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Getting down to details: Scientist builds imager that identifies, locates individual cancer cells

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Dave Wilson was dissatisfied with blurry, low-sensitivity optical images of diseased tissues. So, four years ago he set out to create a better imager.

Now, Wilson, a professor of biomedical engineering at Case Western Reserve University, can identify a single cancer cell in preclinical imaging studies. And he can pinpoint exactly where the cell is located in a three-dimensional image.

Called cryo-imaging, the system enables Wilson and collaborators to identify single molecules, count the number of cells in an organ, compare a normal heart to an abnormal heart and more. The incredibly detailed images can show the effectiveness of different drug therapies, gene therapies and cellular therapies in preclinical testing, Wilson said.

The cryo-imaging system literally disassembles real tissue layer by layer then reassembles the details into a cyber model.

"You can't meet this resolution from outside the body," Wilson said.

In a paper published in the *Annals of Biomedical Engineering*, Wilson and co-authors describe cryo-imaging and the extensive software they wrote to enable them to zero in on single cells.

The images are in color, which provides more detail than the gray scale used in other devices, such as Magnetic Resonance Imaging, he said.

In this specific model, the software assembled images of the internal organs, showing the location of individual metastatic cancer cells in the adrenal gland.

If you're only interested in the central nervous system, the vascular system or something less than a complete specimen, the imager has the capability of giving you exactly what you want, Wilson said. As the computer assembles the images, it sends text message updates to researchers.

James Basilion, an associate professor of radiology and biomedical engineering at Case Western Reserve, did not work on Wilson's imager but has seen the results.

"This device provides superb resolution and sensitivity to identify fluorogenic compounds or cells virtually anywhere within a specimen," Basilion said. "No longer do we need to 'guess' which cells are taking up agents from radiological biodistribution studies. We now can visualize them."

Wilson launched his research with a Third Frontier grant from the state of Ohio. As he made progress, he was funded with about $1.5 million in grants from the National Institutes of Health. He has founded a start-up company, called BioInVision Inc., in Mayfield Village, Ohio, to commercialize the imaging system.

Source: Case Western Reserve University (news : web)