New technology spots drugs' early impact on cancer

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A new preclinical technology enables researchers to quickly determine if a particular treatment is effective against gastrointestinal stromal tumors (GISTs), providing a boost to animal research and possibly patient care, according to new findings presented by Fox Chase Cancer Center at the AACR Annual Meeting 2013 on Tuesday, April 9.

The advantage of the tool, explains study author Lori Rink, PhD, assistant research professor at Fox Chase, is that it tells researchers if a particular compound is killing tumor cells in mice as early as 24 hours after administering the compound—without waiting one week (or more) for an MRI to show the tumor has shrunk.

"This technology will help us quickly identify new drugs—or drug combinations—that are effective against these tumors," says Rink.

All of the mice in the study had GIST tumors implanted. In humans, GISTs originate throughout the gastrointestinal tract and can eventually become metastatic spreading to other parts of the body. Approximately 6,000 new cases are diagnosed each year in the U.S.

GISTs, unlike many other malignancies, are difficult to treat because they are totally resistant to traditional chemotherapy. For many years, the only option for patients was surgery to remove the tumor—with the hope that it would not reoccur. In 2001, a new era of targeted therapy emerged— beginning with imatinib mesylate, or Gleevec. Unfortunately, most patients eventually become resistant to the effects of available

targeted therapies.

To indentify new treatments, scientists try administering potential compounds to mice who have GISTs, then determine if the tumors shrink. But not all tumors shrink in response to therapy, Rink notes—with Gleevec, for instance, sometimes the tumors simply stop growing. While a CT or MRI scan may show the tumors haven't decreased in size, they would still be less likely to spread throughout the body.

In her study, Rink and her colleagues tried a new way to find out more quickly if therapies are working, that doesn't rely on waiting for the tumors to shrink—saving valuable time.

Instead, she and her colleagues injected treated mice with probes that light up when they hone in on dying cells. "Within 24 hours, we were able to determine whether the drug is killing cells in the tumor," says Rink.

The advantage of the technology, says Rink, is it enables researchers working with animals to quickly identify new drugs or drug combinations for GISTs that either shrink tumors, cause cell death, or both, which can then be tested further and eventually given to people. And if a regimen isn't working, researchers can immediately change dosages, or try new drugs or combinations of drugs, without waiting a week or more. "This study is proof of principle that we can use this technology in preclinical research," she says.

"The technology gives us important information not just on whether the treatment works, but also on how it works," adds Rink – "in this case, by causing an increase in cell death rates by particular mechanisms. This knowledge will help us combine the treatment with others in a rational way."

And even though the tool was tested in GISTs, it may also speed up the search for new drugs in other types of tumors, says Rink. "We expect that the technology might be applicable to any sort of tumor."

Provided by Fox Chase Cancer Center