

## MALLINCKRODT FELLOW PROBING IMMUNE MECHANISMS IN HEART DISEASE

**O**VER 40% OF PATIENTS awaiting heart transplant surgery suffer from idiopathic dilated cardiomyopathy, a life-threatening condition of impaired muscle cell metabolism that forces the walls of the heart to balloon out under pressure. Researchers remain baffled by the putative viral origins of dilated cardiomyopathy, which afflicts people of all ages, even teenagers.

The winner of The Society of Nuclear Medicine's 1992 Mallinckrodt Fellowship, Jennifer Williams Tanio, MD plans to use radiolabeled monoclonal antibodies to probe the causes of idiopathic dilated cardiomyopathy. Dr. Tanio is a research fellow in the cardiovascular section of the University of Pennsylvania Hospital. The sponsors of the annual award for promising nuclear medicine research, Mallinckrodt Medical, Inc., will present a \$30,000 check to Dr. Tanio at SNM's Annual Meeting this month in Los Angeles, California.

### Detecting Myocarditis

Dr. Tanio proposes that immunoscintigraphy can be used as a noninvasive yet accurate method for detecting myocarditis, which investigators have suggested somehow triggers the development of dilated cardiomyopathy. The lack of a sensitive and non-invasive technique for diagnosing myocarditis has stymied further understanding of the relationship of the two conditions, which in turn has thwarted attempts to treat dilated cardiomyopathy. "If you can't tell what's causing it, you obviously can't treat the underlying causes," says Howard J. Eisen, MD, an assistant professor in whose laboratory Dr. Tanio works.

Dr. Eisen says that the current means for diagnosing myocarditis, endomyocardial biopsy, fails to detect the condition 90% of the time. Dr. Tanio hypothesizes that immunoscintigraphy using

radiolabeled monoclonal antibodies to surface antigens on lymphocytes will yield far superior results, if she can show that myocarditis is characterized by myocardial infiltration of activated lymphocytes bearing the appropriate receptors.

Her optimism is based on earlier successes with Dr. Eisen using antibodies to T lymphocyte surface activation antigens for the noninvasive detection of cardiac transplant rejection in animals. Dr. Tanio and Dr. Eisen were able to detect cardiac allograft rejection in rats with 100% sensitivity and no false-positive results. That research was presented at a meeting of the American College of Cardiology in April 1992.

Dr. Tanio has established a model of myocarditis in mice using the encephalomyocarditis (EMC) virus. Other investigators have used such murine models of myocarditis to study potential therapeutic agents and methods of detection. Most researchers seeking improved diagnostic tests have focused on anti-myosin antibodies used to detect disruption of muscle cells, but investigators have reported a disappointing rate of false-positive results with this technique.

Since the infiltration of lymphocytes is a more significant feature of myocarditis than myocardial necrosis, Dr. Tanio says that immunoscintigraphy to show gathering lymphocytes would work better than imaging aimed at myosin. "With the anti-myosin approach, you're looking at consequences of the immune response, not the actual immune response to myocarditis," explains Dr. Eisen. For this reason he says the method used by Dr. Tanio promises to be more specific. He adds that he holds much confidence in Dr. Tanio, whom he describes as an "exceptionally bright" researcher with a promising future in academic medicine.

The SNM awards committee selected Dr. Tanio because of the originality of her proposal and its combination of powerful basic science with a tightly defined application to a challenging clinical problem, says committee chairman William J. MacIntyre, PhD, staff nuclear physicist in the department of nuclear medicine at the Cleveland Clinic Foundation, Ohio.

### Attracted to Heart Research

Dr. Tanio received her medical degree from the University of Pennsylvania School of Medicine in 1989 and began her residency in internal medicine at the University of Pennsylvania Hospital. She credits Dr. Eisen for introducing her to new ideas, carefully directing her research efforts in productive directions, and giving her access to the business of science—meetings and publications.

What attracted Dr. Tanio to heart research was the physiology and anatomy of the cardiovascular system, which she finds "intellectually fascinating." As a physician, she says she finds working in cardiology appealing because of opportunities "to intervene and really help patients" with defined and treatable ailments.

Dr. Tanio lives in Philadelphia with her husband Craig Tanio, MD, a fellow senior resident at the University of Pennsylvania whom she married in December 1991. She says she is seeking a faculty position at a large academic hospital, and to conduct cardiology research, particularly transplant cardiology and the molecular biology of heart disease. "I want research to be the focus of my career, but I also enjoy taking care of patients," she says. "I wanted to be a doctor since I was about two years old," she notes, "except for a year or two when I wanted to be a veterinarian."

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