Gene trawl shows curing cancer harder than thought

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Reuters Photo: A strand of DNA is seen in an undated handout image. (National Institutes of Health/Handout/Reuters)

By Maggie Fox, Health and Science Editor
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WASHINGTON (Reuters) - Cancer experts who probed every gene in tumors from two of the hardest-to-treat cancers found that cancer is much more complicated than anyone thought -- and say they found why a cure is so unlikely after a tumor has spread.

But they also discovered a potential new way to treat a common and fatal form of brain cancer, and opened the door to finding cancer before it has spread, when it can still be cured surgically, they reported on Thursday in the journal Science.

"Cancer is very complex -- more complex than we had believed. It is not going to be easy to develop therapies," said Dr. Bert Vogelstein of Johns Hopkins University in Baltimore and the Howard Hughes Medical Institute.

"If you have 100 patients, you have 100 different diseases."

The findings suggest that popular new targeted therapies such as Novartis's Gleevec may not work broadly, because they affect only one mutated gene, while cancer is caused by dozens.

A better approach would be to find the pathways -- networks of genes -- that control a tumor's uncontrolled growth and spread, they told reporters in a telephone briefing.

The international team sequenced the more than 20,000 genes in cells from 24 patients with advanced pancreatic cancer and from 22 patients with glioblastoma multiforme.

The typical pancreatic tumor had 63 genetic mutations, while the average brain tumor had 60, they found.

The good news is they found just 12 pathways that were abnormal in most of the tumors. Some were in expected areas, such as the regulation of programmed cell suicide, or apoptosis, the process by which abnormal cells self-destruct.

COMMON PATHWAYS

"Often what appeared to be mutations in disparate genes turned out to be working in common pathways," said Dr. Kenneth Kinzler of Johns Hopkins, who worked on the study.

One surprising discovery was a new gene called IDH1 found in glioblastoma multiforme, the most common type of brain tumor and one that usually kills patients within a year, said Dr. Victor Velculescu, also of Hopkins.

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Massachusetts Sen. Edward Kennedy, 76, was diagnosed in May with this type of brain tumor.

The patients with these mutations were younger and lived longer than the typical brain tumor patient.

"Glioblastoma multiformes used to be thought of as one disease. It is now clear they are two," Velculescu told the briefing.

Vogelstein said the findings suggest that pharmaceutical companies should change their approach to developing new cancer drugs. While Gleevec, a pill, transformed the treatment of a blood cancer called chronic myeloid leukemia, "our work suggests that most solid tumors are really nothing like CML," Vogelstein said.

"It is extremely unlikely that drugs which target a single gene like Gleevec will be active against a major fraction of solid tumors. Instead of screening for drugs against single proteins, our work suggests that it may be more productive to screen for drugs that act against core pathways," Vogelstein said.

The findings also suggest better ways to screen for cancers, Vogelstein said.

"Our group as well as others have found that you can detect mutations outside of cells, just floating in the plasma, in virtually all patients with advanced colorectal cancer and about two-thirds of those with relatively early tumors," he said.

"It will be possible soon to detect them in many other samples from patients, say in their blood, even when the tumors are early. Almost all tumors and even those of the brain and pancreas would be curable if they are caught early."

(Editing by Julie Steenhuysen and Eric Beech)