Surgical iKnife Identifies Cancer Tissue

A surgical knife that doubles as a chemical probe can help surgeons distinguish between tumor and healthy tissue in the operating room (Sci Transl Med 2013;5:194ra93). The device, developed by researchers at Imperial College London in the UK and MediMass of Budapest, Hungary, couples an electrosurgical knife with a mass spectrometer.

The team creating the “iKnife” hopes surgeons eventually will use the tool to make sure they cut out as much cancerous tissue as possible while doing minimal damage to surrounding healthy tissue. Additionally, the chemical information gathered during surgery might supplement current diagnostics for cancer.

Tumors have different chemical signatures than healthy tissue. Analysis of these signatures via mass spectrometry could help cancer surgeons remove tumors but leave suitable margins of healthy tissue, providing a faster, more data-rich alternative to sending samples to a pathologist during surgery. The iKnife couples existing electrosurgical equipment with a technique known as rapid evaporative ionization mass spectrometry to provide analyses in near-real time.

Electrosurgery produces surgical “smoke” as a byproduct; these systems are already fitted with vents and exhaust systems to clear that smoke. The iKnife diverts it into the mass spectrometer for analysis. The system determines what kind of tissue is being cut by analyzing its lipodomic profile, and displays that information to a surgeon with a delay of about 0.7 seconds, says Jeremy Nicholson, PhD, professor of surgery and cancer at Imperial College London and one of the iKnife’s developers.

Nicholas Winograd, PhD, professor of chemistry at Pennsylvania State University at University Park, who specializes in applying mass spectrometry to image biological tissues, is excited about the results. He says the iKnife does a particularly good job with statistical analysis to make the call about what the chemical data mean, quickly, in a system that’s simple enough for doctors without years of chemistry training to adopt. “Getting mass spec into the operating room is a holy grail, and this has taken us closer to it,” he says.

Games Crowdsources Cancer Research

While you stand in line to pick up a latte or catch a bus this fall, you’ll also be able to help discover new treatments for cancer. In July, Cancer Research UK announced plans for GeneGame, a mobile phone game in which players identify genetic mutations associated with particular cancers. Set to debut in October, GeneGame is the latest gaming effort to tap into the collective intelligence of the public to tackle complex questions in cancer research.

“Games are built around motivation, around getting people to be engaged in a task,” says Andrew Su, PhD, of the Scripps Research Institute in La Jolla, CA. Although not directly involved in the Cancer Research UK initiative, Su has created numerous such “crowdsourcing” projects in biology. “If we
NOTED

- Myriad Genetics of Salt Lake City, UT, and other patent holders filed suit in July against Ambry Genetics of Aliso Viejo, CA, and Gene by Gene of Houston, TX, in U.S. District Court for the District of Utah, alleging infringement of claims covering cDNA and methods of use related to BRCA1 and BRCA2. The two firms added BRCA1 and BRCA2 testing to some test products following the U.S. Supreme Court ruling in June that struck down Myriad’s claims related to isolated DNA. Ambry Genetics filed an antitrust counterclaim against Myriad in August.

- The NIH reached an agreement with the family of Henrietta Lacks for controlled access by biomedical researchers to whole-genome data on HeLa cells originally created from Lacks’s tumor.

- An interim analysis of a phase III clinical trial showed that obinutuzumab (GA101; Genentech) plus chlorambucil offered significant improvement in progression-free survival over rituximab (Rituxan; Genentech and Biogen Idec) plus chlorambucil for people with previously untreated chronic lymphocytic leukemia.

- Cancer drugmakers Agios Pharmaceuticals of Cambridge, MA; bluebird bio, also of Cambridge; OncoMed Pharmaceuticals of Redwood City, CA; and Onconova Therapeutics of Newton, PA, all went public this summer. Foundation Medicine of Cambridge, which offers genomic tests, filed for an initial public offering in July.

- National Cancer Institute (NCI) researchers have carried out a comprehensive analysis of coding variants in the NCI-60 panel of cell lines identified by whole-exome sequencing, creating the world’s largest data set of cancer-related genetic variations (Cancer Res 2013;73:4372).

- In U.S. women diagnosed with breast cancer between 1991 and 2005, the survival gap between blacks and whites persists (JAMA 2013;310:389–97). Researchers suggested that patients’ condition at diagnosis, not subsequent treatment, largely accounts for the differences.

- Survival rates for patients with HIV-associated lymphoma have not improved in the United States since the adoption of antiretroviral therapies (JNCI 2013 Jul 26, [Epub ahead of print]).

By the Numbers

Trends in Cancer Drug Spending

Although spending on medicines in the United States declined by 3.5% from 2011 to 2012, spending on oncology drugs continued to rise, with more money spent on these drugs than any other type. According to a report from the IMS Institute for Healthcare Informatics in Parsippany, NJ, spending on oncology drugs increased from $24 billion in 2011 to $25.9 billion in 2012. The increase was driven by spending on targeted therapies, as sales of hormonal agents and cytotoxic chemotherapies both declined slightly. Data reflect the invoice prices paid to wholesalers and pharmaceutical companies.

For more news on cancer research, visit Cancer Discovery online at http://CDnews.aacrjournals.org.
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