Near Infra-Red optical imaging to track fluorescently labelled filarial parasites *in vivo*

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Filarial drug screening *in vivo* is a time-consuming process. Due to uncertainty of when efficacy may be manifest, screens require large numbers of animals in order to assess multiple time points and to employ extended timeframes (upward of 8 months). Thus far, Ultrasonography (USG) is the only tool to identify loss of parasite motility signal in response to drug therapy. Here we report the optimisation of an *in vivo* near infra-red imaging technology (IVIS® Perkin Elmer) in order to track fluorescently labelled *Brugia malayi*/*Brugia pahangi* microfilariae in circulation and adult parasites in the peritoneum over a 7-day time-course both *in-vitro* and *in-vivo*, in immunodeficient mouse strains.

Initial optimisation has successfully defined the conditions for optimal, intra-vital, fluorescent labelling of *Brugia* parasite proteins, yielding a persistent, detectable signal over seven days without detrimental effects to parasite viability. Further, we have validated the detection of signal within mouse anatomical locations.

We foresee that this platform may be applied to monitor the assessment of drug or vaccine efficacies, whereby change in fluorescent signal, due to parasite death/deterioration in response to therapeutics, can be evaluated by longitudinal imaging. Once validated, this would provide an early prognostic prediction of macrofilaricidal or vaccine efficacy, accelerating preclinical development projects. The successful application of longitudinal bioimaging will significantly reduce the total number of animals required for the assessment of efficacy. Additionally, such a non-invasive approach will be beneficial in refining the use of animals in drug screens by obviating the necessity for invasive filarial viability sampling.