

Project Title

Hydrogel-coated microneedle patches for diagnosis of skin cancers, at the point-of-care via detection of cancer-specific miRNA biomarkers from skin interstitial fluid

Supervisor(s)

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Project Description

The core aim of our research project is to demonstrate how sampling and targeted molecular analysis of skin interstitial fluid (IF) can improve the diagnosis of skin cancer in a timely and non-invasive manner through a low-cost and point-of-care skin patch.

Skin cancer diagnosis most typically originates from a highly subjective visual inspection of the suspicious lesions by a trained professional. This is potentially followed by an urgent referral for skin biopsy and lengthy histopathological examination before a final diagnosis can be confirmed. Whilst an average of less than 6% of all skin biopsies turn out to be malignant melanoma, more than 50% of these biopsies prove non-cancerous. This indicates that over 1 million people undergo unnecessary biopsies every year worldwide which is distressing to the patient and costly to the NHS.

Our solution builds on our patented innovative technology of hydrogel-coated microneedle (MN) patches to (1) identify and validate, within skin interstitial fluid (IF), highly specific and highly sensitive molecular biomarkers for the deadliest forms of skin cancer types, and (2) develop new technologies to be used alongside visual inspection to provide an accurate diagnosis without the need for invasive, slow and costly tissue biopsies.