ROLE OF INFECTION INTENSITY ON THE ABILITY OF HUMAN MACROPHAGES TO REPEAT PHAGOCYTOSIS OF ERYTHROCYTES PARASITISED BY PLASMODIUM FALCIPARUM

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Severe malaria is caused by the blood-dwelling protozoan parasite, *Plasmodium falciparum*, and is responsible for more than two million deaths per year. An important aspect of innate immunity to *P. falciparum* is the phagocytosis of *P. falciparum*-infected erythrocytes (PEs) by macrophages. Previous studies have revealed that phagocytic efficiencies of macrophages, defined as the percentage of macrophages that have internalized parasites, vary greatly between genetically different clones and between infected individuals, and that macrophage function may be inhibited by internalization of haemozoin, a parasite waste product. The first objective of this study was to assess, in vitro, the influence of parasitaemia, defined as the percentage of infected erythrocytes, on phagocytic efficiency. The second objective was to assess how phagocytic efficiencies during a second challenge (i.e., repeat phagocytosis) were affected by different parasitaemia levels. Macrophages from three human volunteers were incubated with parasite cultures of 0.2%, 1% and 5% parasitaemia levels for 4 h in a phagocytosis assay, and then stained and observed using light microscopy. Four days following the initial phagocytosis assay, macrophages were incubated again with cultures of 0%, 0.2%, 1% and 5% parasitaemia, stained and observed. Macrophages initially incubated with higher parasitaemia levels had significantly increased phagocytic efficiencies. Macrophages incubated with parasite cultures a second time had higher phagocytic efficiencies at all parasitaemia levels. These findings reveal that parasitaemia levels in vitro influence the phagocytic efficiency of macrophages and that repeat phagocytosis is not inhibited by parasite internalization, but that macrophage function is actually increased by prior exposure to infected erythrocytes.

Carolyn Dohoo graduated from Colonel Gray High School in Charlottetown, PEI in 2004. Carolyn is currently completing her Honours thesis in her fourth year of Biology at Acadia. During her time at Acadia, Carolyn was an active member of the Acadia Equestrian Team and was the co-coordinator of WUSC (World University Service of Canada) at Acadia. She also participated in the SMILE (Sensory Motor Instruction Learning Experience) as an instructor. In 2008 Carolyn was awarded the Colville Award from Acadia University and received an NSERC (Natural Sciences and Engineering Research Council of Canada) Undergraduate Student Research Award for her Honours research. In the future Carolyn plans on doing a Master’s Degree at Dalhouise in Community Health and Epidemiology.