

Finding *the* best chemotherapy *for* you

Imagine you're a cancer patient, about to discuss chemotherapy with your doctor. But first, the lab draws some blood. Now, imagine that simple act allows your oncologist to pinpoint what kind of chemotherapy you would respond to best – and rule out therapies that would do you no good.

Medicine isn't there yet. But it's closer, thanks to some groundbreaking work by Rebecca Fry, PhD, assistant professor of environmental sciences and engineering at the UNC Gillings School of Global Public Health.

"I'm very excited," says Fry, who began working on the project several years ago at the Massachusetts Institute of Technology. "No one has studied the response of healthy cells to these agents."

In addition to saving lives and avoiding the pain of ineffective chemo treatments, "it would mean you could save a lot of time and money... it's moving toward what we call individualized medicine," Fry says.

It's well known that some individuals respond better to chemo than others. Fry and her colleagues at MIT, where she was a research scientist until joining UNC last year, decided to find out just how different those responses could be and find ways to predict them.

They worked with 450 cell lines from healthy people, all from North America but with a wide variety of ancestries. Healthy cells were exposed to the carcinogen MNNG, a DNA-damaging agent found in cigarette smoke and certain chemotherapy compounds.

"Even given the same exposure, we saw a dramatic difference," Fry says. Those differences surprised even the researchers. "Some were resistant, some were sensitive, and some were in between."

From there, Fry and her colleagues determined that using the expression level (how

much the genes are turned on or turned off) in 48 genes, they could predict an individual's resistance to the compound with 96 percent accuracy.

"This kind of strategy could be used for different types of tumors and chemotherapy," says Fry, but notes that it likely will be several years before scientists will be able to move the research into a clinical setting and work with cancer patients.

Another benefit to the research is that it could help doctors predict who might be more sensitive to certain carcinogens in the environment. With that knowledge, Fry says, doctors might someday be able to warn individual patients they might be particularly susceptible to cancer from cigarette smoke or UV rays, for instance.

Fry's lab at UNC is now studying the effects of exposure to arsenic, a common environmental hazard in North Carolina and throughout the world. ■

– By Sylvia Adcock

