his wife convinced him he had to write it all down, put it into a PowerPoint presentation, or else he would forget everything that had happened.

The slideshow tells the story of how Sasisekharan (pronounced sasi-say-kehron) led an international team that turned the heparin contamination crisis - which has led to 81 deaths in the United States - into a rapid-response triumph for the scientific community. As he begins to recount this medical mystery, sitting recently in the Legal Sea Foods in Kendall Square, he takes a deep breath. And, waitress, a glass of wine, please.

"I got a call from the [Food and Drug Administration] on a Saturday in late February saying they needed help," he begins as he opens his laptop. Heparin, a blood thinner derived from pig intestines that has been a staple of hospitals for more than a half-century, was killing people. Contaminated batches had slipped past the standard safety inspections. And the FDA needed to know what the contaminant was and why it went undetected.

As he clicks through the images on his computer, the events go by in a blur. By mid-March, they had identified the contaminant as oversulfated chondroitin sulfate, which had slipped past the traditional screening methods because it was a sugar chain very similar to heparin itself (leading to allegations that the contaminated batches, which came from China, may have been intentionally counterfeited). By mid-April, they had solved the biological riddle by figuring out that the contaminant was causing allergy-like reactions in patients. By late April, the studies were already published in peer-reviewed scientific journals. Deep breath. Glass of wine.

Sasisekharan, a professor of biological engineering and health sciences and technology who specializes in sugars, was, according to one MIT colleague, the perfect person to bring the global scientific community together. Fast.

"He has the lowest wind resistance on solving a problem of anyone I've ever met," said John Essigmann, a professor of toxicology and chemistry at MIT. "Imagine that you came into a room and there was a clock disassembled, and you had all the necessary people to put that clock back together but they didn't know how to work together. . . . Ram is the kind of person who can be the catalyst for getting all those pieces to fit together."

The heparin case is not the first time Sasisekharan has had success in solving a global medical mystery. In early 2006, he led an MIT team that unraveled the structural mutations necessary for bird flu to make the jump to humans, a discovery that could help science monitor the evolution of the flu virus and prepare vaccines for the moment it makes that jump (which, according to Sasisekharan, is not a question of if, but when).

Sasisekharan, who is 42 and has a natural gregariousness, grew up in India, the son of an academic dean. He said that he was always attracted to the excitement of scientific problem solving. He always wanted to be a doctor - "I did the next best thing and married one," he said - but as a grad student at Harvard, he heard a talk by famed MIT bioengineer Robert Langer, and was inspired to pursue a career using basic science in practical applications.

"The way I've approached science, philosophically, is not just doing the right science, but doing it in the right way in terms of it having a practical impact," he said. He gravitated to MIT, studied under Langer, and ironically, two decades ago had his first academic success cloning an enzyme that was able to remove heparin from blood traveling to a patient via a dialysis machine.

He chose to focus on sugars - which, at the time, was considered a very unsexy branch of science - and was eventually awarded tenure for developing a platform of technologies to study the content of sugars and their role in processing a variety of biological signals outside the cell. His research has led him to found two pharmaceutical companies.

Not bad, when you consider that more than a few colleagues tried to talk him out of studying sugars and wasting his career on "junk."

Without that expertise in "junk," he would have never gotten the call saying the world needed his help. Sasisekharan laughs at the characterization.

"I feel it is my moral obligation as a scientist to society . . . to make the world a better place," he said. "That is always the call.

The heparin case "was a humbling experience, to see how fragile we really are, how everything rests on a couple of things one way or another. And it was a surreal experience, because everyone believed this was the right thing to do. We joined together. This story is really about bringing out the best in people. That's the message."

Fact sheet

Hometown: Bangalore, India; lives in Bedford.

Education: Bachelor's degree from the University of Bangalore in physical sciences, 1985; master's degree in biophysics from Harvard in 1987; PhD in medical sciences from Harvard Medical School in 1992.

Family: Wife, Dr. Uma Narayasami, is a hematologist and oncologist at New England Medical Center; they have a son, Varun, 4, and a

daughter, Kavya, 3.

Hobbies: Sasisekharan loves to read and spend time with his children, but says his main hobby is global issues. He's a leader of a team of MIT professors who volunteer to teach every summer in Asia. ■