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INSTITUT HLEDÁ LÉK NA AIDS



Thirty-four million people in the world are infected with HIV.

Only eight million have access to life-saving drugs, and there's no effective vaccine.

Researchers at the Ragon Institute of MGH, MIT, and Harvard won't rest until they find one.

Hacking HIV

By Anna Trafton
Photos by Adam Osborn

On a May afternoon in 2008, Bruce Walker and Terry Ragon '71 paid a recruiting visit to MIT. Walker is a Harvard Medical School physician who has studied HIV for three decades. Ragon, the founder and CEO of a software company called InterSystems, was about to bankroll a new \$100 million research institute to develop HIV vaccines, with Walker at its head.

About 20 MIT faculty members came to hear Walker and Ragon's pitch for help with their project. One of those was Anup Chakraborty, a professor of chemical engineering who was intrigued by the mission of what would be known as the Ragon Institute. He had worked in immunology for almost a decade, but he had never delved into HIV research, which had been an insular field. "Moreover, I didn't know what I could possibly contribute," Chakraborty recalls.

After several brainstorming sessions, Walker thought Chakraborty might be able to get to the bottom of something that had been stymieing HIV researchers: people whose immune systems are naturally able to fight off HIV infection are also prone to autoimmune disorders. The phenomenon seemed unlikely to be mere coincidence. Perhaps Chakraborty, who uses computational models to study how cells in the immune system distinguish between foreign invaders and the body's own cells, could figure out the connection.

Most a year later, Chakraborty published his first paper on HIV, which focused on immune agents known as T cells. In certain people, he found, the body's process for weeding out T cells that might attack healthy cells isn't completely effective. But the T cells that evade this process are especially effective at fighting HIV.

"In me, that's a great example of something that never would have happened without the community that was developed with the Ragon Institute," says Walker. Giving scientists, engineers, and physicians free rein to tackle HIV is the mission of the Philip T. and Susan M. Ragon Institute of Massachusetts General Hospital, MIT, and Harvard. Since it opened, in 2008, researchers from the three institutions have worked together—and with other researchers around the world—to attack the problem from every angle.

From the outset, Walker wanted to partner with researchers outside the usual realm of virology and immunology

because he didn't think the traditional funding channels were supporting enough novel research. "I would frequently get together with people and talk about a potential collaboration with somebody outside the HIV field, and it would seem like a great idea, but it never went anywhere because we were never able to fund it," he says. "We wanted to get a bunch of people together and really focus them to work on this problem and measure success not in terms of papers published, but in terms of results on the ground."

This approach will have implications far beyond HIV research, says Chakraborty, now the director of MIT's Institute for Medical Engineering and Sciences (IMES), an interdisciplinary center launched last summer (see "An Intellectual Hub for Medical Engineering," page 14). "There's a lot of talk around the world, especially in this country, about getting this kind of work at the interface of disciplines supported," he says. "But personally I don't know of another example where basic scientists and clinicians have worked as much closely as the Ragon Institute."

Identifying the virus's weak points

An antiretroviral drugs have been so effective in treating AIDS that there's a risk of complacency about it in the United States, Walker says. "The problem is, the drugs have to be taken very reliably in order for resistance not to develop. Another, bigger problem is that in the rest of the world there are limited resources and limited drugs available." Fewer than 10 percent of HIV-infected people worldwide had access to the drugs in 2010, according to the Joint United Nations Programme on HIV/AIDS.

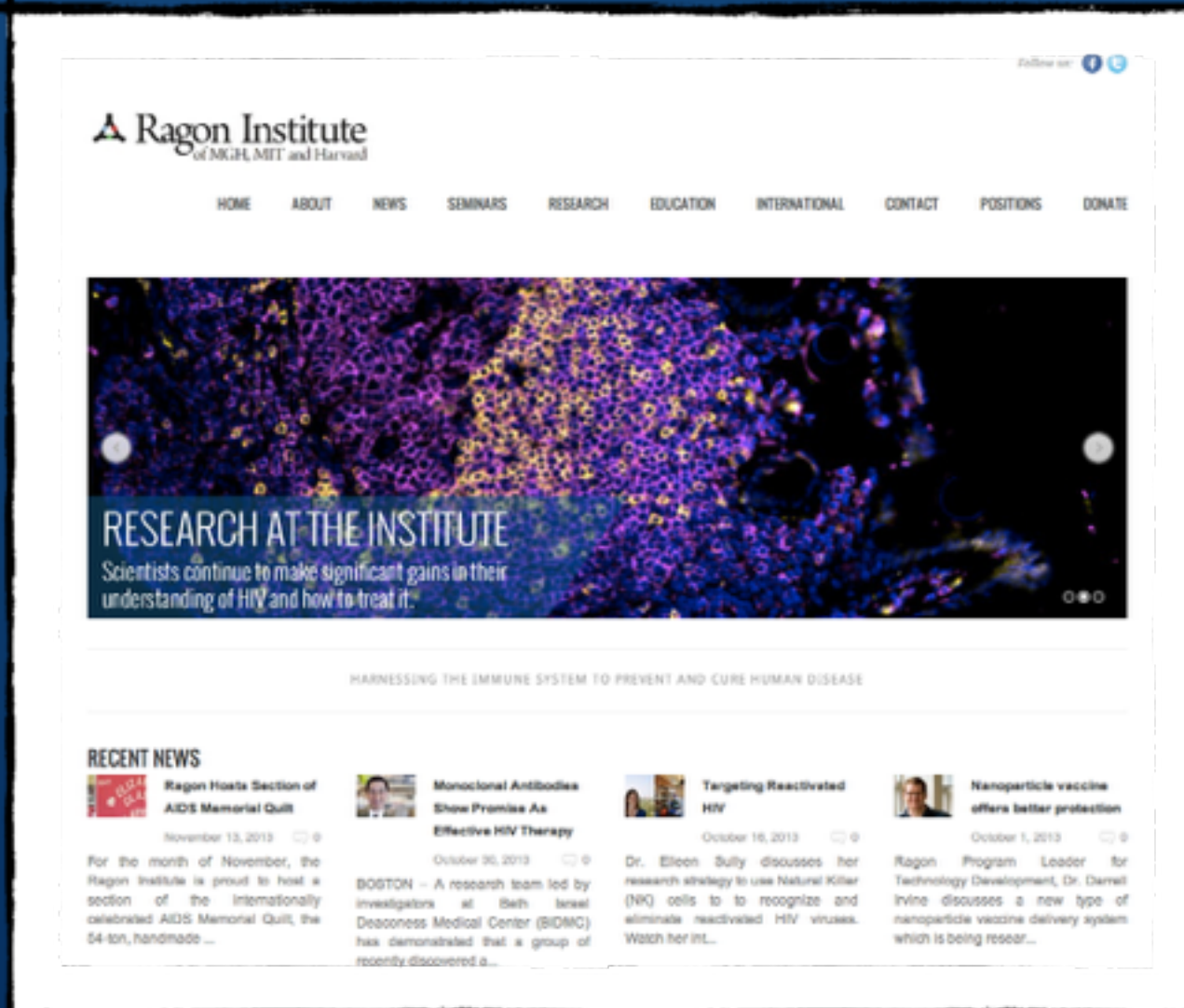
Given these facts, Walker believes, the only way to eradicate HIV is to develop an effective vaccine. But HIV is an elusive target. It mutates much more rapidly than most viruses—over 100,000 times, for which vaccines must be redesigned every year.

Bruce Walker (left) and Terry Ragon '71 are leading the Ragon Institute on a quest to develop a vaccine to prevent HIV.

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“ V dobách Isaaca Newtona, jste snad mohli říct – jsem sólo fyzik, který praktikuje výzkum. Ale dnes, potřebujete velký tým lidí, kteří se společně soustředí na posouvání hranic toho co současná věda zná. **Klíčem je sdílení informací.**“

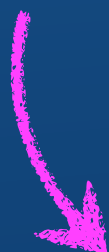
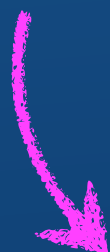
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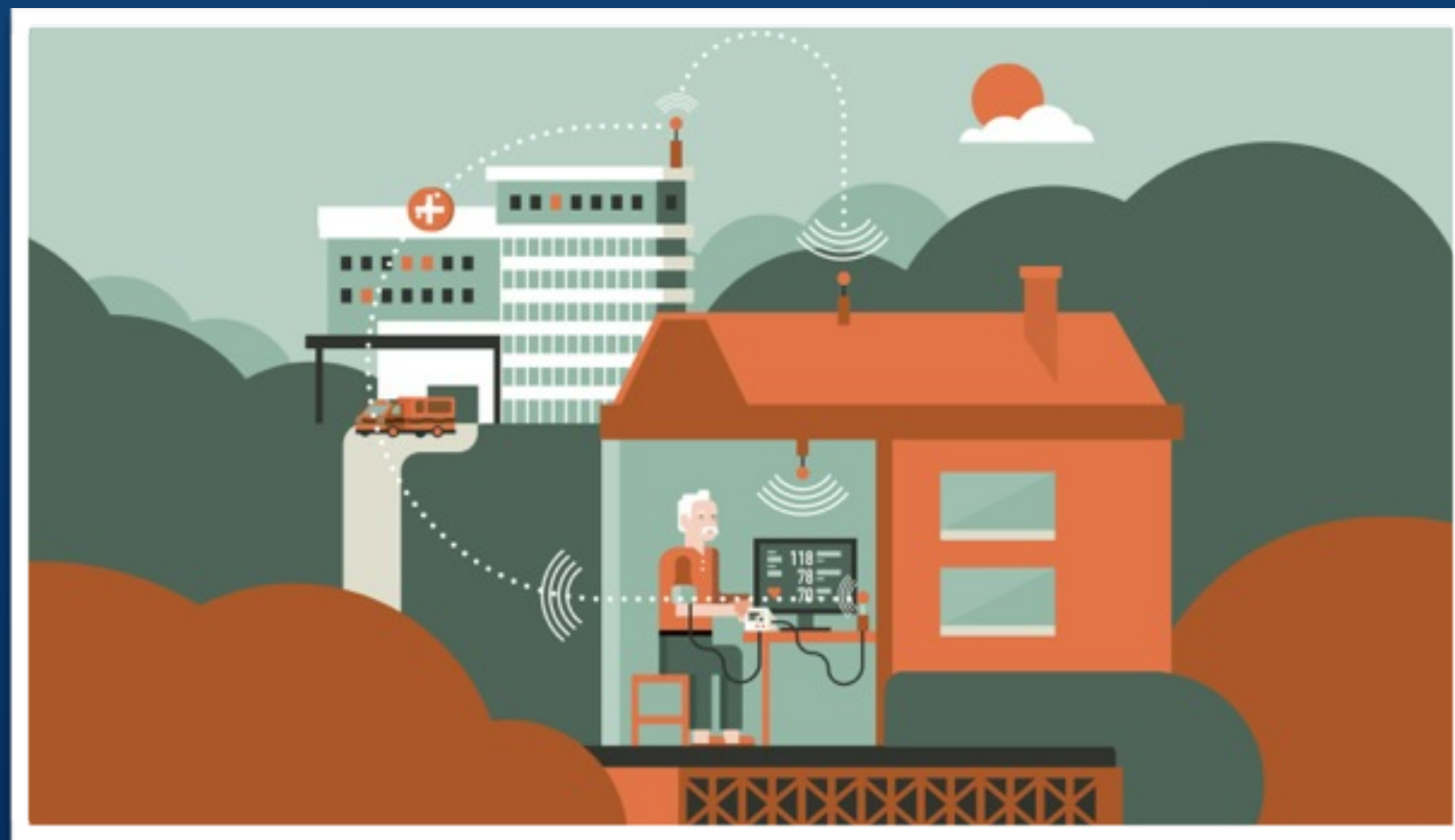


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