

In the Eye of a Fruit Fly

At UCLA, Utpal Banerjee guides undergraduates through serious research—and into the scientific literature.



AT FIRST GLANCE, UTPAL BANERJEE'S LAB at UCLA looks like any other. Across three rows of Formica-topped counters, amid lab equipment and bottles of chemical reagents, 15 microscopes stand at the ready. But the researchers who toil at these workstations are a lot younger than those in a typical lab. Mostly freshmen and sophomores, they're enrolled in an unusual biology class that's open to all undergraduates.

In this lab, which serves as one of the venues for the course, students conduct real experiments. Unconstrained by canned laboratory exercises, many of them

are deciphering mutant fruit fly genes, and their research has generated publishable data that other scientists are using.

"This teaches them a different type of reasoning process," says the amiable Banerjee, an award-winning teacher and chair of UCLA's department of molecular, cell, and developmental biology. "They're able to do experiments with uncertain results and have some pride of ownership about what they uncover."

The Indian-born scientist was one of 20 HHMI professors who were awarded \$1 million grants in 2002 to

BELOW _ IN UTPAL BANERJEE'S LAB AT UCLA, "EACH STUDENT HAS TO DO WHATEVER IT TAKES—PCR, COMPUTER ANALYSIS, SEQUENCING—TO FIGURE OUT WHY THE MUTATIONS ARE DOING WHAT THEY'RE DOING."

find innovative ways to improve undergraduate biology education. Using these funds, Banerjee, along with lecturer Allison Milchanowski and postdoctoral fellows Jiong Chen and Gerald Call, created the course to give students a real taste of the excitement of scientific discovery.

Combined with traditional classroom lectures that provide background information and a computer lab where students learn how to do genetic analysis, the bench experiments give them hands-on research experience.

Banerjee, whose research focuses on the eye, picked the fruit fly *Drosophila* as a model system because the flies reproduce rapidly, making it easier to generate large numbers of them and observe their life cycle, and because all their genes are known. What scientists don't know—and what Banerjee's students are busily uncovering—is how these genes function. The only way to discover this is to mutate a gene, says Banerjee, and then see what happens to the fly's eye.

Some of the students' research was reported in the February 2005 issue of *PLoS Biology*, published by the Public Library of Science. The paper had 148 coauthors—including 138 undergraduate students.

For their part, the students believe the course helps them refine their career goals. At the very least, it gives them a leg up on the competition when they apply to graduate school. Joy Wu, for example, who has taken the class for 6 quarters, is now headed for a career in neuroscience. "That wasn't my goal before, but as I progressed through the class I realized it's what I wanted to do," says the UCLA senior. "And when I've gone to my Ph.D. interviews, I've realized how lucky I am because my experience is different from that of most undergraduates, and I know my way around a lab." ■

- Linda Marsa -

