

Outreach Communiqué

Nanotech-enabled Surgery May Improve Outcomes For Breast Cancer Patients

U.S. Senator Feinstein Commends UCSD NanoTumor Center and NanoBioNexus

Researchers with the NanoTumor Center at the Moores Cancer Center at University of California, San Diego (UCSD) are using nanotechnology to develop a real-time automated system designed to improve accuracy in the detection of malignant cells during surgery, ensuring complete removal of cancerous tissue. The technology's first application is for breast cancer, but it also may be useful for other types of solid tumors. This project and others have captured the interest of United States Senator Dianne Feinstein, who praised the NanoTumor Center, a National Cancer Institute-designated Center of Cancer Nanotechnology Excellence (CCNE), and NanoBioNexus, a global leader in nanobiotechnology outreach, citing their dedication to research and education.

Clinical studies show that 25 to 50 percent of all women who undergo breast surgery to remove a cancerous lump – called lumpectomy or partial mastectomy – must return for a second surgery to remove residual cancer cells. The necessity for repeat operations results in emotional and physical distress for patients, delays in starting post-surgical therapies, poorer aesthetic outcome, higher risk of infection and higher costs.

“The need for a real time cancer detection system to optimize local removal of cancer cells is high,” said surgical oncologist Sarah Blair, M.D., who is working on this project in collaboration with a team of scientists at the NanoTumor Center. “The consequences of failed margins are significant for patients, surgeons and the healthcare system.” Blair is associate professor of surgery and member of the Moores UCSD Cancer Center.

Progress on developments that enable rapid testing of a removed breast tumor's outer margins during an operation rather than waiting weeks for pathology reports were published by Blair and colleagues in the October 2007 issue of *The American Surgeon*.

“The NanoTumor Center is bringing the best minds in engineering, basic and translational research, and clinical care together to apply the power of nanotechnology to the improved treatment of cancer as rapidly as possible,” said NanoTumor Center Director Sadik Esener, Ph.D., professor of nanoengineering and electrical and computer engineering at the UCSD Jacobs School of Engineering, and member of the Moores Cancer Center. “We're certainly pleased that word of our center and this important work has reached our nation's capital and has been met with such positive endorsement.”

Feinstein also praised NanoBioNexus, a San Diego-based nanobiotechnology education and outreach company and sub-recipient of the NCI Alliance grant that funds the NanoTumor Center, for its efforts to educate the scientific and lay communities about the importance of this promising area of cancer research.

“Education plays a key role in the emerging field of cancer nanotechnology,” said Adriana Vela, founder and chair of NanoBioNexus. “Understanding how nanotechnology can be applied to cancer is critical for gaining support and funding to further expand research and commercialization.”

The NanoTumor Center (Center of Nanotechnology for the Treatment, Understanding and Monitoring of Cancer), established in October 2005 with a five-year \$20 million grant from the National Cancer Institute, is one of eight centers in the NCI Alliance for Nanotechnology in

Cancer. The UCSD-led collaboration includes investigators from the UC Irvine, Santa Barbara and Riverside campuses, and the Burnham Institute, united in a national effort to fight cancer with nanoscale devices. The NanoTumor Center is using nanotechnology to develop anti-cancer therapies that directly target tumor cells, more accurate and faster diagnostics, and ways to track down cancer cells that survive therapy.

Senator Feinstein is committed to supporting increases in government-funded research that will help make these innovations a reality.

“Nanotechnology is aiding the fight against cancer,” said Feinstein in her video address about cancer (view video at: www.ntc-ccng.org/senfeinstein.aspx). She also said that the cure will be found through research, such as the work under way at the NanoTumor Center.

Upcoming nanotech applications in cancer will be discussed at the December 13 NanoBioNexus event to be held at the Moores Cancer Center – “Nanoparticles for Targeted Gene and Drug Delivery of Cancer Therapeutics: From Manufacturing to Market Application.” For details: www.nanobionexus.org/events.aspx.

About the Moores Cancer Center at UCSD

Founded in 1979, the Moores Cancer Center is one of 39 centers in the United States to hold a NCI designation as a Comprehensive Cancer Center. The Moores Cancer Center, located on the UCSD Medical Center-La Jolla campus, ranks among the top centers in the nation conducting basic and clinical cancer research, providing advanced patient care and serving the community through outreach and education programs. On the net: www.cancer.ucsd.edu.

About NanoBioNexus

Non-profit NanoBioNexus, headquartered in San Diego is dedicated to nanobiotechnology education and outreach. With a growing international constituency, NanoBioNexus’ mission is to increase awareness and understanding of nanotechnology through business opportunities, educational forums and professional services in the application of nanotechnology in life sciences. Nanotechnology involves manipulating matter smaller than 100 nanometers and utilizing properties present only at that scale. On the net: www.nanobionexus.org.