

NanoZoomer Application Note #4

Tissue Microarray and Image Analysis Unit Division of Cancer Sciences and Molecular Pathology, Glasgow University

In 2008 the Unit purchased a NanoZoomer HT slide scanning system and fluorescence illumination option together with image archiving and analysis software. The purchase was made possible thanks to Think Pink Scotland which is a charity dedicated to raising awareness and funds towards breast cancer research in the west of Scotland.

Clare Orange, who is the TMA and Image Analysis Unit Manager, commented "the NanoZoomer HT offers high throughput digitisation of brightfield and fluorescence stained slides with z-stack focusing and superb image quality and has enormous potential to improve turnaround times for research applications and increase output of results". The digital slides are archived on a dedicated server which can be accessed via the internet so slides and associated data can be accessed remotely to facilitate national and international collaborations.

Education and Training

Digital slides have been created for use within a quality assurance scheme and for the establishment of a pathology teaching archive. The use of digital slides from which identical copies can be made ensures everyone participating in the scheme can view the same images, making the scheme more interactive and also reducing resource costs. All users can annotate and comment on the sections and no loss of cellular detail occurs as the tissue block is used up. The system has been used within paediatric pathology to scan slides for a national training day and to create an educational package in lung pathology for trainee pathologists. Scanned images have also been used for a year one dedicated training programme for pathologists and has been used for a training booklet. Teaching slides are a valuable resource which since changes to the Human Tissue Act have become increasingly difficult to obtain and maintain. By digitising the slides currently available it is possible to extend the lifespan of this important teaching resource.

Diagnosis

An audit is being carried out which involves 500 cases of Her2 reporting in breast cancer which looks at the effectiveness of semi-automated reading of scanned, immunostained sections. If this is successful the system could save time for pathologists and improve turn-around-times for diagnosis.



Breast Cancer Research

The Institute of Cancer Sciences has been one of the main users of the unit which has constructed 3 breast cancer arrays and 3 prostate cancer arrays for the Institute. By using the TMAs in their research the cost and time associated with immunohistochemistry (IHC) and fluorescence in-situ hybridisation (FISH) based studies has been reduced dramatically. The NanoZoomer and image analysis software have been used to digitise slides and score the tissue to considerably increase the output of results.

Torsten Stein from the Institute of Cancer Sciences, Pathology, highlighted the benefits of the NanoZoomer; "the slide scanner allows me to share data easily and quickly with other scientists and to prepare images for presentations and publications. It has further allowed me to analyse IHC results in my own time from my own computer which has made it easier, faster and much more convenient. The system has been a great help to my work and for the maintenance of collaborations."

Collaboration with the Beatson Institute

The institute of Cancer Sciences has strong links with the Beatson Institute which carries out a programme of world-class science directed at understanding key aspects of cancer cell behaviour.

Using the NanoZoomer, the TMA and Image Analysis Unit has facilitated research in the investigation of cancers of the skin, colorectal cancer, prostate cancer, melanomas, colon cancer, breast cancer, pancreatic cancers and bone disorders.

Other Users in the NHS and Glasgow University

The Hamamatsu and Slidepath system has been used in a number of MSc and PhD projects relevant to cancer research and an investigation into the effect of obesity on histological changes in the gastroesophageal junction. In conclusion; The NanoZoomer slide scanning system has become an important core facility in the Unit and is being used for a multitude of applications.

