New test could estimate age of crime suspects from bloodstains

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A new test can estimate crime suspects' or missing people's ages to an accuracy of nine years based on bloodstains at a crime scene, scientists report.

"Human age can be estimated from blood with reasonable accuracy using a simple, robust, and sensitive test assay," said Manfred Kayser of the Erasmus MC University Medical Center Rotterdam in the Netherlands, one of the developers. "Our method is applicable in situations where only bloodstains are available, which covers a large proportion of crime cases."

In principle, the technique could be put to immediate use by law enforcement, say the researchers, who report their findings in the Nov. 23 issue of the journal *Current Biology*. They have begun a required validation of the test, designed to ensure quality standards are met.

The method will be especially useful in cases in which age information is important to provide leads, Kayser added. Existing methods for age estimation have limited use for crime investigation, he said, because they depend on the availability of teeth, bones, or other identifiable body parts.

The new method takes advantage of a feature of immune cells known as T cells. These play a key role in recognizing foreign invaders, an ability that depends on a structures on the cellular surfaces called T cell receptors. Each receptor matches specific molecules derived from bacteria, viruses, parasites, or malignant cells. That diversity of receptors is achieved through a specific rearrangement of the T cells' DNA, a process that produces small circular DNA molecules as a by-product.

The number of those circular DNA molecules, known as signal joint TCR excision circles, declines at a constant rate with age. The new test measures the concentrations of these circles "in the total DNA extracted from a small blood sample and use a reference gene not affected by age to compensate for the total amount of DNA in the sample," Kayser explained.

Kayser said the test is at least as accurate as any test designed to estimate a human trait from DNA information. Its prediction accuracies are comparable to or better than those recently demonstrated for predicting brown versus blue eye color from DNA, a test that has already been put to forensic use, he added.

The new techniques may be harbingers of what's to come as researchers uncover new methods to reconstruct the appearance of unknown persons from crime scene

samples. Conventional DNA profiling “can only identify persons already known” to investigators, Kayser said.