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Many solid tumors carry genetic changes targeted by existing compounds

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Nearly two-thirds of solid tumors carry at least one mutation that may be targeted, or medicated, by an existing compound, according to new findings from researchers Fox Chase Cancer Center that will be presented at the 49th Annual Meeting of the American Society of Clinical Oncology on June 3. The results suggest that it may one day become commonplace for doctors to sequence tumors before deciding on a treatment regimen.

"Extended sequencing of a patient's tumor is not something that's routinely done now," says study author Patrick Boland, MD, a hematology/oncology fellow at Fox Chase. "Our ultimate hope is that, if we determine testing is worthwhile, it becomes routine for a doctor to send off a tumor sample to look for mutations before deciding on a course of treatment."

In some forms of cancer, such as lung cancer, doctors do check for a limited number of mutations. Mutations found with this focused testing only affect the treatment of a small proportion of patients. However, most tumors likely have many mutations, some of which may be targeted specifically by drugs already on the market, or under development.

To investigate, 77 patients with solid tumors—primarily inflammatory breast cancer and colon cancer— underwent genetic profiling looking for nearly 200 mutations associated with cancer. Boland and his co-author Alan Skarbnik reviewed the DNA sequencing to analyze the net results of testing and consider the potential impact on patient care.

Most of the patients—96%—carried one mutation or more. Nearly two-thirds had at least one mutation the researchers termed "actionable," meaning it is targeted by a drug that is on the market or in development. Many of the mutations were amplifications, in which multiple copies of a single gene were present, which ramps up its effect on the body.

Boland stresses that even though these genetic alterations are present, in many cases it's not clear which ones – if any – are driving the cancers. "Even if we find a [change], we don't know if it's something that's driving the tumor to grow, or something that just happened along the way." The results from this study highlight the need for more research to understand the basic biology of tumors, he notes. "We need our colleagues in the basic sciences to continue investigating the genetic underpinnings of cancer, so we can determine which mutations are most important to target."

The sequenced data was reviewed by the patients' doctors, and in some cases, they prescribed new medications that targeted the identified mutations. Even though patients had all tried—and failed—treatments in the past, some responded well to the new medicine, including one patient who has been on the treatment for at least 6 months.

A major limiting factor in sequencing all tumors, says Boland, is cost—the list price of the sequencing test used in the study, from the company Foundation Medicine, is nearly $6,000. "We hope that, once sequencing tumors becomes the standard of care, it will be routinely covered by insurance."

Indeed, genetic sequencing is getting more affordable, notes Boland. Once tumor DNA can be analyzed readily, doctors learn more regarding how to use that information to guide treatment, and patients get more access to medicines that target these mutations which may be beneficial. It may become commonplace for most doctors to sequence tumors

before deciding how to treat them. "The expectation is that, sometime soon, these kinds of tests will be done on a routine basis," predicts Boland. "We're not there yet."

Provided by Fox Chase Cancer Center