



## A Training Program for Cancer Biologists

**Y**ale Cancer Center is distinguished by its commitment to translational medicine—that is, to turn promising laboratory breakthroughs into new cancer therapies. To that end, Yale’s scientists and clinicians work closely together on Disease Aligned Research Teams, or DARTs, each devoted to specific cancer types. DARTs meet to discuss new research, clinical results, and possible new investigations, with the goal of accelerating the delivery of innovative therapies to cancer patients.

Yale University is a leading center for education of PhD biologists who are destined to become leaders in diverse areas of the biological and biomedical sciences. Yet, until recently, Yale offered no predoctoral or postdoctoral training programs in basic science that focused specifically on cancer research. The new Yale Cancer Biology Training Program fills that gap and initiates young basic scientists into the practicalities of translational medicine. The goals are to complement traditional PhD training, to educate

Qin Yan, PhD, David Stern, PhD, program director, and Katerina Politi, PhD (front, left-right) with their students.

predoctoral and postdoctoral trainees about real-world clinical issues in oncology, and to prepare them to lead translational teams comprised of basic scientists and clinicians.

“This kind of training is not typical for PhD students or postdoctoral fellows,” said the program’s director, David F. Stern, PhD, Professor of Pathology, Associate Director of Shared Resources at YCC, and Co-Leader of the Signal Transduction Research Program. “We’ve been training bench scientists the same way since I was a grad student—classroom training, lab experience, and then the development of an independent research project. But, we finally understand enough about the biology of cancer processes that scientific investigators can now work closely with clinicians in developing the best ways of controlling disease. So there’s a real need here for this training.”

The need was created by the swiftly changing landscape of cancer science. In the past, basic scientists and clinicians worked on separate tracks, without much contact. But new insights into the biology of cancer have created an explosion of therapies that harness the immune system or direct drugs at specific genetic and molecular targets. Researchers, clinicians, pharmaceutical companies and patients all want to speed up the process of turning these insights into effective remedies. For that to happen, research scientists and clinicians must work in tandem and create a bench to bedside to bench circuit in which lab breakthroughs can be tested in the clinic, analyzed and improved.

“We tried to figure out what PhD students and postdoctoral fellows are

missing with standard biomedical PhD training,” said Dr. Stern, “and that has a lot to do with understanding the clinical world, the whole disease side, and also the practical limits on what clinicians can and can’t do because of drug toxicities and working with patients—limiting factors in the real world. They can learn these things by training with and working with clinicians and clinician-scientists.”

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The program has several key components. Graduate students and postdoctoral fellows already have scientific mentors, but every trainee in the new program also will have a clinical mentor, a guide into the hurly-burly of real-world medicine. The trainee will shadow the clinician during appointments and rounds, and will attend tumor boards where treatment recommendations are made for challenging diagnoses.

The second part of the clinical training will use specialized coursework to introduce participants to the practical challenges of creating clinical trials from research ideas. Basic scientists need to understand this complex process so that trials can be designed for maximum efficiency and value to scientists, clinicians, and patients.

The program also adds two extra classes to the standard curriculum. The first is, “Advanced Topics in Cancer Biology,” led by Dr. Qin Yan, that adds

to the existing course on cancer biology offered to all graduate students by diving into specialized research topics. For the second course, clinicians who specialize in various cancers describe the most critical problems within their areas of expertise. “Those critical problems can be the best ones for trainees to focus on in their research,” Dr. Stern explained. Trainees also do a clinical analysis of

patient tumor samples to gain experience in analyzing and interpreting genetic tumor information.

The two-year program is funded by a new grant from the National Cancer Institute of about \$232,000 per year for five years, with additional financial support from Yale Cancer Center and Yale School of Medicine. The funding provides each trainee with a stipend plus tuition. Interest has been strong, with six PhD students already enrolled and four postdocs expected to enter the program by the end of 2016. Eventually the program will include 16 trainees, split equally between PhD students and postdoctoral fellows.

Because of the extra work required on top of their regular programs, trainees must be highly motivated to specialize in cancer research. “Many PhD trainees will eventually run their own labs,” said Dr. Stern. “We want to train generational leaders in cancer research.”