

New screening method can detect a range of clinical conditions from a single dried blood spot

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Scientists have developed a rapid method that can be used to simultaneously screen patients for a range of genetic and acquired clinical conditions from a single dried blood spot.

The test uses a highly sensitive and specific technique, known as mass spectrometry, to simultaneously analyse proteins, enzymes and metabolites in the blood, without the need for the large liquid blood samples currently used. Collection of dried blood spots is less invasive for patients and the costs and biohazards associated with sample transport, processing and storage are minimised.

Researchers at King's College London, together with clinicians from Guy's and St Thomas' NHS Foundation Trust, as part of King's Health Partners Academic Health Sciences Centre, have built on their innovative approaches to dried blood spot screening for inherited [metabolic disease](#) and sickle cell disease in newborn babies. This approach can now be used in the early detection and clinical monitoring of [chronic health problems](#), including kidney and heart disease and diabetes.

King's has today officially launched a spin-out company, SpotOn Clinical Diagnostics Ltd, to provide both analytical services and technical support for other clinical laboratories, many of which already have appropriate [mass spectrometry](#) instrumentation, to offer this new

method.

Requiring only a drop of blood from a simple finger-prick, or heel-prick in newborns, this new blood spot analysis method has many potential applications:

- The method is faster, more specific, and cheaper than the methods currently used to screen all 750,000 babies born each year in the UK for sickle cell disease and other clinically significant haemoglobinopathies (abnormalities in [haemoglobin](#) within the blood). The current methods for ante-natal screening for sickle cell disease and thalassaemia require fresh liquid blood samples, which are more expensive to process, store and transport.
- The method has already been successfully used to provide rapid diagnosis of a comprehensive range of inherited metabolic diseases in acutely ill children admitted to intensive care with life-threatening symptoms.
- Pre-symptomatic screening for chronic health problems will introduce personalised clinical diagnostics and cost-effective early detection and monitoring of diabetes and kidney and heart disease.

Dried urine spots can also be used for the very early detection of kidney disease, particularly in patients with a high risk of developing renal complications, for example patients with type 1 or type 2 diabetes.

The test works by converting proteins to peptides and then using a mass spectrometer to select and accurately measure diagnostic metabolites and/or peptides. Liquid blood and urine samples can also be screened using the method.

Compared with conventional clinical laboratory diagnostics the major advantages of the new method are that the measurements for proteins and metabolites can be done simultaneously with both high accuracy and sensitivity. Dried [blood](#) spots and/or dried urine spots offer significant cost savings in the logistics of sample collection, transport to the laboratory, sample processing, and storage.

Neil Dalton, Professor of Paediatric Biochemistry at King's, and co-founder of SpotOn, said: "The lessons we have learned from universal pre-symptomatic screening of newborn babies using dried [blood spots](#) can now be cost-effectively applied to provide a personalised medicine approach to the early diagnosis and clinical monitoring of major chronic health problems like diabetes and kidney and heart disease."

Provided by King's College London

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