



Cancer researcher looks to artists for inspiration

Esther Landhuis, *Science Writer*

By day, Dhruva Deb studies lung cancer. A postdoctoral researcher at the UT Southwestern Medical Center in Dallas, Deb puzzles over disease-causing genes and the scores of signaling pathways in which they act. Searching through this sea of data, he often has trouble deciding where to focus or how to push forward.

In the evenings, Deb leaves the microscope and pipettes and enters a different world—his home studio—where canvas and paint brushes await. Talking with artist friends, Deb sees the different ways they tackle challenges. Researchers in many fields tend to be reductionist in their approaches, whereas artists “look at the problem from a 30,000-foot view,” Deb says. “They try to encapsulate all the complexity in the system. They say, ‘I don’t know what I am doing, but it’s going to lead me somewhere.’”

Deb’s dual pursuits prompted him to figure out how to bring the more open-ended, intuitive thinking of artists into the practice of biomedical research. In 2014 he launched Cancer ART-SCI Network to connect individuals who, like him, want to probe the complexity of cancer using science and art in parallel.

Today this online community has nearly 200 members—artists, researchers, and scientist-artists like

Deb—from 20 countries. Inspired by art–science collaborations in other fields, such as astronomy and neuroscience, Deb hopes his network can spark partnerships that advance research in cancer, the second-leading cause of death in the United States.

But his main goal remains finding ways for art to inspire cancer research and research to inspire his art. Discussing science with artists, he says, can lead to “new ways of looking into a problem and, at times, new hypotheses that biologists might not otherwise consider or test in the lab.”

Dual Passions

A major influence on Deb’s own art was a collaboration with local artist Caroline Ometz—a partnership that led to an exhibition of their work depicting both the horrors and beauty of cancerous cells. Their work grew out of Deb’s brainstorming about new ways to approach the complex, stubborn problem of tumor-cell growth.

Deb’s doctoral work focused on a fundamental mystery of cancer—the unpredictable variability of cells within tumors. Even in the same patient, the biology of individual cancer cells can differ remarkably on many fronts, including how fast they grow and how well they evade the immune system. Tumor variability has stymied efforts to design effective cancer therapies.

Riding the train to and from the lab, Deb sometimes doodled on napkins or scraps of paper while mulling over his data. But he rarely drew actual cells or tumors. Mostly his sketches veered on the abstract, a loose exploration of various concepts and hypotheses. Deb mulled over various questions: What if cancer cells create heterogeneity in a random fashion? What sorts of cell signaling pathways raise a cell’s awareness of environmental stress and, perhaps, make them acquire genetic mutations? What factors determine the extent of tumor heterogeneity? “If I saw an interesting idea emerging, then I would play with mixed media—acrylic, watercolor, oil, and such—in my studio later that day,” Deb says.

In late 2015, Deb proposed a project with Ometz. Using acrylic, mixed media, and watercolors, he and Ometz would each produce a set of paintings exploring the beauty of cancer’s unpredictability. At first it was hard to imagine how art depicting such an awful disease could look beautiful. But then Ometz stumbled on



Working with cancer biologist Dhruva Deb, artist Caroline Ometz explored cancer’s effects on cells, including in this painting, *Order to Chaos*, which depicts a healthy cell (center) being attacked by a yellow cancer-shaped cell. Image courtesy of Caroline Shaw Ometz.

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a book about the Japanese philosophy of wabi-sabi. “Wabi-sabi finds beauty in the imperfect, the ugly, and the mundane,” she said in a 2014 podcast about their project, “Cancer: Finding Beauty in the Beast.”

For his part, Deb saw tumors as normal cells that have transformed into a cancerous state because of environmental stresses, he says. “The beauty in these so-called ugly, scary cells is the process of life itself, trying to survive. That’s where I could relate the concept of wabi-sabi with my scientific understanding of cancer.” In a painting of his called *Looking Forward*, two cancer cells sustain themselves by communicating with healthy cells and receiving nourishment via expanding networks of blood vessels—all while trying to escape detection by roving immune cells.

In early 2016, Deb led a panel discussion held in conjunction with a local art gallery’s exhibit showcasing his and Ometz’s paintings. In addition to sharing their artistic renderings of cancer’s unpredictability, Deb and his research mentor, oncologist John Minna, led a brainstorming session on using art to help people visualize large sets of genomic and proteomic data. The event drew about 150 people—a mix of researchers, artists, and business people—and 12 cancer survivors.

Creative Disturbance

For researchers who aren’t trained to produce art and for artists who are interested in science but lack training, finding a partner in the other realm can be difficult. These people tend to not be easily identified in curricula vitae on university websites, notes physicist Roger Malina, who’s also a professor of art and technology at the University of Texas at Dallas. Vehicles for recognizing such collaborations do exist, such as an “Art and Cancer” section that Deb edits as part of *Leonardo*, a peer-reviewed journal covering the application of modern science to the arts and music (<https://muse.jhu.edu/article/653611>).

But Malina, who’s an advisor on the Cancer ART-SCI Network, is keen on bringing more researchers and artists together to generate what he calls a “creative disturbance,” in part via an online platform he launched in late 2014 with the same name (see *Front Matter Q&A* with Malina www.pnas.org/content/111/52/18403.full?sid=d;197096a1-f3f0-4e03-8032-df5fcc6fcf71). Besides Deb’s and Ometz’s cancer-themed art, the site’s podcasts highlight, for example, a painting project that uses creativity as therapy, an event that paired neuroscientists with artists to create objects that were simultaneously scientific and artistic, and researchers’ use of sound to tease out key elements of visual data on bacterial growth (see <https://createdisturbance.org/podcast/bacteria-singing-willy-wonka-or-theranostics/>).

Deb, for his part, hopes the Cancer ART-SCI Network will help participants find new approaches that



In *Looking Forward*, Dhruva Deb depicts two cancer cells that sustain themselves by communicating with healthy cells and receiving nourishment via expanding networks of blood vessels—all while trying to escape detection by roving immune cells. Image courtesy of Dhruva Deb.

tackle a complex problem in creative ways. Often scientist–artist interactions are local, notes Tal Danino, a bioengineer at Columbia University who collaborates with artists as part of his research developing bacteria that detect and treat cancer. “It’s nice to see some type of global framework,” he says. Danino views the Cancer ART-SCI Network as an early effort to connect artists and researchers separated by borders, both geographical and disciplinary.

Deb’s latest push to generate creative disturbance: An art and medicine symposium taking place in Fall 2018 at the University of Texas at Dallas. The symposium will include scientific talks, workshops, and discussions in a gallery showcasing medicine-themed art by using emerging media. Several of those planning to attend are network members who said connections made via the network prompted their interest in participating.

Provocative art can also help reach out to audiences, raising awareness about the import of the research. Cancer, in particular, is “a very visceral topic. It draws a strong emotional reaction,” Danino says. “When you see cancer, whether it’s a cell or a tumor, you’re facing cancer, seeing it for what it is.”