# Method for the production of Tissue Microarrays and An Accurate Sample Cutter

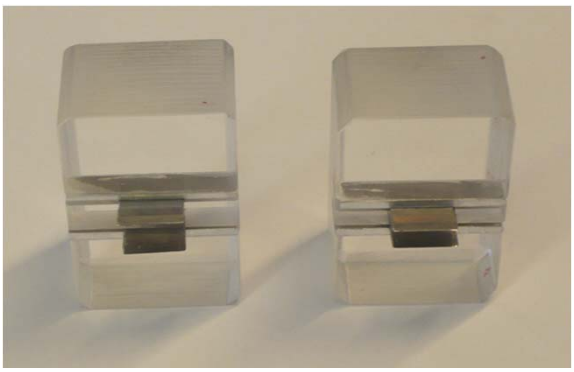
- Method for producing tissue microarrays from needle biopsies allowing a high sample density to be achieved while imposing order on the positions of the samples
- Cutter allows for uniform samples to be cut precisely and speedily from needle biopsy specimens
- Cutter facilitates correct alignment and positioning of tissue within a sample.

**Background**

Histopathological examination of formalin fixed needle biopsies are needed for the diagnosis of many different types of cancer. However with the limited amount of material this produces there is an urgent need for methods that allow the high-throughput analysis of these samples so that immunohistochemical staining and fluorescence in situ hybridisation analsysis can be performed. Dr Sameer Jhavar of the ICR developed the first biopsy tissue microarray by fixing needle biopsies horizontally on the surface of a paraffin wax block so that lengthwise slices of the entire biopsy specimen could be taken for diagnostic examination. The samples are then repositioned in a vertical orientation so that approximately 70 4µm-thick sections from each biopsy can be made available for examination. In comparison only a few sections were available from horizontally embedded specimens. However this method is precarious to perform and has orientation issues for identifying specimens which limits the number of specimens per array block and reduces the prognostic information that can be achieved.

**Development**

A new superior method for producing the tissue arrays has been developed and tested using prostate needle biopsy specimens. A team at the ICR lead by Professor Colin Cooper have developed a rubber mould with three troughs of differing sizes and an aluminium mould base suitable for a tissue microarray. Use of the rubber mould allows easy orientation and identification of the samples. They also developed a new cutting system which comprises a Perspex block containing two parallel blades with fixed distance between the blades (see image).



The cutting device makes cutting of the tissue much easier and quicker and allows more uniformity of the samples. More uniformity means it is possible to have denser arrays. They have also produced standard operating procedures. The experiment showed that the construction of biopsy tissue microarrays provides an effective method for the multiplex analysis of immunohistochemical and fluorescence markers. In the future it is critical that the number of specimens produced allows multiplex analysis of biomarkers as it is likely to be the analysis of a combination of markers rather than of a single marker that will provide the best prognostic information.

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**Inventors**

Professor Colin Cooper is the principal scientist leading the work at the ICR. He is a Professor of Molecular Biology and Chairman of the Section of Molecular Carcinogenesis. The other key inventor is Ms Anne Fletcher who ran the ICR Tissue Resource Lab building. The current work follows on from that developed by Dr Sameer Jhavar also of the ICR.

**Key Publications**

F McCarthy et al. "An improved method for constructing tissue microarrays from prostate needle biopsy specimens," Journal of Clinical Pathology (2009) 62, 694-698.

S Jhavar et al. "Construction of tissue microarrays from prostate needle biopsy specimens," British J. Of Cancer (2005) 93, 478-482.

**Commercial Opportunity**

The ICR is seeking a commercial partner to collaborate with the team at the ICR to develop a commercial product. The partner would receive exclusive commercialisation rights to the technology.

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The ROYAL MARSDEN NHS Foundation Trust

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