

Exploring the heterogenous functions of blood monocytes



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Circulating blood monocytes are crucial for innate immunity and have traditionally been thought of as 'reserves' to replenish tissue macrophages and some dendritic cells. With appropriate infectious or inflammatory stimuli, peripheral monocytes can transmigrate across the vascular endothelium and differentiate into polarized tissue macrophages, which exhibit a range of phenotypes depending on the local cytokine milieu. However, far from being circulating precursors, it is now clear that monocytes have important functions prior to differentiation. Circulating monocytes are functionally heterogeneous populations based on surface expression of Ly6c in mouse and CD14 and CD16 in humans. These cells can respond differently to bacterial and viral cues and have independent migratory phenotypes while at the endothelial interface. My lab is interested in exploring the heterogenous phenotypes of monocyte subpopulations, including the effector functions at the endothelial interface and responses to lipids.

Curriculum Vitae

Personal data:

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Education, training, and positions:

1997-2000 B.Sc 2:1 Human Biology

Aston University, Birmingham, UK

2000-03 PhD. Title: 'Mediators of monocyte activity in inflammation' Aston University, Birmingham, UK PI Prof Helen Griffiths

2003-06 Roche international research fellow

Roche, Basel, Switzerland & Baker IDI Heart and Diabetes Institute, Melbourne, Australia. Pls Prof. Shaun Jackson, Prof Chin-Dusting.

2006-09 National Heart Foundation postdoctoral fellow

Baker IDI Heart and Diabetes Institute, Melbourne, Australia. Pls Prof. Jackson, Chin-Dusting & Dart.

2009-13 British Heart Foundation Intermediate fellow

Lab of Prof. Frederic Geissmann, Kings College London, London, UK (transferred to Imperial College).

2012-current Non-Clinical Senior lecturer

Division of Immunology & Inflammation, Dept. of Medicine, Hammersmith

Campus, Imperial College London, London, W12 0NN. UK.

Reviewer:

Regular reviewer for Circulation, Circulation Research, ATVB, JACC, Blood, Journal of Immunology, British Journal of Pharmacology, Diabetes, Thrombosis & Haemostasis and others.

Peer grant and fellowship reviewer: BHF (UK), NHF (Australia), NHMRC (Australia), INSRPLS (Israel), WWTF (Austria) and NMRC (Singapore).

Other advisory committees:

2006-2007, Organisation committee, ECS Annual Retreat; 2008, Organisation committee: IVBM Satellite Symposium 'Atherothrombosis - the disease continuum'

Awards:

2002 EULAR Young Investigator Award; 2005 FVM Young Investigator Award; 2005

HBPRCA Finalist 'Clinical Scientist' New Investigator Award; 2006 NIH Travel Scholarship,

2007; CASS Travel Grant, 2007; ECS Travel Grant, 2008 NHF Travel Grant; 2008 NIH Travel Scholarship; 2010 EFIS Travel Award;

Membership:

2014 - Member elect: Henry Kunkel Society.

2014 - British Atherosclerosis Society

Selected publications: (of 37 peer-reviewed publications since 2002)

Highest IF = 21

Woollard KJ*, Kling D, Kulkarni S, Dart AM, Jackson S & Chin-Dusting J. (2006). Raised plasma soluble P-selectin in peripheral arterial occlusive disease enhances leukocyte adhesion. **Circ. Res.**, 98;149-156. * Corresponding Author. Editorial Feature.

Kulkarni S, Woollard KJ*, Thomas S & Jackson S. (2007). Conversion of platelets from a pro-aggregatory to a pro-inflammatory adhesive phenotype: A role for PAF in the spatial regulation of neutrophil activation on thrombi. **Blood**. 110:1879-1886. *Joint 1st Author. Cover Feature.

Tikellis C, Jandeleit-Dahm KA, Sheehy K, Murphy A, Chin-Dusting J, Kling D, Sebokova E, Cooper ME, Mizrahi J, and Woollard KJ (2008). Reduced plaque formation induced by rosiglitazone in an STZ-diabetes mouse model of atherosclerosis is associated with downregulation of adhesion molecules. **Atherosclerosis**, 199:55-64.

Woollard KJ*, Suhartoyo A, Harris EE, Eisenhardt SU, Jackson SP, Peter K, Dart AM,

Hickey MJ, Chin-Dusting JP. (2008) Pathophysiological levels of soluble P-selectin mediate adhesion of leukocytes to the endothelium through Mac-1 activation. **Circ Res**. 103:1128-1238. *Corresponding Author

Shaw JA, Bobik A, Murphy A, Kanellakis P, Blombery P, Mukhamedova N, Woollard K, Lyon S, Sviridov D, Dart AM. (2008). Infusion of reconstituted high-density lipoprotein leads to acute changes in human atherosclerotic plaque. **Circ Res**.103:084-1091.

Woollard KJ, Sturgeon S, Chin-Dusting JP, Salem HH, Jackson SP. (2009). Erythrocyte Hemolysis and Hemoglobin Oxidation Promote Ferric Chloride-induced Vascular Injury. **J Biol Chem**. 284:13110-13118.

Eisenhardt SU, Habersberger J, Murphy A, Chen YC, Woollard KJ, Bassler N, Qian H, Constantin VM, Hagemeyer CE, Ahrens I, Chin-Dusting J, Bobik A, Peter K. (2009). Dissociation of pentameric to monomeric C-reactive protein on activated platelets localizes inflammation to atherosclerotic plaques. **Circ Res.**, 105:128-137

Chorro L, Sarde A, Li M, Woollard KJ, Chambon P, Malissen B, Kissenpfennig A, Barbaroux JB, Groves R, Geissmann F (2009). Langerhans cell (LC) proliferation mediates neonatal development, homeostasis and inflammation-associated expansion of the epidermal LC network. **J Exp Med** 206:3089-3100.

Cros J, Cagnard N, Woollard K*, Patey N, Zhang SY, Senechal B, Puel A, Biswas SK, Moshous D, Picard C, Jais JP, D'cruz D, Casanova JL, Trouillet C, Geissmann F. (2010). Human CD14^{dim} Monocytes Patrol and Sense Nucleic Acids and Viruses via TLR7 and TLR8 Receptors. **Immunity**, 24:375-386. * Joint 1st Author. Editorial Feature.

Murphy AJ, Woollard KJ, Suhartoyo A, Stirzaker RA, Shaw J, Sviridov D, Chin-Dusting JPF. (2011). Neutrophil activation is attenuated by High Density Lipoprotein and Apolipoprotein A-I in in-vitro and in-vivo models of inflammation. **Arterioscler Thromb Vasc Biol** 31:1333-41

Ling GS, Bennett J, Woollard KJ, Szajna M, Fossati-Jimack L, Taylor PR, Scott D, Franzoso G, Cook HT, Botto M. (2014). Integrin CD11b positively regulates TLR4-induced signalling pathways in dendritic cells but not in macrophages. **Nat Commun** 5: 3039.

Rogacev KS, Zawada AM, Emrich I, Seiler S, Böhm M, Fliser D, Woollard KJ*, Heine GH* (2014). Lower Apo A-I and Lower HDL-C Levels Are Associated With Higher Intermediate CD14⁺⁺CD16⁺ Monocyte Counts That Predict Cardiovascular Events in CKD. **Arterioscler Thromb Vasc Biol.**, 34: 2120-2127. *Joint senior authors.

Thiele JR, Habersberger J, Braig D, Schmidt Y, Goerendt K, Maurer V, Bannasch H, Scheichl A, Woollard KJ, von Dobschütz E, Kolodgie F, Virmani R, Stark GB, Peter K, Eisenhardt SU (2014). Dissociation of pentameric to monomeric C-reactive protein localizes and aggravates inflammation: in vivo proof of a powerful proinflammatory mechanism and a new anti-inflammatory strategy. **Circulation** *In press*.

Selected reviews:

Highest IF = 10.4

Murphy AJ, Chin-Dusting JP, Sviridov D, Woollard KJ. (2009) The anti inflammatory effects of high density lipoproteins. **Curr Med Chem.**16: 667-675.

Woollard KJ*, Geissmann F (2010). Monocytes in atherosclerosis: subsets and functions.

Nat. Rev. Cardiol. 7: 77-86. * Corresponding author.

Woollard KJ. (2013). Immunological aspect of atherosclerosis. **Clin. Sci.** 128: 221-235. Jackson W and Woollard KJ. (2014) Targeting monocyte and macrophage subpopulations for immunotherapy. **Expert Opin Ther Pat.** *In press*