A self-portrait in cells: Grad student gets cheeky with art show entries


"Les Demo-cells d'Avignon"

Pablo Picasso's angular, proto-Cubist "Les Demoiselles d'Avignon," painted at the dawn of the 20th century, is one of the foundational works of modern art and a jewel in the collection of the Museum of Modern Art in New York City.'

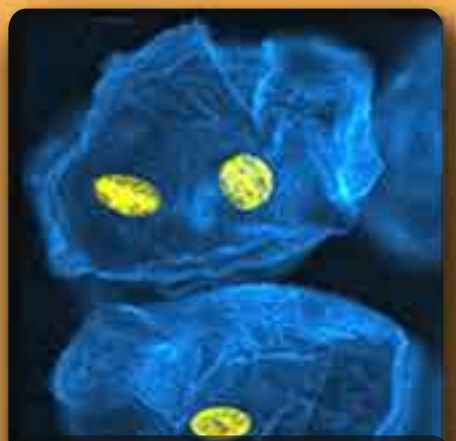
UAB doctoral student Shane Kelly's "Les Demo-cells d'Avignon" (above), currently on display in The Edge of Chaos as part of the annual UAB School of Medicine Art Show, represents new movements in 21st century art and science. "Les Demo-cells" is one of three micrograph images that Kelly has entered in the show. [His two other entries were also inspired by great art: "Cell-Flowers," from Vincent Van Gogh's blockbuster painting "Sunflowers," and "Ariga-to," whose robot-like appearance reminded Kelly of the classic Styx rock anthem "(Domo Arigato) Mr. Roboto."

All three images are fluorescent confocal micrographs of cheek cells. "Some are my own and some from friends," Kelly explains. Separate fluorescent probes highlight DNA, the plasma membrane, and actin in the images. The art is definitely an "extracurricular project," says Kelly, who is a graduate research assistant in the lab of microbiologist David Bedwell, Ph.D. He thought it would be fun "to create a type of personal cellular art" by imaging his own cells, inspired by "DNA art" companies such as DNA11.com, which turn DNA samples into poster-size prints.

Kelly's studio is the "mini lab" he built at home. He scoured eBay to buy the centrifuges and other equipment he needed to collect and stain the cells. "Then I rent a microscope from UAB's High Resolution Imaging Facility to acquire the images," he says.
Kelly learned how to use fluorescent confocal microscopy under the tutelage of Shawn Williams at the High Resolution Imaging Facility as part of his day job in the Bedwell lab. Bedwell, a leading cystic fibrosis researcher, is focused on "inducing translation read-through of premature termination codons in order to treat patients with genetic disease," Kelly says.

Roughly 10 percent of patients with cystic fibrosis have a mutation in the CFTR gene that results in a premature "stop" codon, preventing the gene from working properly. Bedwell's lab has identified drugs that suppress these "stop" mutations in experimental models


"Cell-flowers"


"Arigato"

"The idea being if a patient has a mutation in a gene that is a stop codon, the patient could take a drug that would allow the translating ribosome to 'read-through' the stop codon and produce the full-length protein," Kelly says. Ultimately, the approach could be applied to treat a wide range of genetic diseases

Kelly's own work focuses on autophagy, a natural process by which cells rid themselves of "unwanted, unneeded, or damaging proteins," he says. "I'm studying how autophagy is controlled at the messenger RNA level," particularly when a cell is starved of nitrogen. Autophagy mRNA is known to be upregulated during nitrogen starvation, which increases the production of autophagy proteins. "We are studying how this occurs and will be submitting a manuscript of our findings soon," Kelly says.