

# Histopathology: Advances in research and techniques

(Formerly the Improving Immunohistochemistry annual meeting)

Institute of Child Health, London, UK : Friday, 15 April 2011

*This is the 8<sup>th</sup> Annual event (originally called Improving Immunohistochemistry) and is the flagship meeting for Euroscicon. Held in the centre of London this meeting draws together international experts to discuss the need for technical-based updates in the areas of immunohistochemistry, clinical and research based histopathology and in situ hybridisation. This meeting gathers together workings from clinical, academic and pharmaceutical organisations. We expect our 2011 event to be the most informative to date.*

We include a troubleshooting panel session in this event, so that delegates can discuss their work directly with a panel of experts.

This event has CPD accreditation and is also linked to our Improving Immunohistochemistry workshop which will occur later in the year

Meeting Chair: *Dr Will Howat*, Cambridge Research Institute, Cancer Research UK

- 9:00 – 9:45      **Registration**
- 9:45 – 10:00    **Introduction by the Chair:** *Dr Will Howat*, Cambridge Research Institute, Cancer Research UK
- 10:00 – 10:30    **Tissue Cross-Reactivity at HLS**  
*Jo Mitchell*, Huntingdon Life Sciences, UK  
This presentation will provide a general overview of the activities carried out by the SPS department at HLS, a general overview of tissue cross-reactivity studies, how they are conducted at HLS specifically and what challenges are faced along the way.
- 10:30 – 10:45    **Digital Pathology: Services to support tissue research and biomarker discovery**  
*Professor Peter Hamilton*, IPath Diagnostics, Belfast, Ireland  
Digital Pathology is transforming tissue based research for biomarker evaluation, drug discovery and stratified medicine. i-Path have established a high performance web-based infrastructure and extensive software services, supporting a wide range of tissue-based research applications. Using PathXL™, researchers can store whole slide scans to a cloud-based high performance server cluster. Feature rich viewing software and a powerful administrative interface allows configuration of research and pathology networks for digital slide sharing and remote analysis. Fully web-enabled PathXL TMA software provides unique management and evaluation tools for remote tissue biomarker assessment and centralised collation of IHC/FISH scores. I-Path provides high throughput image analysis of high volume tissue samples for tumour sufficiency and IHC biomarker quantitation. i-Path enables researchers in academic and commercial organisations to access the benefits of digital pathology in a more cost-effective and reliable fashion.
- 10:45 – 11:15    **Quantum Dots Light up Pathology**  
*Dr Richard Byers*, University of Manchester, UK  
Quantum dots are novel nanocrystal fluorophores with extremely high fluorescence efficiency and minimal photobleaching. Their unique optical properties make them near perfect fluorescent markers and there has recently been rapid development of their use for bioimaging. QDs can be conjugated to a wide range of biological targets, including proteins, antibodies, and nucleic acid probes, rendering them of particular interest to pathology researchers. They have been used in multiplex immunohistochemistry and in situ hybridisation, which when combined with multispectral imaging, has enabled quantitative measurement of gene expression in situ.
- 11:15 – 11:40    **Speakers' photo then mid-morning break and trade show**
- 11:40 – 11:55    **Developing the next generation of 3DHistech Scanners"**  
*Viktor Varga*, 3DHistech, UK
- 11:55 – 12:25    **Creation of a human protein atlas**  
*Mrs IngMarie Olsson*, HPR/Uppsala University, Sweden  
Completion of the human genome has opened up a possibility for global expression profiling of human tissues, allowing for comparative studies between normal and disease tissues. Recombinant protein fragments (PrESTs) were used as immunogens to generate antibodies. Analysis of protein expression patterns was performed on normal and cancer tissue and cell microarrays containing >700 spots. A comprehensive, antibody-based protein atlas has been created ([www.proteinatlas.org](http://www.proteinatlas.org)). The database contains images and data from protein profiling of over 13,000 antibodies corresponding to more than 50% of the human genome. We believe that the presented approach combining immunohistochemistry and tissue microarray technology can be used as an effective strategy to identify and evaluate novel biomarkers.

- 12:25–13:35 **Innovation in Personalised Health Care**  
*Dr Mary Padilla, Roche Tissue Diagnostics, UK*
- 12:35–13:30 **Lunch and trade show**
- 13:30 – 14:30 **Question and Answer Session**  
Delegates will be asked to submit questions to a panel of experts. Questions can be submitted before the event or on the day
- 14:30 – 14:45 **The Leica HER2 FISH System - enhancing laboratory workflow**  
*Sarah Barnett, Leica Microsystems (UK) Ltd*  
The talk will provide an introduction to the NEW Leica HER2 FISH System, due to be launched in Europe in April. The Leica HER2 FISH System is a fully automated kit that combines the use of PathVysion® HER2 FISH probes, supplied by Abbott Molecular Inc, with Leica's BOND automated platform for the assessment of HER2 gene status in breast cancer tissue. This fully automated system uses an optimised ready-to-use Leica HER2 FISH reagent kit with a robust BOND protocol to produce consistent, high quality stained slides and enhance the laboratory workflow.
- 14:45 – 15:15 **Observations on Dual Immunohistochemistry at both the Light and Electron Microscope Level**  
*Mike Shires, Leeds Institute of Molecular Medicine, UK*  
Immunoelectron microscopy (IEM) was facilitated by the introduction of commercially available beam stable acrylic resins and antibody conjugated gold nano-particles in the 1980's. The technique has gradually developed from using single antibody to dual antibody labelling and silver enhancement. The benefits and limitations of IEM on acrylic resins will be discussed. A more recent return to light microscope (LM) based immunohistochemistry and the use of dual chromogens has permitted the visualisation of multiple targets within the same section. Imaging techniques and digital analysis on both EM and LM sections will also be presented
- 15:15– 15:45 **Afternoon Tea/Coffee and trade show**
- 15:45 – 16:00 **Using TMA Lab data management to accelerate biomarker research**  
*Dr Jacqueline Aÿ, Aperio, Oxford, UK*  
Aperio is digitizing histopathology with its award-winning ScanScope whole-slide scanning systems, Spectrum Plus image and information management software, and whole-slide image analysis toolbox. The Spectrum Plus TMA Lab module is a powerful software module for managing tissue microarray (TMA) images, data and image analysis. In this presentation, Dr. Aÿ will discuss how TMA Lab facilitates auto-segmentation of TMA spots into individual images, side-by-side viewing of serial TMA spots stained with different antibodies, linking of TMA core images with tissue specimen data, and server-side image analysis of individual spots.
- 16:00 – 16:30 **Ensuring and Improving Quality of tissue samples collected for research: A Biobanking Case Study**  
*Mr. Garry Ashton, Paterson Institute for Cancer Research, Leeds University, UK*  
The presentation will focus on the groups biobanking activities. Following a general introduction and a breakdown of the numbers and types of samples collected, I will focus on how we ensure and assess the quality of samples our samples ensuring they are fit for purpose
- 16:30 - 17:00 **Expression of Immunohistochemical Markers in Ductal Carcinoma In Situ of the Breast**  
*John Brown, Kings College, London*  
Ductal carcinoma in situ (DCIS) of the breast displays a wide heterogeneity, from low grade indolent lesions to highly aggressive entities. Classification of DCIS is currently unreliable in determining invasive and recurrent potential. This study aims to identify key biomarkers in DCIS that enable prognostic assessment and thus management decisions to be made with greater accuracy. Immunohistochemical analyses of our series (n=280) to date indicate that the immunoprofiles corresponding to genetic sub-types of invasive cancers are also present in precursor lesions. The merits and pitfalls of immunohistochemistry for use as an adjuvant to genetic profiling will be discussed.
- 17:00 **Chairman's summing up**

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*This meeting was organised by Euroscicon ([www.euroscicon.com](http://www.euroscicon.com)), a team of dedicated professionals working for the continuous improvement of technical knowledge transfer to all scientists. Euroscicon believe that they can make a positive difference to the quality of science by providing cutting edge information on new technological advancements to the scientific community. This is provided via our exceptional services to individual scientists, research institutions and industry.*

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## About the Chair

**Will Howat** graduated with a BSc (Hons) in Immunology & Pharmacology from the University of Strathclyde, before gaining a PhD in Pathology from the University of Southampton. After two post-doctoral positions in Southampton, he moved to the Wellcome Trust Sanger Institute in Cambridge as the leader of Research & Development for the Immunohistochemistry group of the Atlas of Protein Expression project. He is now with Cancer Research UK as the head the Histopathology/ISH facility at the Cambridge Research Institute.

## About Our Speakers

**Jo Mitchell**, Huntingdon Life Sciences, UK

Jo holds a BSc. honours in Applied Biology with European Studies and a MSc. in Biomedical Science. She has over 12 years experience in IHC, 5 years gained at Pharmagene working on pre-clinical research projects, 3 years spent managing the day-to-day operations of 'The Atlas Project' high-throughput IHC lab at The Sanger Institute and 2 years spent helping to set-up and run the CR-UK Histopathology/IHC Core Facility at the CRI. Jo joined HLS in 2008 as Head of Special Pathology Services (Safety Assessment: Pathology Division). She assumes scientific responsibility for IHC (including tissue cross-reactivity), electron microscopy and micro-autoradiography studies

**Sarah Barnett** graduated with a BSc Hons in Biomedical Science and an MSc in Cellular Pathology from the University of Surrey. She has over 11 years experience in clinical histopathology laboratories as a Biomedical Scientist, over 5 years of which was gained as Clinical Laboratory Manager at UCL Advanced Diagnostics, UCLH, London. During this time Sarah also provided numerous IHC workshops, was a part time lecturer on the MSc course for Cellular Pathology at the University of Westminster and an assessor for UK NEQAS. Sarah now works as a Theranostics Product Manager for Leica Biosystems, Newcastle.

**IngMarie Olsson** is the lab manager of the Tissue microarray facility at the Uppsala site of the Human protein atlas (HPA) project responsible for selection of tissues and cells for tissue microarrays, sectioning of blocks, digitalisation of immunohistochemically stained tissues.. The HPA project is set to generate antibodies towards the entire human proteome, and to use the antibodies for expression analysis in situ in a multitude of human tissues and cells.

In 2001 **Garry Ashton** was appointed head of the Histology Core facility at the CRUK funded Paterson Institute for Cancer Research. As well as routine histology, the group specialises in IHC, laser capture microdissection and tissue microarray construction. In 2006 the Manchester Cancer Research Centre (MCRC) biobank was formed and integrated within the core facility.

**John Brown** graduated with a BSc (Hons) from Anglia Ruskin University followed by a Masters degree at De Montfort University, Leicester. He is a fellow of the Institute of Biomedical Scientists and an assessor for UKNEQAS. Previous research includes studies on cell cycle proteins for the University of Cambridge and Hutchison/MRC. He has also worked for Addenbrooke's Hospital Histopathology Department as a senior biomedical scientist and a researcher for the Cancer Genomics Group, MRC Cambridge. He is currently undertaking a part time PhD at Kings College London studying precursor lesions of the breast.

**Dr Richard Byers**, University of Manchester, UK

After general medical training, trained as a histopathologist and did a PhD in molecular biology. Specialist diagnostic clinical interest is in leukaemia and lymphoma and I am Head of an integrated molecular diagnostic service in haemato-oncology for Greater Manchester. Research is centered around technology development for translation of microarray identified prognostic gene signatures to routine clinical use, using real-time PCR measurement of gene expression and in-situ detection of multiple markers by quantum dot based multiplex in-situ hybridization.

**Jacqueline Aÿ** obtained a PhD in protein chrysallography from the Max-Delbrück-Center for Molecular Medicine, Berlin in 1998. After completing her PhD, Dr. Aÿ spent three years at the University Hospital Charité, Institute of Biochemistry, Berlin as a postdoctoral fellow where she solved several structures of antibody fragments. Following her academic career, she worked for Dako Denmark for seven years as a sales representative and then as a project leader for the ACIS III and image analysis. Dr. Aÿ, has been with Aperio since 2009 working in sales and applications support.

**Professor Peter Hamilton** is Founder of i-Path Diagnostics Ltd and Head of the Bioimaging and Informatics Research Group at Queen's University Belfast. For the past 20 years he has been leading research on computer vision and decision support in diagnostic cancer pathology and the identification of novel digital tissue and cell markers for diagnostics, prognostics and for predicting response to therapy in cancer. He sits on the UK Medical Research Council Panel of Experts and on the committees of a number of major medical research organisations including the Pathological Society of Great Britain and Ireland and the International Society for Cellular Oncology.