

## Isolation of Cell-Free Tumour DNA from Peripheral Blood: A Method Development Study in Patients with Neuroendocrine Tumours

*Rhiannon White*  
*University of Warwick*

### Background

The presence of cell-free genetic material (cfDNA) circulating freely in the blood has a range of potential clinical uses, particularly in the diagnosis and management of a range of cancers. However, there currently exists no standardised and validated method of extracting and analysing this cfDNA from peripheral blood samples, and it is unclear to what extent the various methods that are commercially available are appropriate for use in a non-specialist clinical laboratory setting. This study aimed to compare a range of commercially available DNA isolation kits (Maxwell, QIA and MagMAX), and evaluate their efficacy and appropriateness for use in a non-specialist lab.

### Methods

Plasma samples from seven patients with Neuroendocrine tumours were used to extract cfDNA using each of three different isolation kits. The isolated products were then evaluated in terms of the quantity of cfDNA, as well as the presence of specific mutations known to be present in some Neuroendocrine tumours, as a proxy of the quality of extracted cfDNA.

### Results

Using cfDNA quantity as a measure of kit efficiency, it was found that the Maxwell was the most efficient in cfDNA isolation, followed by the QIA, with MagMAX found to be the least efficient kit. In terms of appropriateness, the Maxwell was the most straightforward method, with QIA and MagMAX having the advantage of being able to process a large volume of sample. The QIA had the added advantage of lowest cost per sample, and fastest total running time.

### Key Messages

Effective cfDNA isolation is possible in a non-specialist setting, with the optimal kit dependent on the value a laboratory places on factors such as efficiency, time and cost.

