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New Cell Type Identification Procedure is More Accurate and Provides More Information than Current Procedures

RICHMOND, Virginia – (date) –

A Virginia Commonwealth University researcher has developed a procedure for identifying the four primary cell types in a forensic biological tissue sample – saliva, epidermal, vaginal, and blood – that may soon change how cell types are identified in samples across numerous industries.

According to VCU researcher, Christopher Ehrhardt, Ph.D., current techniques for establishing cell types in biological samples are quite flawed. They're mostly based on microchemical reactions and/or genetic markers, both of which are prone to false negatives and false positives.

"The information is often inaccurate," says Ehrhardt. "And when using those other methods, you either need a large sample, or you have to be prepared for the cell typing technique to consume part of the sample. Either way, you end up decreasing the value of it."

Ehrhardt's procedure begins by taking microscopic images of the individual cells at multiple fluorescent wavelengths. A number of measurements are then made and applied to machine learning algorithms to correlate those measurements with the cell type.

"This new procedure," says Ehrhardt, "can be used to determine the number of contributors in a sample, as well as the phenotypic attributes, like age, sex, and so forth. And the best part is that identification accuracy is better than 90%."

Brent Fagg, VCU Technology Manager, says forensic laboratories can use this new procedure to improve the efficiency of their testing.

"Current forensic testing methods," says Fagg, "are time consuming, destructive to samples, and unable to determine the abundance of cell types in a sample. Using our new procedure, labs will be able to analyze dry samples in a quick and non-destructive manner. And with much better results."

Fagg says that forensic analysis is just one possible application for this new procedure. It can also be used in areas like pharmaceutical and healthcare, and even to monitor the spread of disease.

"There are a number of industries that could benefit from this new cell type identification procedure," says Fagg. "And adopting this technique couldn't be easier, as it uses standard lab equipment."

About VCU and the Cell Type Identification Procedure

This new procedure was developed by researcher, Christopher Ehrhardt, Ph.D., and the Forensic Science Department at Virginia Commonwealth University. VCU's cell imaging algorithm supports DNA profiling, can separate cells from multiple donors, and reduces sample processing time. It can be used for forensic analysis, and in numerous pharmaceutical and healthcare applications.

Research Link:
https://www.biorxiv.org/content/early/2018/01/23/245159.article-metrics