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Medica 2014: HistoIndex brings stain-free, 3-D digital pathology to the lab

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DÜSSELDORF, Germany — "Who can remember how we worked without smartphones? [Digital pathology](#) is going to bring the same revolution to clinical diagnosis with smart instruments and we are at the center of what is going to happen," said Gideon Ho, the CEO and a co-founder of Singapore-based [HistoIndex](#).

The company is the first to develop a commercial model for a laser-based, multiphoton imaging system for tissue diagnostic that eliminates the time-consuming process of staining samples.

Staining tissue samples is essential for providing contrast that can spotlight features such as tumors for pathologists looking through a traditional light microscopes.

Eliminating the time and cost of staining slide samples alone revolutionizes lab analytics, but like a smartphone, the compact desktop Genesis 200 instrument from HistoIndex is loaded with capabilities that accelerate the workflow, enhance diagnostic quality, and ultimately benefit patients.

"After a biopsy there is a patient in a hospital bed, and instead of waiting a couple days to know how to treat this patient, we can deliver results while the patient is still in the hospital," said Ho.

"It's phenomenal, a paradigm change that will disrupt a lot of things," he said.

After loading a biological specimen on the Genesis instrument the operation is fully automated from scanning to image processing and even analysis.

The technology at the heart of the Genesis platform is two-photon excitation fluorescence using a femtosecond laser that results in the emission of a photon that passes through a crystal and then a prism to generate a second-harmonic wave.

The non-linear, dual-channel imaging technique results in a high resolution image that maps tissue samples and enables fine measurements in three dimensions.

This 3-D visualization of bulk samples represents another revolution for tissue diagnosis enabling an examination of morphology to a depth of 300 micrometers, features that are usually lost when samples are thinly sliced for microscope slide preparation.

The digital capture also enables computerized assistance for quantification, eliminating inter- and intra-observer inconsistency.

Uploading data sets to the cloud brings the full power of the digital revolution to tissue diagnostics creating the possibility to share and compare results.

"Everything is going up to the cloud and connecting, bringing us closer to integrated diagnostics, the potential for combining test results for a fuller -omic view of the patient using proteomics, in our case, with next-generation genomic sequencing," said Ho.

The Genesis 200 is approved for commercialization with a CE mark, though the strategic focus is on research centers rather than high-throughput labs.

Full commercialization of the technology will come in 2015 with a new instrument, the Laennec, combined with the FibroIndex software and connecting to the Liver Cloud.

The Laennec analyzer is currently in the regulatory approval process "everywhere," said Ho.

Follow-on products for the Genesis platform will see the introduction of multi-modular, multi-organ imaging capabilities to expand the HistoIndex footprint in the lab for tissue analysis.

A next-generation product in development aims to apply the proprietary technology to endoscopic imaging to enable in vivo clinical diagnosis with virtual biopsy.

Created in 2010, HistoIndex currently generates almost \$3 million in revenue on sales of instruments and consumables to research centers.

Ho said he expects to close a Series A financing round in January, 2015 and that within two years after that he hopes to see the company launch an initial public offering on the Singapore stock exchange. //

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