

# Precision Medicine at The Cancer Institute of New Jersey

WORDS BY BARBARA HURLEY / PHOTOGRAPH BY ANDREW HANENBERG

**T**he 40 people gathered for the first Molecular Tumor Board meeting at The Cancer Institute of New Jersey last month were hoping for some answers. The group included a broad spectrum of cancer specialists joined by a four-some of molecular computational biologists and bioinformatics specialists recently recruited from Princeton's Institute for Advanced Study.

The new team is part of a major initiative at The Cancer Institute of New Jersey. Their charge is to collect and analyze patient data in the context of the biology of cancer. Scientists analyze how well a particular treatment worked on the specific mutations identified in the tumor of an individual patient.

"CINJ recognized the importance of bioinformatics," reports Lorna Rodriguez, MD/PhD, director of the precision medicine initiative. "We have a large, multi-disciplinary team here. Everyone has something important to contribute — scientists, clinicians, computational biologists." The objective is to facilitate the flow of data from researcher to doctor to patient and back again.

But here's what the group had come to hear at the Molecular Tumor Board. The patient's doctor presents the case: a brain tumor has metastasized to the bone. The tumor was analyzed and three "driver" mutations were identified. Identifying cancer "drivers" is a crucial first step toward individualizing a cancer patient's treatment according to the tumor's genetic signature. The goal is to decode the genetic background of a tumor and then treat the patient based on the specific mutation or mutations. For this patient, the systems biologists provided data on the drugs that worked on those mutations. The patient's treatment was changed to one of those drugs, and although early on, Rodriguez reports that the patient has started to respond.

Rodriguez is a good fit to lead the precision medicine initiative. As a PhD, she understands the science. She is also a clinician with a gynecological oncology specialty and a surgeon. Plus she has experience as an administrative leader managing people.

She sees what is happening at The Cancer Institute of New Jersey as "an amazing, magical success story." Yet she is realistic. "Science is often a rollercoaster," she notes. "There are valleys but there are also peaks, and we learn from failure as well as success."

In the search for answers to what causes the many diseases we now know as cancer, Institute Director Robert DiPaola is convinced that The Cancer Institute of New Jersey will play a pivotal role, growing in importance, size and presence throughout the state. Precision medicine has come here, ushered in by rapid advances in science and technology that have led to an enhanced understanding of the biology of cancer. "Technology allows gene sequencing that pinpoints tumor abnormalities," he explains. "This personalizes therapy by defining just what we should target in a specific patient."

At The Cancer Institute of New Jersey, the emphasis is on precision. "It's the whole process of understanding the individual and the individual mutation responsible for the cancer and developing therapies designed to counteract the mutation," he adds.

DiPaola is a Jersey boy who came back to his home state to witness and direct the growth of The Cancer Institute of New Jersey, New Jersey's only NCI-designated comprehensive cancer center. It's the "comprehensive" that he stresses. "Cancer care is complex," he emphasizes. "CINJ offers enormous advantages by giving patients access to the multi-disciplinary team. And with the link to research, patients get the latest and best drug therapies." His own research interests are rooted in a desire to find new pathways to target cancer cells and to understand the challenge of drug resistance.

Precision medicine offers intriguing answers and DiPaola is encouraged. He points to early trials of vaccines that heighten the immune system to attack specific protein in cancer cells, although larger studies are needed. He sees opportunities to engage industry to bring more rapid trials to the patients who need them most. He believes that individual genetics can lead to preventative strategies for those at high risk for cancer. And he knows that The Cancer Institute of New Jersey will continue to accelerate the translation of discoveries into treatments for the many patients throughout the state in need of the best options available. ■



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