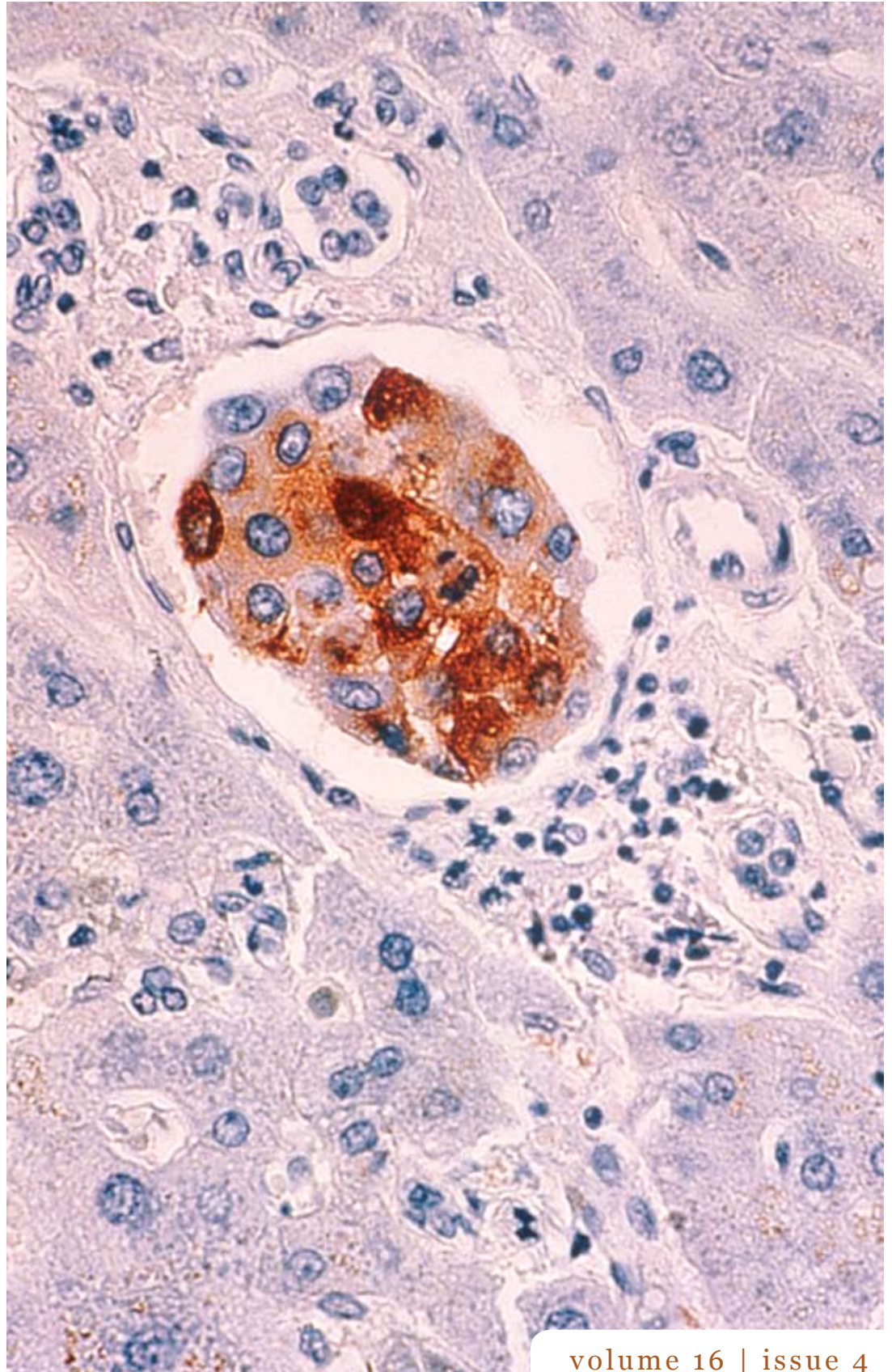


# LifeLines

*For the Southern California  
Life Science Community*



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*NIH image of malignant  
breast cancer cells  
metastasized to the liver.*

## COVER STORY



# THE WAR ON CANCER: SAN DIEGO ON THE FRONT LINES

by *Larry M. Edwards*

This year, more than 560,000 Americans will die of cancer, making it the second most common cause of death. In addition, more than 1.4 million people will be diagnosed with it. With the American Cancer Society estimating the disease is likely to kill one in four Americans, nearly everyone's life is touched by cancer.

Because of this profound impact on our lives, finding a cure for the dread disease remains the holy grail of medical science. Cancer is a key focus of research on San Diego's Torrey Pines Mesa, and the target of new therapeutics being developed at more

*Above: Ben Colson, an associate scientist at Biogen Idec's Tumor Biology lab in San Diego, working on a cancer cell signaling project.*

than 60 life science companies in the region. Four of the most successful cancer treatments have major ties to the San Diego region, and the thriving life science community is developing more. Next year marks the 30th anniversary of the founding of Hybritech, which spawned San Diego's biotechnology industry and launched the region's first commercial venture in the oncology arena.

"San Diego has come a long way since 1978," said Dr. Ivor Royston, who co-founded Hybritech and Idec Pharmaceuticals and is a managing partner with the venture capital firm Forward Ventures.

"In terms of biological research, San Diego is number one," he added, pointing to the world-renowned programs at UCSD, The Scripps Research Institute, the Salk Institute, the Sidney Kimmel Cancer Center,

the Burnham Institute for Medical Research, and other research facilities located here.

Those institutes act as the idea generators for dozens of life science companies that develop those therapies into marketed products given to patients. Many of the mainstays in the oncology arsenal have strong ties to the San Diego life science community, which has 37,000 employees in more than 500 companies and represents the largest technology cluster in the region.

Biogen Idec, whose predecessor Idec Pharmaceuticals discovered and developed the most successful cancer drug ever, bases all of its cancer work here in La Jolla. Biotech giant Genentech makes its cancer drug Avastin in Oceanside. And Pfizer's Sutent, approved last year, had its clinical development in San Diego. The company recently consolidated its cancer research program here.

"San Diego is a great place to be," said Kitty Mackey, head of Pfizer's research and development operation in La Jolla. She said the decision to consolidate the company's oncology program in San Diego "is a validation of the ecosystem we have here."

While Pfizer's total headcount in San Diego will remain about 1,000, the number of employees working in oncology will nearly double, Mackey said.

With large academic institutions next to small biotech and medical device companies, the environment is fertile for cultivating oncology work.



*Linda Pan, a pharmacist at UCSD's Rebecca and John Moores Cancer Center, takes Genentech's Avastin out of refrigerated storage. Avastin is made in Genentech's Oceanside facility.*

"You develop synergies with the research labs and small biotech companies," said Dr. Robert Peach, senior director of molecular discovery for Biogen Idec's Oncology Research Group. "All the elements are in place for building a successful oncology franchise here."

But cancer is still a relentless killer. The National Institutes of Health estimates the country will spend \$206 billion on the disease, with almost \$80 billion of that in direct medical costs. One area that needs improvement is the movement of ideas from research

institutions into products on the market. To accomplish that, the region needs to bridge the funding gap between research institutions and late-stage drug development.

Dr. Dennis Carson is working to do just that. After taking the helm of the Rebecca and John Moores UCSD Cancer Center in 2003, he established an

Office of Industrial Relations to develop stronger ties between academia and industry and bolster translational research at UCSD. He is also enlisting support for a Cancer Innovation Center, which would bolster programs for translational research in San Diego.

Because funding for cancer research has been cut by the Bush administration three years in a row, a new funding model is required, said Carson, who discovered 2-chlorodeoxyadenosine, or 2-CdA, now marketed as Leustatin. "We need novel ways of dealing with this situation."

Carson, who has founded four biotech companies, said San Diego needs to break out of "me-too drug development" and become a leader in

changing the way drugs are discovered and moved into the clinic. This means reducing redundancies and incorporating cost-saving efficiencies. For example, rather than a research institute and a private company both investing in duplicate pieces of expensive equipment, they could share one. Similarly, they may not both need full-time staff positions for specific types of research. Instead, they could share some staff members, or collaborate on specific research and development projects.

Toward this end, UCSD is in discussions with Pfizer, the world's largest drug maker, and last December, the Moores Cancer Center announced that it is collaborating with Princeton, N.J.-based Medarex, Inc., to develop certain targets for antibody-based cancer therapeutics.

"We have hundreds of clinical trials in oncology around the world that are run from San Diego," said Charles Baum, M.D., Ph.D., the global clinical leader for Pfizer Oncology. "We have a robust pipeline with a variety of products that are looking at angiogenesis, such as Sutent, and agents that stimulate an immune response to cancer."

**SAN DIEGO-AREA LIFE SCIENCE COMPANIES WITH ONCOLOGY PROGRAMS**

Acadia Pharmaceuticals	Amgen	DermTech	Illumina	MicroMet	Protein Polymer
ActiveSight	Avanir Pharmaceuticals	Favrille	Immune Response	MultiCell Technologies	Technologies
Adventrx Pharmaceuticals	AviaraDx	Gen-Probe	Immusol	Nanogen	Quidel
Aethlon Medical	Biogen Idec	Genentech	Inovio Biomedical	Nereus Pharmaceuticals	Sequenom
Althea Technologies	Biosite	Genoptix	Invitrogen	NovaRx	SGX Pharmaceuticals
Anadys Pharmaceuticals	Celgene	Halozyme Therapeutics	Isis Pharmaceuticals	Nventa	Takeda San Diego
Androclus Therapeutics	Chembridge	Hollis-Eden	Lpath Therapeutics	Biopharmaceuticals	TargeGen
Angstrom Pharmaceuticals	ChemDiv	Pharmaceuticals	MediciNova	Optimer Pharmaceuticals	Tracon Pharmaceuticals
AntiCancer	Cylene Pharmaceuticals	Ichor Medical Systems	MediGene	Pfizer	Vical
Ambit Biosciences	Cytori Therapeutics	IDM Pharma	Metabasis Therapeutics	Pharmexa-Epimmune	

Based on DMS NewsAnalyzer search for oncology in the region.



*Biogen Idec's Rituxan was approved by the FDA in 1997 to fight non-Hodgkin's lymphoma.*

Similarly, Biogen Idec, which in February received orphan drug status for its experimental drug lumiliximab – a monoclonal antibody for patients with chronic lymphocytic leukemia – seeks collaborative opportunities with San Diego-area research institutes. And last year, the company acquired San Diego-based Conforma to add small molecule research to its portfolio.

Biogen Idec has roughly 400 employees in San Diego, most of them working in oncology, but “we don’t have the resources to do all the research we’d like to do,” Peach said. The company is looking for another blockbuster like Rituxan, the best-selling cancer drug ever. Last year’s \$2 billion in U.S. sales is shared with marketing partner Genentech, the country’s largest biotech, headquartered in South San Francisco.

Genentech’s Oceanside facility, acquired in 2005 from Biogen Idec, is

an important part of the company’s manufacturing network, said David Broad, Ph.D., general manager of the Oceanside campus. “People are starting to realize the Southern California scientific community has had a great impact in the area of oncology.”

Dr. Albert Deisseroth, president and CEO of the Sidney Kimmel Cancer Center, concurs: “San Diego is viewed as a trend setter for cancer research. People have migrated here and created a momentum that outstrips most other places.”

SKCC is collaborating with La Jolla-based Stratagene through a licensing agreement under which Stratagene will produce diagnostic tests for prostate and breast cancers. In addition, three biotechs have been spun out of SKCC, including Favril Inc., which develops immunotherapies for the treatment of cancer and other diseases of the immune system.

But like Royston and Carson, Deisseroth laments that a San Diego weakness is that too many cancer patients must leave San Diego to get treatment. SKCC conducts some clinical trials with Sharp Healthcare, but Deisseroth says the region needs more patient-oriented programs.

Carson said continuing the region’s growth in oncology requires more collaboration between academia and industry to support increased translational research. He acknowledges

there are challenges to overcome, not the least of which is protecting academic freedom and intellectual property rights. He envisions the proposed Cancer Innovation Center as one way of forging these relationships and developing global agreements for protecting the academic and commercial rights of the stakeholders while lowering the cost of drug development.

“We have a big advantage in San Diego, because we are not as tradition-bound as other areas of the country; we are more accepting of change,” Carson said. “To keep whining to Congress is not the answer. We have to do this ourselves.”

Royston agrees. “Oncology has grown significantly in San Diego over the past thirty years, but we need to do more to improve early-stage funding and increase translational research.”

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