

Therapeutic Drug Monitoring through Tiny Dried Blood Spots

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Dried blood spot testing for large populations, which involves the use of capillary blood collected from the heel or finger to screen for metabolic diseases, was introduced more than half a century ago. The technique's advantage is that it only requires a tiny drop of blood from a prick with a lancet, which can be particularly useful when screening newborn children. Samples can also be collected by caregivers and posted to distant laboratories for analysis. However, it was only recently that the technique became useful in therapeutic drug monitoring with the affordability of sensitive and specific mass spectrometers.

Prof Paul Ho and his research group became aware of using dried blood spot testing in this new way through participation in a study conducted by Prof James McElnay of Queen's University. They used the method to evaluate the adherence of children with epilepsy to prescribed antiepileptic drugs, with the findings published in *Epilepsia* during 2013. Prof Ho and his graduate student Kong Sing Teang then extended the use of the technique to the metabolomic profiling of diseases with gas chromatography-mass spectrometry (GC-MS), which has the advantages of high separating power and sensitivity. Their analytical approach was published in *Analytical Chemistry*, and subsequently featured in *Bioanalysis Zone*. It is currently being applied in preclinical and clinical studies, with the ultimate aim of application in pharmacokinetic and pharmacometabolomic studies of large populations.

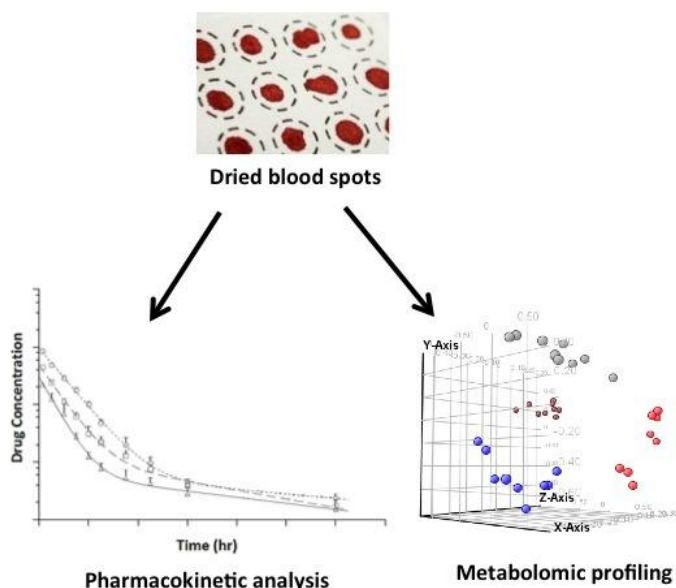


Figure 1. Application of dried blood spots for pharmacokinetic analysis and metabolomic profiling.

Publications:

Shah, N.M., Hawwa, A.F., Miller, J.S., Collier, P.S., Ho, P.C., Tan, M.L., Peake, D., Tirupathi, S., Bothwell, J., Bailie N., Shepherd C., Craig J., McElnay, J.C., Adherence to antiepileptic medicines in children: A multiple methods assessment involving dried blood spot sampling. *Epilepsia* 54(6), 1020-1027 (2013).

Kong, S.T., Lin, H.S., Ching, J.H., and Ho, P.C., Evaluation of dried blood spots as sample matrix for gas chromatography/mass spectrometry based metabolomics profiling. *Analytical Chemistry* 83, 4314-4318 (2011).