**Project Title:** Modulation of macrophage phenotype in inflammation and atherosclerosis.  

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**Host School/ Institute**  
The Heart Research Institute  
**Address:** The Heart Research Institute  
7 Eliza Street, Newtown, NSW 2042  

**URL:** [www.hri.org.au](http://www.hri.org.au)  

**Personal Supervisor:** Dr Bronwyn Brown  
**Phone:** 02 8208 8900  
**Email:** bronwyn.brown@hri.org.au  

**Co-Supervisor:** Associate Professor Clare Hawkins  

**Project Type:** Laboratory based  

**Project Category:** Cardiovascular, Molecular biology  

**Project Keywords:**  
1. Atherosclerosis  
2. Macrophage phenotype  
3. Myeloperoxidase  
4. Oxidant  
5. Inflammation  

**Project Description:**  
Myeloperoxidase (MPO) is a key enzyme released by activated white blood cells during inflammation that produces oxidants such as hypochlorous acid (HOCl) and hypothiocyanous acid (HOSCN). These oxidants are important in the immune system but induce many detrimental effects and damage cells in the blood vessel wall, which triggers lesion development in atherosclerosis. Macrophages are a key target of MPO-derived oxidants. These cells are pivotal to atherosclerotic plaque development, and these plaques are what eventually cause blood vessel occlusion, leading to the clinical symptoms such as heart attacks.

Macrophages are a heterogeneous cell group that can adopt different phenotypes depending on their environment, which influences their properties and function in vivo. Both inflammatory “M1” and proliferative “M2” macrophages are present in atherosclerotic plaques. However, little is known about the interplay between MPO-derived oxidants and macrophage phenotype. This project will focus on the effects of MPO-derived oxidants on different macrophage phenotypes, and potential therapeutic modulation. This project will provide training in techniques such as cell culture (for macrophages), examine cell surface phenotypic changes by flow cytometry, gene expression changes by quantitative real-time PCR, and differences in protein expression by Western blotting and ELISA.