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Command Performance

From dancers to divas, piano prodigies to pop stars, a Weill Cornell center offers specialized care for artists

Internal Defense

Drafting the immune system into the war against cancer

JOHN ABBOTT

Yao-Tseng Chen, MD, PhD '86

The case was hopeless: an inoperable sarcoma had invaded sixteen-year-old John Ficken's abdominal wall, pelvis, and bladder. The boy's belly protruded with the growth, and the pain was unrelenting. Yet Ficken's young surgeon and oncologist, William Coley, MD, harbored cause for optimism: an experimental bacterial cocktail intended to jump-start his immune system and eradicate the cancer. Over the course of four months in the winter and spring of 1893, the New York City physician injected Ficken's tumor with an increasingly potent dose of Coley vaccine. Each treatment induced inflammation, chills, and fever. But slowly, the tumor shrank. By the time Ficken's treatment ended in May, the cancer had shrunk by 80 percent. As the summer drew to a close, the tumor was barely perceptible. Ficken lived another quarter-century, dying of a heart attack in 1919.

A century after Coley's pioneering work was eclipsed by sterile surgical techniques combined with the emergence of radiation and chemotherapy, scientists have again turned their attention to the role of the immune system in the war against cancer. "We are trying to find things that are produced by the tumor, yet recognized by the immune system as foreign," says Weill Cornell molecular pathologist Yao-Tseng Chen, MD, PhD '86, "so that the immune system would generate a response and destroy the tumor cells." Unlike vaccines such as Gardasil, which prevents the viral precursor to cervical cancer and thus averts the associated malignancy, the approach taken by Chen and his collaborators echoes Coley's work: prompting the immune system to mount an attack against an existing tumor.

Nasser Altorki, MD, director of the Division of Thoracic Surgery at NewYork-Presbyterian Hospital/Weill Cornell Medical Center and one of Chen's collaborators, says oncologists and patients desperately need new, less toxic complements to the conventional trifecta of surgery, radiation, and chemotherapy. "Recruitment of the immune system can probably result in an anti-tumor effect with minimal side effects because it targets the tumor and not healthy cells," he says. "In lung cancer, we've seen that although chemotherapy produces some results, they are by no means spectacular. Good results occur in far too few patients—and for some patients, the treatment has side effects without benefits."

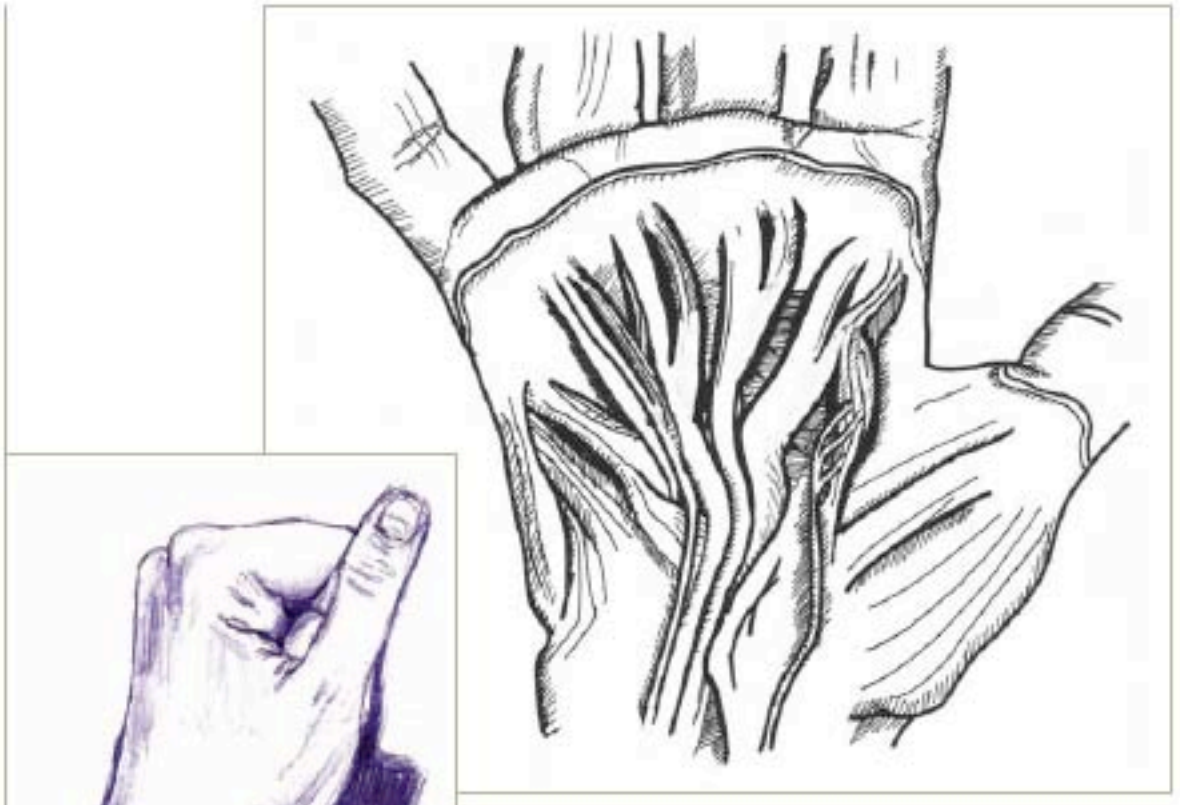
In 1996, Chen and his graduate mentor, immunology professor Lloyd Old, MD, published their discovery of NY-ESO-1—a protein common to many forms of melanoma, lung cancer, and ovarian cancer—isolated from a patient of Altorki's with esophageal cancer. In August 2009, scientists at Cornell's Ithaca-based Bioproduction Facility announced that they had successfully created a vaccine based on the protein for Phase I trials in patients with melanoma and ovarian cancer. The trials began last fall at New York University Medical Center and the Roswell Park Cancer Institute in Buffalo, New York. "I would

be cautiously optimistic that in another ten years, we would indeed see this becoming more relevant in clinical care," says Chen.

Chen, who received his medical degree in Taiwan and became a tumor immunologist at Weill Cornell, credits the rapid pace of discovery to funding and support from the Cancer Vaccine Collaborative—a joint venture of the nonprofit Ludwig Institute for Cancer Research and the Cancer Research Institute, which Coley's daughter founded in 1953 to extend her father's work. (Coley died in 1936, many of his findings unpublished and his data insufficiently detailed to satisfy scientist-physicians seeking insight into why his treatments worked.) Soon after publishing their NY-ESO-1 findings, Chen and Old—a former director of the Ludwig Institute and longtime director of the Scientific Advisory Council of the Cancer Research Institute—tapped Carl Batt, PhD, Cornell's Liberty Hyde Bailey Professor of Food Science and an expert in the production of recombinant proteins. "We had a core capability to make therapeutic agents, to make proteins in microbial systems," says Batt. "This was an outstanding opportunity to partner and develop long-term relationships to see our work make its way into the clinic."

Chen notes that because the researchers needed to generate material that could be injected into the human body, FDA rules prohibited them from producing it at the bench. Typically, investigators license their intellectual property to a pharmaceutical company certified in the appropriate manufacturing practices, in the hope that the firm will ultimately pursue clinical trials. But, he notes, "if you do that, you lose control of the pace of development and design of the clinical trial." In 2001, the Ludwig Institute funded the construction of the Bioproduction Facility, located next to Batt's lab in Ithaca's College of Agriculture and Life Sciences. It is operated in accordance with federal standards and staffed by undergrads, graduate students, and postdocs. Funds from the Ludwig Institute, Atlantic Philanthropies, and the Cancer Research Institute defray operating costs. "Here we have the opportunity to discover and produce clinical-grade materials tested in clinical trials without restrictions on academic freedom," says Altorki. "If it's successful, it can then be released to the pharmaceutical industry for large-scale development. It puts us in a whole different boat in terms of economic and academic freedom."

— Sharon Tregaskis



Doodling in class: Doing line drawings gives Monica Payne '12 a better grasp of the course material.

Hands-On Learning

Drawing her way to an MD

Second-year medical student Monica Payne likes to keep her hands moving as she tries to wrap her mind around her coursework. "I'm not an auditory learner, so I find my attention wandering sometimes during lectures, especially if the lecturer doesn't use many pictures," says Payne. "But when I draw, I stop daydreaming and listen." She fills her notebooks with illustrations of difficult science concepts, which help her release some creative energy and get a better grasp of the material. But what she has long considered doodling has caught the attention of her peers and professors alike.

Anatomy professor Ahmed Khan likes her work so much that he's using it to illustrate his article "Variations in the Palm and Arch of the Hand," which he hopes to publish in the *Journal of Clinical Anatomy*. "Her drawings are absolutely marvelous—she has a great gift as a medical illustrator," says Khan, who met Payne when she volunteered to help with his research.

When she was a child, Payne pored over *Grey's Anatomy* and other medical reference materials. Although she considered a career in art, she ultimately decided to go to medical school—but she hasn't given up hope that her two interests may merge. Someday, she says, she'd like to author a medical textbook in the form of a graphic novel. "There are a lot of applications for art in medicine," she says. "One thing that impresses me is how a textbook illustrator can clarify a concept through a good drawing." In the meantime, Payne continues to practice her art, painting murals in her apartment, doing the occasional portrait, and even sketching her classmates' heads during class. "I have to," she says, "because it's hard to find people who will sit still for that long."

— Rebecca Coffman