Abstract
To Study the Biology of Ocular Tumours and Biomarkers of Retinoblastoma
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Therapeutic targets and biomarkers are important for cancer detection and prevention of progression. Retinoblastoma (RB) belongs to a type eye cancer which requires potential therapeutic targets and biomarkers for early cancer detection and cure. Epithelial cell adhesion molecule (EPCAM) is showed to be high expressed marker in RB invasive and well differentiated tumours. Interrelation between EpCAM and non-coding small RNA (microRNA) in the present study shed light on the EpCAM control of RB through various tumourigenic microRNAs. Functional importance of EpCAM related microRNAs; miR-181c, and miR-130b for therapeutic target study has been carried to reveal those microRNA roles in RB. Clinical relevant RB microRNAs unique expression pattern was reported and thoroughly quantified the levels of few microRNAs (miR-17, miR-18a, miR-19b, miR-20a and miR-92) in donor RB patients. Above basic research findings of microRNAs were further translated to develop prototype model of point of care microfluidic devices. Here, MicroRNAs were being detected on highly successful PDMS and PMMA material based microfluidic platforms with a novel microRNA bio-assay. Overall, few microRNAs for RB diagnosis and their plausible therapeutic use was elucidated in the present thesis by a combination of invitro experimental demonstrations and followed by critical bioinformatics pathway enrichment analysis. In conclusion, EpCAM and miRNAs synergetic, interlinked interaction plays a pivotal role in RB progression. MicroRNA detection on microfluidic device paved the way for development of point of care device and non-invasive blood based biomarkers for RB.