LAMP assay diagnostics for schistosomiasis

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Background

- Three main *Schistosoma* species affect humans; *S. japonicum, S. mansoni* and *S. haematobium.*
- Accurate and early diagnosis is crucial for elimination and control.
- Current diagnostic tools are either unreliable or expensive and require trained personnel.
- LAMP technology is a powerful, cheap, simple, sensitive and specific DNA detection tool.
- It utilizes 4 primers to amplify the target DNA gene sequence at a single temperature.
- Results can be visualized within 30 minutes by the naked eye, and does not require expensive equipment or highly trained personnel
- We aimed to develop a novel LAMP assay for the diagnosis of *S. mansoni*

Methods and Results

Figure 1: Eggs were isolated from mice livers of infected *S. mansoni* mice.

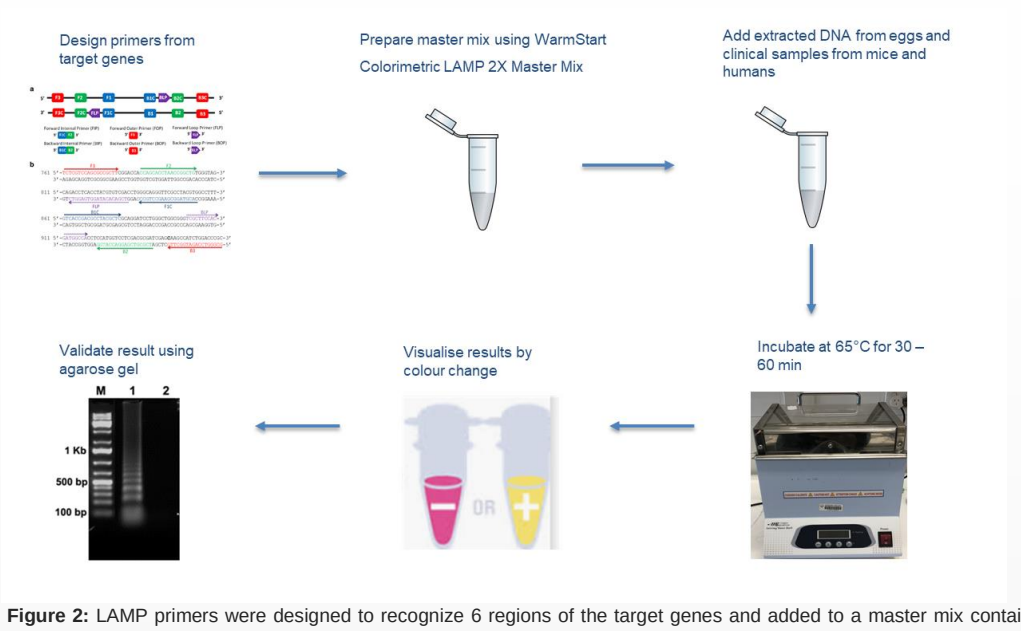

Figure 2: LAMP primers were designed to recognize 6 regions of the target genes and added to a master mix containing the polymerase with high strand displacement ability. These, together with the template DNA were incubated in a simple water bath for 40 mins.

Methods and Results

- DNA was extracted from eggs obtained from the livers of mice infected with *S. mansoni* cercariae.
- LAMP primers were designed from a specific sequence targeting the *nad5* mitochondrial gene of *S. mansoni*
- LAMP reactions contained WarmStart Colorimetric LAMP 2X Master Mix, the inner and outer primers and 1 µl template DNA.
- Negative controls utilized MilliQ water instead of DNA.
- Specificity of the designed *S. mansoni* primers was tested using other *Schistosoma* and soil-transmitted helminth (STH) species.

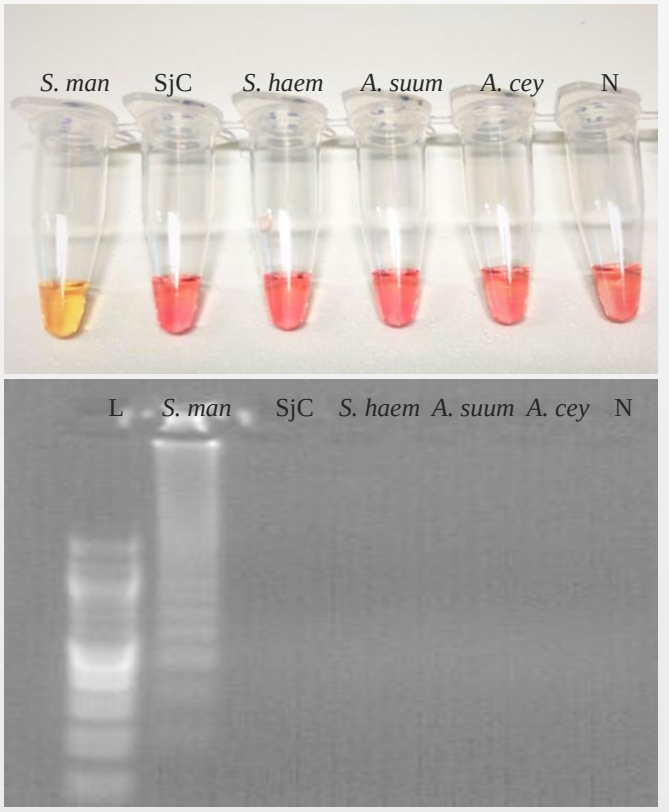

Figure 3: DNA copies of target DNA (*S.* mansoni) was amplified. Positive sample turned yellow while negative samples remained pink

Conclusion and Future Directions

- Isolated *S. mansoni* DNA was successfully amplified with LAMP assay.
- Designed *nad5* primers were specific for *S. mansoni.*
- We would develop primers to detect *S. japonicum and S. haematobium*
- We would optimise this assay using clinical samples (urine, sera and faeces) from mice.
- After successful optimization of this assay, we will set up LAMP reactions from clinical human samples and visualize in the field.
- This will be a useful molecular tool in identifying infected individuals in limited-resource endemic areas.

Acknowledgements

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