Histopathology: Advances in research and techniques

Friday, 12 April 2013

The Royal College of Pathologists, London, UK

This is the 10th Annual event (originally called Improving Immunohistochemistry), 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 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

Meeting chair: *Dr Will Howat,* Cancer Research UK, Cambridge.

9:00 – 9:45 **Registration**

9:45 – 10:00 **Introduction by the Chair**: *Dr Will Howat*, Cancer Research UK, Cambridge.

10:00 – 10:30 **Potential, Pitfalls and Problem Solving: The 3 Ps of ISH**

Dr Julia Jones, Cancer Research UK, Cambridge.

In situ hybridisation is an invaluable tool in identifying gene expression patterns in tissue. Advances in ISH methods are allowing us to move on from radioisotopes to faster chromogenic and fluorescent techniques. Short modified nucleic acid probes and branched DNA ISH enable us to localise small non-coding RNAs, such as miRNA and piRNA as well as mRNA. I will discuss which methods should you use, how you should optimise and what controls you need.

10:30 – 11:00 **The Human Protein Atlas, taking it to the next level.**

Evelina Sjöstedt, Rudbeck Laboratory, Sweden

The Swedish Human Protein Atlas project, funded by the Knut and Alice Wallenberg Foundation, has been set up to allow for a systematic exploration of the human proteome using Antibody-Based Proteomics. This is accomplished by combining high-throughput generation of affinity-purified antibodies with protein profiling in a multitude of tissues and cells assembled in tissue microarrays. Confocal microscopy analysis using human cell lines is performed for more detailed protein localization. The results can be found in the Human Protein Atlas portal with expression profiles of human proteins in tissues and cells (www.proteinatlas.org). The latest addition to the Human Protein Atlas project is RNAseq. Some preliminary results regarding the comparison between RNAseq and IHC will be presented.

11:00 – 11:30 **Speakers' photo then mid-morning break/networking and trade show**

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11:30 – 12:00 **Digital pathology techniques for quantitative assessment of biomarkers in tissues**

Dr. Madhuri Warren, Pathology Diagnostics Ltd., Cambridge, UK

12:00 – 12:15 **3D Reconstruction of Histology Sections using both brightfield and fluorescence stains.**

Dr Martin Groher, MicroDimensions GmbH, Munich, Germany

There is an increasing demand for volumetric measurements on a microscopic level, particularly for histology images. With the advent of whole slide imaging, the exploration of tissue sections at different magnification levels becomes easy. This is used more and more in modern clinical and research institutes. In this talk we present a solution, which is able to reconstruct 3D histology volumes from a stack of whole slide images. The result is a whole slide "volume", which allows the inspection of tissue in 3D and volumetric measurements from 1x to 40x.

12:15 – 12:45 **Direct histological processing of EUS biopsies enables effective histopathological assessment and allows molecular biomarker analysis for interventional pancreatic cancer trials**

Dr Rebecca Brais, Cambridge University Hospitals NHS

Current practice to diagnose pancreatic cancer is accomplished by endoscopic ultrasound guided fine needle aspiration (EUS FNA) using a cytological approach. This method is time consuming and often fails to provide suitable specimens for modern molecular analyses. We compared this cytological approach with direct formalin fixation of pancreatic EUS FNA micro-cores and evaluated the potential to perform molecular biomarker analysis on these specimens. We found that direct formalin fixation significantly shortened the time required for diagnosis and reduced the number of slides for histopathological processing. It also preserved the tumour tissue architecture with neoplastic glands embedded in stroma which were suitable for molecular studies including the immunohistochemical detection of intranuclear Hes1 in malignant cells, and the laser-capture microdissection mediated measurement of Gli-1 mRNA

in tumour stromal myofibroblasts. We advocate this approach for future investigational trials in pancreatic cancer patients.

12:45 – 13:45 **Lunch/networking and trade show**
This is also a good time to fill out your feedback forms and any questionnaires

13:45 – 14:45 **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

14:45- 15:00 **Enhanced FFPE Sample Processing**
Dr Fiona Marshall, Promega UK, UK
Promega offers many solutions for the extraction of nucleic acids from a variety of clinical samples. FFPE samples are extensively prepared to preserve tissue but this process can damage nucleic acids, making it both challenging to obtain good yields and raising the possibility that sample degradation may impact downstream applications. Promega will present state-of-the-art methods for nucleic acid extraction from FFPE samples as well as insights into new product development focused on enhancing extraction from this sample type.

15:00 – 15:30 **Afternoon Tea/Coffee, networking and trade show**

15:30 – 16:00 **Molecular Histopathology: The Backbone of Translational Research**
Professor Manuel Salto-Tellez, Queen's University Belfast
Over more than a decade, one of the the main drives in translational oncology has been to change the basis of tumor classification from morphological to molecular characteristics. However, in this talk, it will be argued that modern translational research should be morphomolecular. This will be discussed at many levels: pathology sampling, histological characteristics, hybridization-based techniques and FFPE-related molecular interrrogation of tissues and cells. Examples will be presented at all these levels, and a general model for organization of pathology archives guiered to research endeavours will be discussed.

16:00 – 16:30 **FISH Detection of ERG translocations in Prostate Cancer**
Dr Jeremy Clark, UEA, UK
A TMPRSS2/ERG translocation is found in ~50% of prostate cancers and duplication of this translocation has an associated poor prognosis. However, patterns of translocation within a single prostate are far from homogenous, and individual foci of tumour can display different gene translocations, or no translocation at all. I will discuss the complexity of clonal variation in prostate cancer with respect to ERG, AR and PTEN and the problems of adequate sampling of prostate tissue to assess prognosis.

16:30 - 17:00 **Chairman's summing up**

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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 the Speakers

Julia Jones graduated with a BSc (Hons) in Biomedical Science from the University of Southampton before gaining a PhD in Neuroscience from Cambridge University. She is now with Cancer Research UK as a Senior Scientific Officer (ISH) where she has run the ISH service in the Histopathology/ISH facility at the Cambridge Research Institute for 5 years.

Jeremy Clark has researched the molecular changes in cancer for over 25 years, and has discovered a number of novel oncogenes including the SYT/SSX translocation in synovial sarcoma, 3 fusion partners of TFE3 in papillary renal cell carcinoma and the EWS/CHN fusion in chondrosarcoma. His current research concentrates on prostate cancer detection and prognosis.

Manuel Salto-Tellez is a histopathologist and a molecular diagnostician. He has trained in Germany, The Nehterlands, UK and US, and worked for more than a decade in Singapore. His research and diagnostic activity has been focused in the interface between genotype and phenotype. He is authors of more than 160 peer-reviewed papers and several books and book chapters. He is the recipient of generous grant funding and several international awards, including the 2005 - World Scientists Forum International Award by the International Research Promotion Council (IRPC); the silver frame in recognition to research in the area of gastrointestinal diseases, presented at the 13th Annual Helenic (Greek) Helicobacter Pylori Congress, 2008; and the 2008 – National University of Singapore Faculty Research Excellence Award

Rebecca Brais has been a Consultant Histopathologist at Addenbrooke's hospital since 2006 with a specialist interest in liver and pancreaticobiliary disease. She is part of the specialised team at Addenbrooke's hospital which serves as the centre for the diagnosis and treatment of pancreaticobilairy malignancies covering Bedfordshire, Cambridgeshire, north east Essex, Norfolk and Suffolk - a population of around 3.2 million people

Evelina Sjöstedt were fist involved in the Human Protein Atlas project in in 2007. Were employed in 2008; started by working with the TMA construction and then moved to the antibody evaluation. Since the beginning of 2011 she is leading the antibody approval team.

Julia Jones graduated with a BSc (Hons) in Biomedical Science from the University of Southampton before gaining a PhD in Neuroscience from Cambridge University. She is now with Cancer Research UK as a Senior Scientific Officer (ISH) where she has run the ISH service in the Histopathology/ISH facility at the Cambridge Research Institute for 6 years

Madhuri Warren has a 19 year background in clinical academic medicine, specializing in histopathology, and a 10 year background in molecular cancer research, including comparative pathology. She studied initially at the University of Cambridge, followed by academic training in internationally renowned labs at the Institute of Cancer Research, London and in Cambridge. She is a Fellow of the Royal College of Pathologists, and a member of European and US pathologists' organizations. She has collaborated on and published over 30 scientific papers and reviews in high ranking peer-reviewed journals in the field of oncology research, digital pathology and the evaluation of tissue biomarkers. In 2005 she established and managed an academic pathology research laboratory in Cambridge. In 2008, Madhuri founded Pathology Diagnostics Ltd. (www.pathologydiagnostics.com), and has grown this to a highly successful award-winning GCLP accredited laboratory specializing in tissue diagnostics for R&D projects and biomarker/companion diagnostic evaluation and development.

Keywords: immunocytochemistry, in situ hybridization, confocal microscopy, TMA, Target Discovery, Validation, Human, Advances in Detection, Probes and Digital Pathology, image analysis, whole slide image analysis, pattern recognition, HER2, Dimerisation, Breast Cancer, Ligands, TMA, tissue micro array, slide scanning, Biobank, nottingham, Auto-fluorescence, multicolour immunohistochemistry, tissue segmentation, FISH, ERG, Translocation, Prostate, Cancer, Molecular Histopathology, Pancreatic tumours, Endoscopic ultrasound, EUS, Fine needle aspiration, FNA,histology, Diagnostic biomarkers,, TMA, RNA sequencing, In situ hybridisation, FFPE tissue, RNA, chromogenic, fluorescent.

Event Web site: www.regonline.co.uk/hist2013

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arrivals). You will not be included in this list if you have opted out and you can do this by logging into your registration details. This list will not be sold or ever give out to third parties. Only people attending or sponsoring the event have access to the list

- There may be an independent meeting report published within a few months of this event. If this is published we will send you an email to let you know the reference details
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- We may take pictures during the meeting. These pictures will be used to promote our events and placed on our various websites and the closed Euroscicon group on Facebook. If you do not want your photograph distributed please let one of the Euroscicon staff know.