

Frozen Tissue; A new Experience with Fast Fluid Exchange Technology

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Cancer biomarker analysis plays a key role in cancer diagnosis and treatment, as well as in immunology research. Conventional immunohistochemistry is nowadays a widely used tool in diagnostic histopathology. However, current standard systems presents limitations due to their lengthy incubation times, in the range of 2h 30min for some automated stainers, to hours or days in the case of manual stainings. These long reaction times imply long diffusion times and a lack of precision over reagent application, as well as limited fluidic exchange rates.

In this presentation, we describe a newly developed single-slide automated delivery system, utilising an automated Microfluidic Tissue Processor (MTP) for the detection of biomarkers in cancer diagnosis. The MTP technology in this device allows for a fast fluidic exchange rate between tissue and reagents that enables fast (<30min for FFPE slides), accurate, and reproducible IHC analysis of fixed tissue sections on standard microscope slides.

The MTP technology, an open system, can be used to carry out chromogenic IHC as well as Immunofluorescence (IF), with both Formalin-Fixed-Paraffin-Embedded (FFPE) samples and Frozen Sections (FS). At the moment, FS of tumor samples are fundamental in the current pathological intraoperative consultation workflow, providing relevant morphological information following H&E staining, during the microscopic analysis of specimens during surgery. So far, routine intraoperative IHC on FS during these interventions had not been demonstrated due to the short timeframe required. The MTP technology has shown greatly decrease IHC turnaround times with FS (10-15min) while offering a high level of control over reagent delivery, temperature control, incubation homogeneity and reproducibility. The adoption of the MTP technology in the field of surgical pathology can bring substantial improvement in the way FS influence decision-making during surgical procedures and have an impact on early diagnosis and treatment.