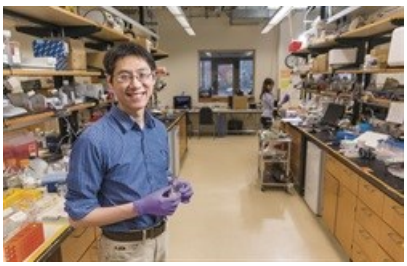
A new device deciphers the language of cells

By Bruce Fellman

6 Jun 2014

Yale biomedical engineer Rong Fan, a soft-spoken wizard of the nanorealm, has crafted an unprecedented way to trap individual cells as they travel highways only a billionth of a meter wide.



Biomedical engineer Rong Fan has developed a device that reveals a cell's nature based on the proteins it secretes. "Cells use proteins to talk to each other," he says. "I wanted to know what they were talking about."

Photo by Robert A. Lisak

As inventions go, Yale biomedical engineer Rong Fan's entry into the innovation sweepstakes is not much to look at. Fan's device, impressively named a single-cell, 45-plex protein secretion measurement platform, seems to be little more than a sandwich of two sheets of clear silicon rubber the thickness of window glass, each sheet a bit smaller than a credit card and bearing a smaller, darker rectangle divided into 14 vertical sections. It has no flashing lights, no intriguing noises, no moving parts, no signs of Applesque high design. Indeed, the object, displayed in Fan's bustling laboratory on the first floor of the Daniel L. Malone Engineering Center, doesn't appear to be doing anything at all.

Appearances deceive. Fan, a soft-spoken wizard of the nanorealm, has crafted an unprecedented way to trap individual cells as they travel highways only a billionth of a meter wide. In that same device, the engineer has incorporated a technology akin to supermarket barcodes that enables him to learn and listen to the language of cells.

Collaborators at the School of Medicine and other universities, pharmaceutical companies, and government laboratories are starting to use Fan's invention to uncover the hidden details of the cells' stories. These investigations-all in their early stages-could help scientists make medical discoveries that lead to more effective vaccines, precision-targeted medications, a better understanding of autoimmune diseases, and even optimal strategies for diagnosing and treating such perplexing ailments as prostate cancer, glioblastoma, and myeloproliferative disorders.

"The potential applications are very broad," said Fan, who has spun off a company called IsoPlexis to commercialize the

device. "We're entering the era of cellular medicine."

Read the full article at Yale School of Medicine.