Research holds promise for personalized lung cancer treatments

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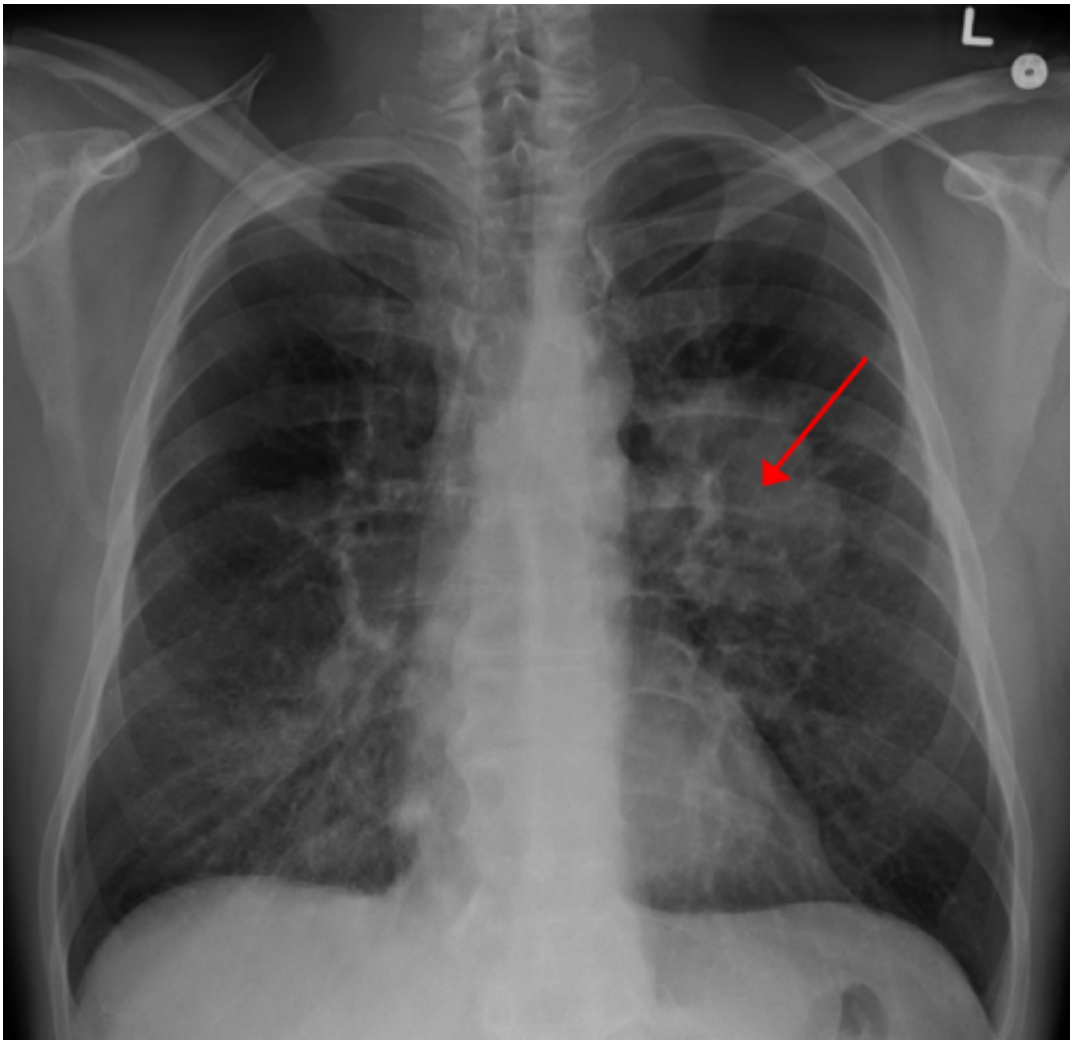

Lung CA seen on CXR. Credit: CC BY-SA 4.0 James Heilman, MD/Wikipedia

New research from scientists at Huntsman Cancer Institute (HCI) at the University of Utah uncovered distinct types of tumors within small cell lung cancer that look and act differently from one another. Scientists also identified a targeted drug combination that worked well with one specific tumor type. The study was published today in *Cancer Cell*. The findings suggest small cell lung cancer should not be treated as a uniform disease.

Trudy G. Oliver, PhD, an investigator at HCI and assistant professor in oncological sciences at the University of Utah, led the study. She says, "Currently when small cell lung cancer patients come in, there is no genetic testing for them. They're just diagnosed with small cell and they are all treated basically the same way. But our research showed small cell tumors do not all act alike. That becomes very important in how a patient is treated."

Using mice, Oliver's team created the first known replica of a small cell tumor subgroup called C-MYC. Researchers estimate this tumor makes up about one-fifth of patients with small cell lung cancer. As scientists studied these tumors, they began to see a pattern of distinct properties.

"The C-MYC tumors physically look different under the microscope," says Oliver. "They're much more aggressive. They grow faster and they spread faster. And most importantly, they respond differently to therapy."

Small cell lung cancer is traditionally treated with chemotherapy. Though the treatment starts out effective in about 80 percent of patients, tumors can quickly develop resistance to chemotherapy. Most drugs haven't proven successful. But until now, the drugs hadn't been tested on a live C-MYC model.

After HCI scientists analyzed the properties of the C-MYC tumor, they

collaborated with Martin Sos, PhD, at the University of Cologne, Germany to identify drugs that may work with this type of small cell tumor. Together they determined a drug called an Aurora kinase inhibitor improved outcomes for mice when combined with chemotherapy.

"The mice survive about twice as long," says Oliver. "We have some mice that really had extended survival. If these observations could be translated to people, this could be a significant breakthrough for patients with small cell lung cancer."

The findings might also help explain why drugs previously only worked for a small percentage of people.

"Historically when you would test a drug in small cell lung cancer, almost everything failed," says Oliver. "You'd maybe have 10 or 20 percent of people respond - and you didn't know why those did. So now that we have a new appreciation for the different molecular types of tumors, we might realize, 'Oh, 100 percent of this tumor subgroup actually responded - it just happened to be only 20 percent of the whole.'"

The study points to future targeted cancer treatment and suggests the importance of genetic testing for small cell lung cancer patients.

"We should be able to do molecular testing to say, 'You have this type of small cell versus this type,'" says Oliver. "That really matters because it's going to dictate which therapy you should get. We also need to find therapies that work specifically for each type of tumor."

Though this research dealt with lung cancer, scientists believe the results could impact other neuroendocrine tumors like brain, pancreatic, gastrointestinal or prostate cancers.

Small cell lung cancer causes about 30,000 U.S. deaths a year. The cancer is associated with smoking, but non-smokers with lung cancer can also develop small cell as a response to therapy.

More information: *Cancer Cell*DOI: 10.1016/j.ccell.2016.12.005 , www.cell.com/cancer-cell/fullt … 1535-6108(16)30600-6

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