

SHORT RESEARCHER VISIT REPORT

DEVELOPMENT OF POLYMERASE CHAIN REACTION (PCR) DNA-BASED MEDICAL DIAGNOSTIC ASSAYS USING SURFACE ACOUSTIC WAVES (SAW)

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Background:

Glasgow and Northumbria Universities, Epigem Ltd. have all collaborated in a range of SAW based projects for biomedical applications. The visiting researcher has been involved in developing a Surface Acoustic Wave (SAW) for biological assays applications via a KTP project between Epigem and Northumbria University. This consortium is facing a roadblock in adapting biochemistry on the platform that Glasgow has experience in translating. This short visit was aimed at overcoming this and developing new opportunities for further collaboration in complex assays.

Aims of the visit:

- Develop biological assays in thin film ZnO based surface acoustic waves
- To provide Epigem-Northumbria with an understanding of the biological assay processes and Glasgow with exposure to thin film capabilities
- Test the Epigem-Northumbria platform performing spiked mock samples (DNA in buffers), benchmarked against gold standard techniques available in the Glasgow laboratories (real-time PCR)

Achievements:

- Troubleshooting the Epigem-Northumbria SAW platform and identification of potential design flaws
- Induction to PCR preparation protocols and mixing steps
- Training in gel optical imaging for end-point PCR
- DNA amplification using the thin film ZnO SAW platform with real-time PCR. Figure 1 shows a portion of a sample droplet (centre) anchored with mineral oil (outer ring). The sample droplet consisted in PCR mix spiked with DNA target.

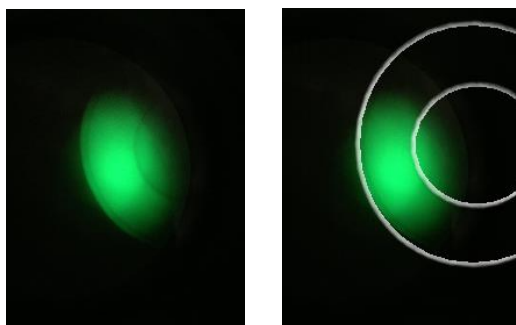


Fig. 1 – (a) Amplified DNA sample with oil coating. Droplet diameter was approximately 5mm (b) Contour for both oil anchoring (outer ring) and DNA sample (inner ring)

Future relationships

This SRV visit has cemented future collaborations between all three partners for further collaborative research projects. Since the visit Glasgow and Epigem have applied to InnovateUK for the development of an anti-microbial resistance (AMR) diagnostic device. Further biological assay testing using the Epigem-Northumbria at Glasgow is currently being planned.