The effect of in vitro carbon source concentrations on asexual *P. falciparum* parasite drug responses

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Introduction: Malaria is a life-threatening tropical disease that caused 409 000 deaths in 2019. Although malaria is a curable disease, Plasmodium falciparum parasites develop resistance, rendering current antimalarials ineffective. Energy production in the *Plasmodium* parasite is essential for the proliferation and development of the parasite. Under aerobic conditions, the asexual parasite relies on fermentative glycolysis for energy production, while the tricarboxylic acid cycle is used to produce metabolic intermediates from glutaminolysis instead of pyruvate. The artificial media used to cultivate *P. falciparum* were initially used to satisfy the growth requirements of diverse cell types with various demands. This resulted in the use of supraphysiological nutrient concentration in the culture media for *in vitro P. falciparum* parasites that does not properly represent the *in vivo* concentrations and may lead to incorrect assessment with regards to the effectiveness of metabolic inhibitors. This raises the question: Do changes in the *in vitro* glucose and glutamine concentrations affect the response of parasites to metabolic drugs?

Methodology: In this project, I investigated the minimum glucose and glutamine concentrations able to support the *in vitro* asexual proliferation of the parasite.

Results: It was found that 0.69 mM glucose and 1 mM glutamine concentrations supported the greatest parasite proliferation, however a combination of theseconcentrations did not sustain *in vitro* parasite proliferation.

Discussion and Conclusion: This project determined the effect of glucose and glutamine concentrations on parasite proliferation and questions the parasite response to metabolicdrugs in nutrient restricted media.

References:

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