

# STUDY ON THE FEASIBILITY OF USING MAGNETO-ARCHIMEDES LEVITATION TO FRACTIONATE SCHISTOSOME EGGS FROM FAECAL SAMPLES

Renata Russo Frasca Candido<sup>1</sup>, Thales Daniel Acker<sup>2</sup>, Courtenay Mandy<sup>1</sup>, Robert Charles Woodward<sup>1</sup>, Alessandra Loureiro Morassutti<sup>2</sup>, Carlos Graeff-Teixeira<sup>2</sup>, Timothy Guy St Pierre<sup>1</sup> and Malcolm Kenneth Jones<sup>3</sup>

1 School of Physics, The University of Western Australia, Crawley, Australia

2 Laboratório de Biologia Parasitária, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, Brazil

3 School of Veterinary Sciences, The University of Queensland, Brisbane, Australia

**Introduction:** Schistosomiasis is prevalent in rural areas of approximately 70 nations, where it is persistently associated with poverty. In many endemic areas, diagnosis is often neglected because of associated costs, giving rise to an urgent need for affordable and reliable diagnostic services. The feasibility of using magneto-Archimedes levitation for schistosome egg detection in faecal matter was explored in this study.

**Method:** A prototype device that uses magneto-Archimedes levitation was used to separate *Schistosoma* eggs in faecal suspensions. *S. japonicum* and *S. mansoni* eggs were placed into a 2.55 M MnCl<sub>2</sub> solution in a 4.5 mL cuvette placed between two permanent NdFeB magnets positioned coaxially in an anti-Helmholtz configuration.

**Results:** The eggs migrated to highly reproducible positions in the device. The range of densities of *S. japonicum* eggs was observed to lie between 1.31 and 1.46 g/mL while *S. mansoni* eggs were between 1.30 and 1.46 g/mL. When 100 *S. mansoni* eggs were seeded into 200 mL of human formalin-fixed faeces, 30% could be retrieved.

**Conclusion:** Our data indicate that schistosome eggs can be fractionated from faecal matter using the MAL device. Furthermore, the separation technology could potentially be used for separation of eggs of other helminths and protozoan cysts.