

Laser Microdissection - A Day For Answers

The BioPark Hertfordshire, Welwyn Garden City, AL7 3AX: 17th June 2010

Following on from our successful *Improvements in Laser Microdissection & Downstream Applications* on 11th February 2005 we are delighted to announce our follow up event which has expert speakers and a panel discussion where delegates will be able to ask our expert panel their questions about Laser Microdissection

This meeting has CPD accreditation

- 9:00 – 9:45 **Registration**
- 9:45 – 10:00 **Introduction by the Chairs:** *Dr David Whitehouse*
- 10:00 – 10:40 **Laser Microdissection in Parasitology**
Professor Rory Post, The Natural History Museum and London School of Hygiene & Tropical Medicine
Studying the genetics of parasites presents special problems in obtaining material from the living human host. Adult parasites can be inaccessible within deep tissues and larvae are small and difficult to handle. Laser microdissection has been explored as a solution to these problems, and is being applied to study the molecular epidemiology of infection and disease in the tropics.
- 10:40 – 11:20 **Transcriptional Profiling of FFPE Tissue in Prostate Cancer Biopsies using Laser capture microdissection**
Ajay Joseph, Cambridge University, UK
Prostate cancer accounts for 24% of male cancers diagnosed in the UK and 16% of cancer-related deaths. Prognostic markers can improve prediction of the behaviour of prostate cancer at the point of diagnosis. Effective and patient-specific treatment is not yet possible due to the heterogeneity of the disease and the tissue, identifying a biomarker can be challenging. Laser capture microdissection allows for transcriptional profiling of a specific population of cancerous, benign and stromal cells from a tissue biopsy. This can be used as part of a retrospective study with correlation to clinical outcome, the results of which may help to treat patients in the future.
- 11:20- 11:30 **Speakers photo**
- 11:30 – 12:00 **Mid-morning break**
- 12:00 – 12:40 **Laser microdissection in forensic sciences**
Trees Lepez, Laboratory of Pharmaceutical Biotechnology, Ghent University , Belgium
Laser capture microdissection (LCM) is a valuable tool in forensic sciences. In cases of sexual assault, spermatozoa recovered from postcoital samples can be automatically screened after staining with Sperm HY-LITER™. Male cells from male/female mixtures can be automatically screened after fluorescence in situ hybridization in suspension (S-FISH) by using Y-chromosome-specific probes. In both cases, male cells were isolated using LCM and DNA analysis was performed. Full DNA profiles could consistently be obtained from as little as 30 spermatozoa and 10 male cells respectively, which proves that staining with Sperm HY-LITER™ as well as S-FISH had no significant influence on DNA recovery.
- 12:40 – 13:30 **Lunch**
- 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 – 15:10 **Analysis of metastatic disease in pancreatic cancer- use of laser microdissection to procure lymph node metastases**
Tatjana Crnogorac-Jurcevic , Bart's Institute of cancer, Queen Mary University of London, UK
Pancreatic cancer is the 5th leading cause of cancer death in the western world, with virtually no 5-year survival. This is mostly due to the late presentation, when the disease has already spread, and the curative surgery is not possible. There are currently no effective therapies for metastatic disease, understanding the underlying molecular changes is therefore of paramount importance if we are to make an impact on the survival of pancreatic cancer patients. Our results on protein profiling of microdissected primary and metastatic lymph node formalin-fixed paraffin-embedded specimens will be presented.
- 15:10 – 15:30 **Chairman's summing up.**

About the Meeting chair
Dr David Whitehouse

David is an experienced academic and commercial scientist. He has more than 20 years research experience in the university sector, mostly with the MRC Human Biochemical Genetics Unit in UCL focusing on protein detection, human molecular genetics and genomics and the development of rapid diagnostic tests using monoclonal antibodies. In 2000 he transferred to the commercial sector where he specialized in the development of optical and electrophoretic devices for microbial detection and new approaches to DNA based diagnostics. He is an experienced freelance manager of intellectual property including patent applications in the biotechnological and neurosciences fields. He writes, lectures, and devises presentations and learning modules in biotechnology and healthcare for the commercial and higher education sectors.

About the Speakers

Professor Rory Post is a medical entomologist and parasitologist based at the Natural History Museum in London and with an Honorary Chair at the London School of Hygiene and Tropical Medicine. He researches the parasitic worms which cause river blindness in tropical Africa, and the blood-sucking flies which transmit them. His work has directly resulted in the elimination of some of the most dangerous vectors in West Africa by the World Health Organisation.

Dr Tatjana Cmogorac-Jurcevic completed her MBBS and MD thesis at the Medical Faculty, University of Zagreb, Croatia, and her PhD at the Imperial College, London, UK. She joined the Institute of Cancer in November 2004. She is developing a Cancer Biomarker programme in pancreatic adenocarcinoma, a tumour type with exceptionally aggressive phenotype. She is studying the molecular changes of both precursor lesions and the molecular signatures of micrometastatic disease. The selected proteins could represent a target for both early diagnosis as well as novel therapeutics that could be used in the treatment of pancreatic cancer.

Trees Lepez obtained her Master degree in Biomedical Sciences at Ghent University in 2006 and a Master degree in Forensic Science at Maastricht University in 2008. She is currently working as a PhD student in the Laboratory of Pharmaceutical Biotechnology. This laboratory performs human identification by the use of DNA profiling techniques, mainly for the Belgian Department of Justice. One of the main research topics in this laboratory is the application of laser microdissection on forensic mixed samples, resulting in pure cell preparations for DNA analysis. The presented work is mainly performed by Mado Vandewoestyne, one of the quality assurance managers of the laboratory.

Ajay Joseph, formerly employed by National Centre for Toxicological Research (FDA), USA (2008-2009) began his research career by investigating the effect of (+)-usnic acid on mitochondrial functions based on mitochondria-specific oligonucleotide microarray in liver of mice. He continued his research in Translational Prostate Cancer Group (TPCG) led by Dr. Vincent Gnanapragasm, University of Cambridge. Currently his group is developing transcriptional profile of archival prostate cancer tissues using Laser Capture Microdissection to test the prognostic significance of known and novel biomarkers in the context of different treatments for prostate cancer. His goal in research is to understand cancer biology by studying mRNA and micro RNA behavior using Real time PCR and micro array technology.

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Posters

AUTOMATIC DETECTION OF SPERMATOOZA FOR LASER CAPTURE MICRODISSECTION

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In sexual assault crimes, differential extraction of spermatozoa from vaginal swab smears is often ineffective, especially when only a few spermatozoa are present in an overwhelming amount of epithelial cells. Laser capture microdissection (LCM) enables the precise separation of spermatozoa and epithelial cells. However, standard sperm staining techniques are non-specific and rely on sperm morphology for identification. Moreover, manual screening of the microscope slides is time-consuming and labour-intensive.

In the present study, we describe an automated screening method to detect spermatozoa stained with Sperm HY-LITER™ (Independent Forensics, Hillside, IL), a fluorescent kit for the detection of human spermatozoa which does not rely on morphological characteristics or non-specific staining for identification. The spermatozoa are detected using an Alexa Fluor 488 derivatized mouse monoclonal antibody against proteins contained in the human sperm heads. In addition, a 4',6-diamidino-2-phenylindole (DAPI) staining is used to detect all nuclei present on the slide. Processed slides can be viewed at low magnification, greatly increasing the speed of sperm identification. Different ratios of spermatozoa and epithelial cells were used to assess the automatic detection method. In addition, real postcoital samples were also screened. Detected spermatozoa were isolated using LCM and DNA analysis was performed. Robust DNA profiles without allelic dropout could be obtained from as little as 30 spermatozoa recovered from postcoital samples, showing that the staining and laser capture microdissection had no significant influence on DNA recovery.