

# Histopathology and *In Situ* Hybridisation

[www.cambridgecancer.org.uk/research/coreresources/histopathology\\_ish](http://www.cambridgecancer.org.uk/research/coreresources/histopathology_ish)



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The Histopathology/ISH core facility at the Cambridge Research Institute is run with a central theme of high throughput and automation. We offer a full range of histological techniques, immunohistochemistry, *in situ* hybridisation, laser capture microdissection as well as automatic slide digitisation and analysis.

### Histology

The facility is able to process, embed and section human and animal tissues or cell lines into frozen, paraffin or resin formats and stain these with the standard haematoxylin and eosin (H&E) or routine special stains, such as Masson's Trichrome or Periodic-Acid-Schiff, as requested by the researcher. Sectioning of tissue blocks can be performed using one of the two cryomicrotomes or five paraffin microtomes. The construction of tissue microarrays (TMAs) is an important feature of the facility and using our Beecher Manual Arrayer, we have created six arrays this year, including 280 core (Figure 1a) and 470 core arrays of adenocarcinoma. In the coming year, we will continue to research into using arrays for routine immunohistochemistry work-up.

### Immunohistochemistry (IHC)

The facility has two Vision Biosystems BondMax autostainers for performing fully automated IHC. These systems are highly standardised and will complete an IHC run within four hours. Any antibody can be requested for work-up and will then be offered out as a routine service to other researchers in the building. We have added a further 54 antibodies to our routine panel this year, including the staining of Pax-2 for the Carroll laboratory (Hurtado et al., *Nature*, 2008; 456:663) (Figure 1b), making a total of 94 antibodies worked up for routine use. We aim to be offering routine fluorescent dual

staining methods and tyramine amplification next year.

### *In situ* hybridisation

We are currently performing radioactive ISH using  $S^{35}$ -labelled riboprobes. We are very happy to advise in the design of probes to our specifications and will run all ISH staining for the individual researchers. During the last three months we have started to develop non-radioactive methods for DIG-labelled ISH using tyramine amplification and will continue this with the aim to automate on the BondMax autostainers.

### Digitisation and analysis

The facility has two automated systems for digitisation, the Applied Imaging Ariol SL-50 for scanning of slides for analysis, fluorescence and TMAs, and the Aperio XT for fast scanning of H&E slides. Each slide scanning system is connected to 15 terabytes of data storage space, with the Ariol having an additional four processor farm for high throughput batch analysis. To date, the Ariol system has collected 7 TB of data for analysis and the Aperio holds an additional 800

GB. Current analyses being used include nuclear proliferation with Ki-67 or BrdU, percent ER/PR positivity and fluorescence intensity. Our goal over the coming year is to improve upon the use of the systems for HER-2 and cytoplasmic marker analysis.

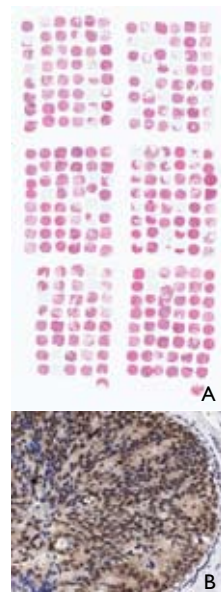


Figure 1. (a) Tissue Microarray of human adenocarcinoma. Each individual circle represents a piece of tissue taken from a tumour block. (b) Human breast cancer stained with an antibody to Pax-2. The nuclei of positive cells are stained brown.

Publications listed on page 63

\*Joined during 2008 †Left during 2008