

OptiPrep™ Mini-Review MC02

Mononuclear cells, monocytes and polymorphonuclear leukocytes: a bibliographical review

- ◆ This Mini-Review divides the published papers into **cell type and (where necessary) method type and/or source, species and research topic**; within each group references are listed alphabetically according to first author.
- ◆ A companion Mini-Review (MC01) is a methodological review of iodixanol gradient technology for purifying all mononuclear cells from blood and tissues.

1 Monocytes

1a From a leukocyte-rich plasma (discontinuous flotation gradient)

Note that monocytes are also prepared from mononuclear cell preparations (see Section 2) by antibody-bead negative selection

1a-1 Human

Adherence (to endothelial cells)

- AbdAlla, S.**, Lother, H., Langer, A., el Faramawy, Y. and Quitterer, U. (2004) *Factor XIIIa transglutaminase crosslinks AT₁ receptor dimers of monocytes at the onset of atherosclerosis* Cell, **119**, 343-354
- Aspinall, A.I.**, Curbishley, S.M., Lalor, P.F., Weston, C.J., Blahova, M., Liaskou, E., Adams, R.M., Holt, A.P. and Adams, D.H. (2010) *CX3CR1 and vascular adhesion protein-1-dependent recruitment of CD161 monocytes across human liver sinusoidal endothelium* Hepatology, **51**, 2030-2039
- Belcher, J.D.**, Marker, P.H., Weber, J.P., Hebbel, R.P. and Vercellotti, G.M. (2000) *Activated monocytes in sickle cell disease: potential role in the activation of vascular endothelium and vaso-occlusion* Blood, **96**, 2451-2459
- Blomqvist, H.M.** and Olsson, A.G. (2003) *Monocyte chemoattractant protein-1 and CC-chemokine receptor-2 in severe hypercholesterolaemia* Scand. J. Clin. Lab. Invest., **63**, 513-520
- Brevig, T.**, Holst, B., Ademovic, Z., Rozlosnik, N., Rohrmann, J.H., Larsen, N.B., Hansen, O.C. and Kingshott, P. (2005) *The recognition of adsorbed and denatured proteins of different topographics by β_2 integrins and effects on leukocyte adhesion and activation* Biomaterials, **26**, 3039-3053
- Crosley, L.K.**, Bashir, S., Nicol, F., Arthur, J.R., Hesketh, J.E. and Sneddon, A.A. (2013) *The single-nucleotide polymorphism (GPX4c718t) in the glutathione peroxidase 4 gene influences endothelial cell function: Interaction with selenium and fatty acids* Mol. Nutr. Food Res., **57**, 2185-2194
- Del Conde, I.**, Nabi, F., Tonda, R., Thiagarajan, P., Lopez, J.A. and Kleiman, N.S. (2005) *Effect of P-selectin on phosphatidylserine exposure and surface-dependent thrombin generation on monocytes* Arterioscler. Thromb. Vasc. Biol., **25**, 1065-1070
- Ferreira, A.M.**, Isaacs, H., Hayflick, J.S., Rogers, K.A. and Sandig, M. (2006) *The p110 δ isoform of PI3K differentially regulates β_1 and β_2 integrin-mediated monocyte adhesion and spreading and modulates diapedesis* Microcirculation, **13**, 439-456
- Galettis, A.**, Campbell, S., Morris, J.M., Jackson, C.J., Twigg, S.M. and Gallery, E.D.M. (2004) *Monocyte adhesion to decidual endothelial cells is increased in pregnancies complicated by type 1 diabetes but not by gestational diabetes* Diabetes Care, **27**, 2514-2515
- Humphries, J.**, Gossage, J.A., Modarai, B., Burnand, K.G., Sisson, T.H., Murdoch, C. and Smith, A. (2009) *Monocyte urokinase-type plasminogen activator up-regulation reduces thrombus size in a model of venous thrombosis* J. Vasc. Surg., **50**, 1127-1134
- Ohlsson, S.**, Hellmark, T., Pieters, K., Sturfelt, G., Wieslander, J. and Segelmark, M. (2005) *Increased monocyte transcription of the proteinase 3 gene in small vessel vasculitis* Clin. Exp. Immunol., **141**, 174-182
- Ronald, J.A.**, Ionescu, C.V., Rogers, K.A. and Sandig, M. (2001) *Differential regulation of transendothelial migration of THP-1 cells by ICAM-1/LFA-1 and VCAM-1/VLA-4* J. Leukoc. Biol., **70**, 601-609
- Schwartz, B.R.**, Karsan, A., Bombeli, T. and Harlan, J.M. (1999) *A novel β_1 integrin-dependent mechanism of leukocyte adherence to apoptotic cells* J. Immunol., **162**, 4842-4848
- Sneddon, A.A.**, McLeod, E., Wahle, K.W.J. and Arthur, J.R. (2006) *Cytokine-induced monocyte adhesion to endothelial cells involves platelet-activating factor: Suppression by conjugated linoleic acid* Biochim. Biophys. Acta, **1761**, 793-801

Ward, J.R., Francis, S.E., Marsden, L., Suddason, T., Lord, G.M., Dower, S.K., Crossman, D.C. and Sabroe, I. (2009) *A central role for monocytes in Toll-like receptor-mediated activation of the vasculature* Immunology, **128**, 58–68

Zimmermann, H., Weston, C.J., Curbishley, S.M. and Adams, D.H. (2012) *The role of vascular-adhesion-protein 1 (vap-1) in mediating monocyte migration across inflamed hepatic sinusoidal endothelium* Gut, **61**, A124

Angiogenic/immune responses

Agostini, L., Martinon, F., Burns, K., McDermott, M.F., Hawkins, P.N. and Tschopp, J. (2004) *NALP3 forms an IL-1 β -processing inflammasome with increased activity in Muckle-Wells autoinflammatory disorder* Immunity, **20**, 319-325

Aittomaki, S., Pesu, M., Groner, B., Janne, O.A., Palvimo, J.J. and Silvennoinen, O. (2000) *Cooperation among Stat1, glucocorticoid receptor, and PU.1 in transcriptional activation of the high-affinity Fc γ receptor I in monocytes* J. Immunol., **164**, 5689-5697

Ammons, M.C.B., Siemsen, D.W., Nelson-Overton, L.K., Quinn, M.T. and Gauss, K.A. (2007) *Binding of pleomorphic adenoma gene-like 2 to the tumor necrosis factor (TNF)- α -responsive region of the NCF2 promoter regulates p67^{phox} expression and NADPH oxidase activity* J. Biol. Chem., **282**, 17941-17952

Cousins, S.W., Espinosa-Heidemann, D.G. and Csaky, K.G. (2004) *Monocyte activation in patients with age-related macular degeneration* Arch. Ophthalmol., **122**, 1013-1018

Filion, L.G., Matusевичius, D., Graziani-Bowering, G.M., Kumar, A. and Freedman, M. (2003) *Monocyte-derived IL12, CD86 (B7-2) and CD40L expression in relapsing and progressive multiple sclerosis* Clin. Immunol., **106** 127-138

Filion, L.G., Graziani-Bowering, G., Matusевичius, D. and Freedman, M.S. (2003) *Monocyte-derived cytokines in multiple sclerosis* Clin. Exp. Immunol., **131**, 324-334

Hong, G., Davis, B., Khatoon, N., Baker, S.F. and Brown J. (2003) *PPAR γ -dependent anti-inflammatory action of rosiglitazone in human monocytes: suppression of TNF α secretion is not mediated by PTEN regulation* Biochem. Biophys. Res. Commun., **303**, 782-787

Li, C-Y., Chou, T-C., Lee, C-H., Tsai, C-S., Loh, S-H. and Wong, C-S. (2003) *Adrenaline inhibits lipopolysaccharide-induced macrophage inflammatory protein-1 α in human monocytes: the role of β -receptors* Anesth. Analg., **96**, 518-523

Lommatzsch, M., Schloetcke, K., Klotz, J., Schuhbaeck, K., Zingler, D., Zingler, C., Schulte-Herbruggen, O., Gill, H., Schuff-Werner, P. and Virchow, J.C. (2005) *Brain-derived neurotrophic factor in platelets and airflow limitation in asthma* Am. J. Respir. Crit. Care Med., **171**, 115-120

Miller, L.A., Li, C and Hyde, D.M. (2000) *Expression of the HML-1 epitope on human monocytes is independent of αE integrin mRNA* Inflammation, **24**, 195-205

Ohlsson, S., Wieslander, J. and Segelmark, M. (2004) *Circulating cytokine profile in anti-neutrophilic cytoplasmic autoantibody-associated vasculitis: prediction of outcome* Mediators Inflamm., **13**, 275-283

Scott, C., Bonner, J., Min, D., Boughton, P., Stokes, R., Cha, K.M., Walters, S.N., Maslowski, K., Sierro, F., Grey, S.T., Twigg, S., McLennan, S. and Gunton, J.E. (2014) *Reduction of ARNT in myeloid cells causes immune suppression and delayed wound healing* Am. J. Physiol. Cell. Physiol., **307**, C349–C357

Xue, M., March, L., Sambrook, P.N., Fukudome, K. and Jackson, C.J. (2007) *Endothelial protein C receptor is overexpressed in rheumatoid arthritis (RA) synovium and mediates the anti-inflammatory effects if activated protein C in RA monocytes* Ann. Rheum. Dis., **66**, 1574-1580

Bacterial interactions

Brown, M.J., Russo, B.C., O’Dee, D.M., Schmitt, D.M. and Nau, G.J. (2014) *The contribution of the glycine cleavage system to the pathogenesis of Francisella tularensis* Microb. Infect., **16**, 300-309

Horzempa, J., Tarwacki, D.M., Carlson Jr., P.E., Robinson, C.M. and Nau, G.J. (2008) *Characterization and application of a glucose-repressible promoter in Francisella tularensis* Appl. Envir. Microbiol., **74**, 2161-2170

Horzempa, J., Carlson Jr, P.E., O’Dee, D.M., Shanks, R.M.Q. and Naum G.J. (2008) *Global transcriptional response to mammalian temperature provides new insight into Francisella tularensis pathogenesis* BMC Microbiol., **8**: 172

Jung, J-Y., Gleave Parson, M., Kraft, J.D., Lyda, L., Kobe, B., Davis, C., Robinson, J., Pena, M.O.M. and Robinson, C.M. (2016) *Elevated interleukin-27 levels in human neonatal macrophages regulate indoleamine dioxygenase in a STAT-1 and STAT-3-dependent manner* Immunology, **149**, 35–47

Mancilla-Herrera I., Alvarado-Moreno, J.A., Cébulo-Vázquez, A., Prieto-Chávez, J.L., Ferat-Osorio, E., López-Macías, C., Estrada-Parra, S., Isibasi, A. and Arriaga-Pizano, L. (2015) *Activated endothelial cells limit inflammatory response, but increase chemoattractant potential and bacterial clearance by human monocytes* Cell Biol. Int., **39**, 721–732

- Martins, R.**, Maier, J., Gorki, A-D., Huber, K.V.M., Sharif, O., Starkl, P., Saluzzo, S., Quattrone, F., Gawish, R., Lakovits, K., Aichinger, M.C. et al (2016) *Heme drives hemolysis-induced susceptibility to infection via disruption of phagocyte functions* Nat. Immunol., **17**, 1361-1372
- Roberts, L.L.** and Robinson, C.M. (2014) *Mycobacterium tuberculosis infection of human dendritic cells decreases integrin expression, adhesion and migration to chemokines* Immunology, **141**, 39–51
- Robinson, C.M.**, Jung, J-Y. and Nau, G.J. (2012) *Interferon- γ , tumor necrosis factor, and interleukin-18 cooperate to control growth of Mycobacterium tuberculosis in human macrophages* Cytokine, **60**, 233–241

Chemotaxis

- Li, Y.**, Nishiura, H., Tokita, K., Kouike, Y., Taniguchi, C., Iwahara, M., Nishino, N., Hamad, Y., Asakawa, M. and Yamamoto, T. (2009) *Elastin peptide receptor-directed monocyte chemotactic polysaccharides derived from seaweed sporophyll and from infectious fungus* Microb. Pathog. **45**, 423–434
- Magazine, H.I.**, Chang, J., Goumon, Y. and Stefano, G.B. (2000) *Rebound from nitric oxide inhibition triggers enhanced monocyte activation and chemotaxis* J. Immunol., **165**, 102-107
- Mancilla-Herrera I.**, Alvarado-Moreno, J.A., Cébulo-Vázquez, A., Prieto-Chávez, J.L., Ferat-Osorio, E., López-Macias, C., Estrada-Parra, S., Isibasi, A. and Arriaga-Pizano, L. (2015) *Activated endothelial cells limit inflammatory response, but increase chemoattractant potential and bacterial clearance by human monocytes* Cell Biol. Int., **39**, 721–732
- Papaspapiridonos, M.**, McNeill, E., de Bono, J.P., Smith, A., Burnand, K.G., Channon, K.M. and Greaves, D.R. (2008) *Galectin-3 is an amplifier of inflammation in atherosclerotic plaque progression through macrophage activation and monocyte chemoattraction* Arterioscler. Thromb. Vasc. Biol., **28**, 433-440
- Ritter, U.** and Moll, H. (2000) *Monocyte chemotactic protein-1 stimulates the killing of Leishmania major by human monocytes, acts synergistically with IFN- γ and is antagonized by IL-4* Eur. J. Immunol., **30**, 3111-3120

Cord blood

- Kraft, J.D.**, Horzempa, J., Davis, C., Jung, J-Y., Pena, M.M.O. and Robinson, C.M. (2013) *Neonatal macrophages express elevated levels of interleukin-27 that oppose immune responses* Immunology, **139**, 484–493

Dendritic cell, derived

- Alvarez, Y.**, Municio, C., Alonso, S., San Román, J.A., Sánchez Crespo, M. and Fernández, N. (2009) *Cyclooxygenase-2 induced by zymosan in human monocyte-derived dendritic cells shows high stability, and its expression is enhanced by atorvastatin* J. Pharmacol. Exp. Ther., **329**, 987-994
- Jung, J-Y.**, Roberts, L.L. and Robinson, C.M. (2015) *The presence of interleukin-27 during monocyte-derived dendritic cell differentiation promotes improved antigen processing and stimulation of T cells* Immunology, **144**, 649–660
- Roberts, L.L.** and Robinson, C.M. (2014) *Mycobacterium tuberculosis infection of human dendritic cells decreases integrin expression, adhesion and migration to chemokines* Immunology, **141**, 39–51
- Valera, I.**, Fernández, N., García Trinidad, A., Alonso, S., Brown, G.D., Alonso, A. and Sánchez Crespo, M. (2008) *Costimulation of dectin-1 and DC-SIGN triggers the arachidonic acid cascade in human monocyte-derived dendritic cells* J. Immunol., **180**, 5727-5736

Drug delivery (liposomes)

- Qin, J.**, Chen, D.W., Hu, H.Y., Cui, Q., Qiao, M.X. and Chen, B.Y. (2007) *Surface modification of RGD-liposomes for selective drug delivery to monocytes/neutrophils in brain* Chem. Pharm. Bull., **55**, 1192-1197
- Qin, J.**, Chen, D.W., Hu, H.Y., Qiao, M.X., Zhao, X.L. and Chen, B.Y. (2007) *Body distribution of RGD-mediated liposomes in brain-targeting drug delivery* Yakugaku Zasshi, **127**, 1497-1501

Exercise effects

- Périard, J.D.**, Ruell, P.A., Thompson, M.W. and Caillaud, C. (2015) *Moderate- and high-intensity exhaustive exercise in the heat induce a similar increase in monocyte Hsp72* Cell Stress Chaperones, **20**, 1037–1042
- Wang, D.**, Cai, Ge. J. and Yin, L. (2015) *Brief exercises affect gene expression in circulating monocytes* Scand. J. Immunol., **82**, 429–435

Heat-shock protein *see* Exercise effects

Immune responses *see* Angiogenic/immune responses

Inflammatory responses

- Chaudhuri, N.**, Paiva, C., Donaldson, K., Duffin, R., Parker, L.C., Sabroe, I. (2010) *Diesel exhaust particles override natural injury-limiting pathways in the lung* Am. J. Physiol. Lung. Cell. Mol. Physiol. **299**, L263–L271
- Chaudhuri, N.**, Jary, H., Lea, S., Khan, N., Piddock, K.C., Dockrell, D.H., Donaldson, K., Duffin, R., Singh, D., Parker, L.C. and Sabroe, I. (2012) *Diesel exhaust particle exposure in vitro alters monocyte differentiation and function* PloS One, **7**: e51107
- Chen, S.S.H.**, Jenkins, A.J. and Majewski, H. (2009) *Elevated plasma prostaglandins and acetylated histone in monocytes in Type 1 diabetes patients* Diabet. Med., **26**, 182–186
- Digby, J.E.**, Martinez, F., Jefferson, A., Ruparelia, N., Chai, J., Wamil, M., Greaves, D.R. and Choudhury, R.P. (2012) *Anti-inflammatory effects of nicotinic acid in human monocytes are mediated by GPR109A dependent mechanisms* Arterioscler. Thromb. Vasc. Biol., **32**, 669-676
- Mancilla-Herrera I.**, Alvarado-Moreno, J.A., Cébulo-Vázquez, A., Prieto-Chávez, J.L., Ferat-Osorio, E., López-Macias, C., Estrada-Parra, S., Isibasi, A. and Arriaga-Pizano, L. (2015) *Activated endothelial cells limit inflammatory response, but increase chemoattractant potential and bacterial clearance by human monocytes* Cell Biol. Int., **39**, 721–732
- Menu, P.**, Mayor, A., Zhou, R., Tardivel, A., Ichijo, H., Mori, K. and Tschopp, J. (2012) *ER stress activates the NLRP3 inflammasome via an UPR-independent pathway* Cell Death Dis., **3**: e261
- Oo, Y.H.**, Weston, C.J., Lalor, P.F., Curbishley, S.M., Withers, D.R., Reynolds, G.M., Shetty, S. et al (2010) *Distinct roles for CCR4 and CXCR3 in the recruitment and positioning of regulatory T cells in the inflamed human liver* J. Immunol., **184**, 2886–2898
- Papaspyridonos, M.**, McNeill, E., de Bono, J.P., Smith, A., Burnand, K.G., Channon, K.M. and Greaves, D.R. (2008) *Galectin-3 is an amplifier of inflammation in atherosclerotic plaque progression through macrophage activation and monocyte chemoattraction* Arterioscler. Thromb. Vasc. Biol., **28**, 433-440
- Xue, M.**, March, L., Sambrook, P.N. and Jackson, C.J. (2007) *Differential regulation of matrix metalloproteinase 2 and matrix metalloproteinase 9 by activated protein C: Relevance to inflammation in rheumatoid arthritis* Arthritis Rheumatism, **56**, 2864-2874
- Zimmermann, H.**, Weston, C.J., Curbishley, S.M. and Adams, D.H. (2012) *The role of vascular-adhesion-protein 1 (vap-1) in mediating monocyte migration across inflamed hepatic sinusoidal endothelium* Gut, **61**, A124

Leishmania

- Ritter, U.** and Moll, H. (2000) *Monocyte chemotactic protein-1 stimulates the killing of Leishmania major by human monocytes, acts synergistically with IFN- γ and is antagonized by IL-4* Eur. J. Immunol., **30**, 3111-3120

Leukapheresis samples, from

- Akiyama, Y.**, Oshita, C., Kume, A., Iizuka, A., Miyata, H., Komiyama, M., Ashizawa, T., Yagoto, M. et al (2012) *α -Type-1 polarized dendritic cell-based vaccination in recurrent high-grade glioma: a phase I clinical trial* BMC Cancer, **12**: 623

Liver, recruitment to

- Aspinal, A.I.**, Curbishley, S.M., Lalor, P.F., Weston, C.J., Blahova, M., Liaskou, E., Adams, R.M., Holt, A.P. and Adams, D.H. (2010) *CX3CR1 and vascular adhesion protein-1-dependent recruitment of CD161 monocytes across human liver sinusoidal endothelium* Hepatology, **51**, 2030-2039

LPS induced responses

- Creery, D.**, Angel, J.B., Aucoin, S., Weiss, W., Cameron, W.D., Diaz-Mitoma, F. and Kumar, A. (2002) *Nef protein of human immunodeficiency virus and lipopolysaccharide induce expression of CD14 on human monocytes through differential utilization of interleukin-10* Clin. Diagnost. Lab. Immunol., **9**, 1212-1221
- Widing, L.**, Bechensteen, A.G., Mirlashari, M.R., Vetlesen, A. and Kjeldsen-Kragh, J. (2007) *Evaluation of nonleukoreduced red blood cell transfusion units collected at delivery from the placenta* Transfusion **47**, 1481-1487

Macrophage differentiation/function

- Alvarez, Y.**, Municio, C., Alonso, S., Sánchez Crespo, M. and Fernández, N. (2009) *The induction of IL-10 by zymosan in dendritic cells depends on CREB activation by the coactivators CREB-binding protein and TORC2 and autocrine PGE2* J. Immunol., **183**, 1471–1479
- Carlson, P.E.**, Carroll, J.A., O’Dee, D.M. and Nau, G.J. (2007) *Modulation of virulence factors in Francisella tularensis determines human macrophage responses* Microb. Pathogen. **42**, 204-214
- Chaudhuri, N.**, Jary, H., Lea, S., Khan, N., Piddock, K.C., Dockrell, D.H., Donaldson, K., Duffin, R. et al (2012) *Diesel exhaust particle exposure in vitro alters monocyte differentiation and function* PloS One, **7**: e51107

- Cousins, S.W.**, Espinosa-Heidemann, D.G. and Csaky, K.G. (2004) *Monocyte activation in patients with age-related macular degeneration* Arch. Ophthalmol., **122**, 1013-1018
- Jung, J-Y.**, Madan-Lala, R., Georgieva, M., Rengarajan, J., Sohaskey, C.D., Bange, F-C. and Robinson, C.M. (2013) *The intracellular environment of human macrophages that produce nitric oxide promotes growth of mycobacteria* Infect. Immun., **81**, 3198–3209
- Jung, J-Y.** and Robinson, C.M. (2014) *IL-12 and IL-27 regulate the phagolysosomal pathway in mycobacteria-infected human macrophages* Cell Commun. Signal., **12**: 16
- Kraft, J.D.**, Horzempa, J., Davis, C., Jung, J-Y., Pena, M.M.O. and Robinson, C.M. (2013) *Neonatal macrophages express elevated levels of interleukin-27 that oppose immune responses* Immunology, **139**, 484–493
- Liang, C-P.**, Han, S., Okamoto, H., Carnemolia, R., Tabas, I., Accili, D. and Tali, A.R. (2004) *Increased CD36 protein as a response to defective insulin signaling in macrophages* J. Clin. Invest., **113**, 764-773
- Li, C-Y.**, Chou, T-C., Lee, C-H., Tsai, C-S., Loh, S-H. and Wong, C-S. (2003) *Adrenaline inhibits lipopolysaccharide-induced macrophage inflammatory protein-1 α in human monocytes: the role of β -receptors* Anesth. Analg., **96**, 518-523
- Quesniaux, V.**, Erard, F. and Ryffel, B. (2010) *Adjuvant activity on murine and human macrophages* In Vaccine Adjuvants (ed. Davies, G.) Methods Mol. Biol., **626**, 117-130, Humana Press, Totowa, NJ, USA
- Robinson, C.M.**, O’Dee, D., Hamilton, T. and Nau, G.J. (2010) *Cytokines involved in interferon- γ production by human macrophages* J. Innate Immun., **2**, 56–65
- Robinson, C.M.**, Jung, J-Y. and Nau, G.J. (2012) *Interferon- γ , tumor necrosis factor, and interleukin-18 cooperate to control growth of Mycobacterium tuberculosis in human macrophages* Cytokine, **60**, 233–241
- Tyner, J.W.**, Uchida, O., Kajiwara, N., Kim, E.Y., Patel, A.C., O’Sullivan, M.P., Walter, M.J. et al (2005) *CCL5-CCR5 interaction provides antiapoptotic signals for macrophage survival viral infection* Nat. Med., **11**, 1180-1187
- Vosper, H.**, Patel, L., Graham, T.L., Khoudoli, G.A., Hill, A., Macphee, C.H., Pinto, I., Smith, S.A. et al (2001) *The peroxisome proliferator-activated receptor delta promotes lipid accumulation in human macrophages* J. Biol. Chem. **276**, 44258-4426

Metalloproteinases

- Bao, W.**, Min, D., Twigg, S.M., Shackel, N.A., Warner, F.J., Yue D.K., McLennan, S.V. (2010) *Monocyte CD147 is induced by advanced glycation end products and high glucose concentration: possible role in diabetic complications* Am. J. Physiol. Cell Physiol., **299**, C1212–C121
- Ludwig, A.**, Berkhout, T., Moores, K., Groot, P. and Chapman G. (2002) *Fractalkine is expressed by smooth muscle cells in response to IFN- γ and TFN- α and is modulated by metalloproteinase activity* J. Immunol., **168**, 604-612

Methodology

- Graziani-Bowering, G.M.**, Graham, J. and Filion, L.G. (1997) *A quick, easy and inexpensive method for the isolation of human peripheral blood monocytes* J. Immunol. Methods, **207**, 157-168
- Nutt, J.C.**, Willis, C.C., Morris, J.M. and Gallery, E.D.M. (2004) *Isolating pure populations of monocytes from the blood of pregnant women: comparison of flotation in iodixanol with elutriation* J. Immunol. Methods, **293**, 215-218

Transcription factors

- Scott, C.**, Bonner, J., Min, D., Boughton, P., Stokes, R., Cha, K.M., Walters, S.N., Maslowski, K. et al (2014) *Reduction of ARNT in myeloid cells causes immune suppression and delayed wound healing* Am. J. Physiol. Cell. Physiol., **307**, C349–C357

Oxidation

- Gauss, K.A.**, Bunger, P.L., Larson, T.C., Young, C.J., Nelson-Overton, L.K., Siemsen, D.W. and Quinn, M.T. (2005) *Identification of a novel tumor necrosis factor α -responsive region in the NCF2 promoter* J. Leukoc. Biol., **77**, 267-278
- Gauss, K.A.**, Bunger, P.L., Crawford, M.A., McDermott, B.E., Swearingen, R., Nelson-Overton, L.K., Siemsen, D.W., Kobayashi, S.D., DeLeo, F.R. and Quinn, M.T. (2006) *Variants of the 5’-untranslated region of human NCF2: expression and translational efficiency* Gene, **366**, 169-179
- VEGF transfection
- Magazine, H.I.**, Chang, J., Goumon, Y. and Stefano, G.B. (2000) *Rebound from nitric oxide inhibition triggers enhanced monocyte activation and chemotaxis* J. Immunol., **165**, 102-107

Modarai, B., Humphries, J., Gossage, J.A., Waltham, M., Burnand, K.G., Kanaganayagam, G.S., Afuwape, A., Paleolog, E., Smith, A., Wadoodi, A. (2008) *Adenovirus-mediated VEGF gene therapy enhances venous thrombus recanalization and resolution* Arterioscler. Thromb. Vasc. Biol., **28**, 1752-1759

Thiosemicarbazones

Moreno-Rodríguez, A., Salazar-Schettino, P.M., Bautista, J.L., Hernández-Luis, F., Torrens, H., Guevara-Gómez, Y., Pina-Canseco, S. et al (2014) *In vitro antiparasitic activity of new thiosemicarbazones in strains of Trypanosoma cruzi* Eur. J. Medic. Chem., **87**, 23-29

Virus interactions

Chehadeh, W., Bouzidi, A., Alm, G., Wattré, P. and Hober, D. (2001) *Human antibodies isolated from plasma by affinity chromatography increase the coxsackievirus B4-induced synthesis of interferon- α by human peripheral blood mononuclear cells in vitro* J. Gen. Virol., **82**, 1899-1907

Creery, D., Angel, J.B., Aucoin, S., Weiss, W., Cameron, W.D., Diaz-Mitoma, F. and Kumar, A. (2002) *Nef protein of human immunodeficiency virus and lipopolysaccharide induce expression of CD14 on human monocytes through differential utilization of interleukin-10* Clin. Diagnost. Lab. Immunol., **9**, 1212-1221

Dumont, L.J., Luka, J., van den Broeke, T., Whitley, P., Ambruso, D.R. and Elfath, M.D. (2001) *The effect of leukocyte-reduction method on the amount of human cytomegalovirus in blood products: a comparison of apheresis and filtration methods* Blood, **97**, 3640-3647

Mackewicz, C.E., Yuan, J., Tran, P., Diaz, L., Mack, E., Selsted, M.E. and Levy, J.A. (2003) *α -Defensins can have anti-HIV activity but are not CD8 cell anti-HIV factors* AIDS, **17**, F23-F32

Wound healing

Scott, C., Bonner, J., Min, D., Boughton, P., Stokes, R., Cha, K.M., Walters, S.N., Maslowski, K., Sierro, F., Grey, S.T., Twigg, S., McLennan, S. and Gunton, J.E. (2014) *Reduction of ARNT in myeloid cells causes immune suppression and delayed wound healing* Am. J. Physiol. Cell. Physiol., **307**, C349–C357

1a-2 Macaque

Tongaonkar, P., Tran, P., Roberts, K., Schaal, J., Osapay, G., Tran, D., Ouellette, A.J. and Selsted, M.E. (2011) *Rhesus macaque θ -defensin isoforms: expression, antimicrobial activities and demonstration of a prominent role in neutrophil granule microbicidal activities* J. Leukoc. Biol., **89**, 283–290

1a-3 Murine

Abd Alla, J., Langer, A., Elzahwy, S.S., Arman-Kalcek, G., Streichert, T. and Quitterer, U. (2010) *Angiotensin-converting enzyme inhibition down-regulates the pro-atherogenic chemokine receptor 9 (CCR9)-chemokine ligand 25 (CCL25) axis* J. Biol. Chem., **285**, 23496-23505

1a-4 Ovine

Berger, S.T. and Griffin, F.T. (2006) *A comparison of ovine monocyte-derived macrophage function following infection with Mycobacterium avium ssp. avium and Mycobacterium avium ssp. paratuberculosis* Immunol. Cell Biol., **84**, 349-356

1b From whole blood (discontinuous flotation gradient)

Burdo, T.H., Wood, M.R. and Fox, H.S. (2007) *Osteopontin prevents monocyte recirculation and apoptosis* J. Leukoc. Biol. **81**, 1504-1511

Goodman, R.S., Kirton, C.M., Oostingh, G.J., Schon, M., Clark, M.R., Bradley, J.A. and Taylor, C.J. (2008) *PECAM-1 polymorphism affects monocyte adhesion to endothelial cells* Transplantation, **85**, 71-477

Anwar, K., Voloshyna, I., Littlefield, M.J., Carsons, S.E., Wirkowski, P.A., Jaber, N.L., Sohn, A., Eapen, S. and Reiss, A.B. (2011) *COX-2 Inhibition and inhibition of cytosolic phospholipase A2 increase CD36 expression and foam cell formation in THP-1 cells* Lipids **46**, 131–142

2 Mononuclear cells (barrier sedimentation gradient)

2a-1 Blood (canine)

Goto-Koshino, Y., Tomiyasu, H., Suzuki, H., Tamamoto, T., Mizutani, N., Fujino, Y., Ohno, K. and Tsujimoto, H. (2014) *Differential expression of CD45 isoforms in canine leukocytes* Vet. Immunol. Immunopathol., **160**, 118–122

2a-2 Blood (chicken)

Xu, S., Xue, C., Li, J., Bi, Y. and Cao, Y. (2011) *Marek's disease virus type 1 microRNA miR-M3 suppresses cisplatin-induced apoptosis by targeting SMAD2 of the transforming growth factor beta signal pathway* J. Virol., **85**, 276-285

2a-3 Blood (equine)

Ellison, S.P., Greiner, E., Brown, K.W. and Kennedy, T. (2004) *Experimental infection of horses with culture-derived Sarcocystis neurona merozoites as a model for equine protozoal myeloencephalitis* Int. J. Appl. Res. Vet. Med., **2**, 79-89

Pronost, S., Legrand, L., Pitel, P-H., Wegge, B., Lissens, J., Freymuth, F., Richard, E. and Fortier, G. (2012) *Outbreak of equine herpesvirus myeloencephalopathy in France: a clinical and molecular investigation* Transbound. Emerg. Dis., **59**, 256–263

2a-4 Blood (fish)

Li, J., Das, S., Herrin, B.R., Hirano, M. and Cooper, M.D. (2013) *Definition of a third VLR gene in hagfish* Proc. Natl. Acad. Sci., **110**, 15013–15018

Godaheva G.I., Perera, N.C.N., Umasuthan, N., Wan, Q., Whang, I. and Lee, J. (2016) *Molecular characterization and expression analysis of B cell activating factor from rock bream (Oplegnathus fasciatus)* Dev. Comp. Immunol., **55**, 1-11

Oh, M., Bathige, S.D.N.K., Kim, Y., Lee, S., Yang, H., Kim, M-J. and Lee, J. (2017) *A CXCL ortholog from Hippocampus abdominalis: Molecular features and functional delineation as a pro-inflammatory chemokine* Fish Shellfish Immunol., **67**, 218-227

Thulasitha, W.S., Umasuthan, N., Whang, I., Lim, B-S., Jung, H-B., Noh, J.K. and Lee, J. (2015) *A CXC chemokine gene, CXCL12, from rock bream, Oplegnathus fasciatus: Molecular characterization and transcriptional profile* Fish Shellfish Immunol., **45**, 560-566

Umasuthan, N., Wan, Q., Revathy, K.S., Whang, I., Noh, J.K., Kim, S., Park, M-A. and Lee, J. (2014) *Molecular aspects, genomic arrangement and immune responsive mRNA expression profiles of two CXC chemokine receptor homologs (CXCR1 and CXCR2) from rock bream, Oplegnathus fasciatus* Fish, Shellfish Immunol., **40**, 304-318

2a-5 Blood (human)

Adrenoleukodystrophy

Hung, K-L., Wang, J-S., Keng, W.T., Chen, H-J., Liang, J-S., Ngu, L.H. and Lu, J-F. (2013) *Mutational analyses on X-linked adrenoleukodystrophy reveal a novel cryptic splicing and three missense mutations in the ABCD1 gene* Pediatr. Neurol., **49**, 185-190

Cancer/virus studies

Ishikawa, A., Motohashi, S., Ishikawa, E., Fuchida, H., Higashino, K., Otsuji, M., Iizasa, T., Nakayama, T., Taniguchi, M. and Fujisawa, T. (2005) *A phase I study of α -galactosylceramide (KRN7000) – pulsed dendritic cells in patients with advanced and recurrent non – small cell lung cancer* Clin. Cancer Res., **11**, 1910-1917

Kurosaki, M., Horiguchi, S., Yamasaki, K., Uchida, Y., Motohashi, S., Nakayama, T., Sugimoto, A. and Okamoto, Y. (2011) *Migration and immunological reaction after the administration of α GalCer-pulsed antigen-presenting cells into the submucosa of patients with head and neck cancer* Cancer Immunol. Immunother., **60**, 207–215

Motohashi, S., Ishikawa, A., Ishikawa, E., Otsuji, M., Iizasa, T., Hanaoka, H., Shimizu, N., Horiguchi, S. et al (2006) *A phase I study of in vitro expanded natural T killer cells in patients with advanced and recurrent non-small cell lung cancer* Clin. Cancer Res., **12**, 6079-6085

Motohashi, S., Nagato, K., Kunii, N., Yamamoto, H., Yamasaki, K., Okita, K., Hanaoka, H., Shimizu, N. et al (2009) *A phase I-II study of α -galactosylceramide-pulsed IL-2/GM-CSF-cultured peripheral blood mononuclear cells in patients with advanced and recurrent non-small cell lung cancer* J. Immunol., **182**, 2492–2501

Petersen, L., Petersen, C.C., Møller-Larsen, A. and Hokland, M.E. (2010) *Short-term exposure to human cytomegalovirus-infected fibroblasts induces a proportional increase of active CD94/NKG2A⁺ natural killer cells* Hum. Immunol., **71**, 29–35

Petersen, C.C., Nederby, L., Roug, A.S., Skovbo, A., Peterslund, N.A., Hokland, P., Nielsen, B. and Hokland, M. (2011) *Increased expression of CD69 on T cells as an early immune marker for human cytomegalovirus reactivation in chronic lymphocytic leukemia patients* Viral Immunol., **24**, 165–169

Stokes, C.A., Ismail, S., Dick, E.P., Bennett, J.A., Johnston, S.L., Edwards, M.R., Sabroe, I. and Parker, L.C. (2011) *Role of interleukin-1 and MyD88-dependent signaling in rhinovirus infection* J. Virol., **85**, 7912-7921

Sun, C., Feng, L., Zhang, Y., Xiao, L., Pan, W., Li, C., Zhang, L. and Chen, L. (2012) *Circumventing antivector immunity by using adenovirus-infected blood cells for repeated application of adenovirus-vectored vaccines: proof of concept in rhesus macaques* J. Virol., **86**, 11031-11042

Uchida, T., Horioguchi, S., Tanaka, Y., Yamamoto, H., Kunii, N., Motohashi, S., Taniguchi, M., Nakayama, T. and Okamoto, Y. (2008) *Phase I study of α -galactosylceramide-pulsed antigen presenting cells administration to the nasal submucosa in unresectable or recurrent head and neck cancer* Cancer Immunol. Immunother., **57**, 337-345

Yang, Z., Tang, T., Wei, X., Yang, S. and Tian, Z. (2015) *Type 1 innate lymphoid cells contribute to the pathogenesis of chronic hepatitis B* Innate Immun., **21**, 665–673

Basophil isolation

Youssef, L.A., Pharm, B., Wilson, B.S. and Oliver, J.M. (2002) *Proteasome-dependent regulation of Syk tyrosine kinase levels in human basophils* J. Allergy Clin. Immunol., **110**, 366-373

Cell proliferation

Mukherjee, S., Giamberardino, C., Thomas, J., Evans, K., Goto, H., Ledford, J.G., Hsia, B., Pastva, A.M. and Wright, J.R. (2012) *Surfactant protein A integrates activation signal strength to differentially modulate T cell proliferation* J. Immunol., **188**, 957–967

Parmar, S., Thompson, A.A.R., Higgins, K.R., Sabroe, I., Parker, L.C., Lawrie, A., Arnold, J., Walker, S. et al (2012) *Elucidating the mechanism by which monocytes can inhibit hypoxic Pa-Smc proliferation* Am. J. Respir. Crit. Care Med., **185**, A5660

Schmitt, D.M., O'Dee, D.M., Horzempa, J., Carlson Jr, P.E., Russo, B.C., Bales, J.M., Brown, M.J. and Nau, G.J. (2012) *A Francisella tularensis live vaccine strain that improves stimulation of antigen-presenting cells does not enhance vaccine efficacy* PLoS One, **7**: e31172

Stechmiller, J.K., Langkamo-Henken, B., Childress, B., Herrlinger-Garcia, K.A., Hugens, J., Tian, L., Percival, S.S. and Steele, R. (2005) *Arginine supplementation does not enhance serum nitric oxide levels in elderly nursing home residents with pressure ulcers* Biol. Res. Nurs., **6**, 289-299

Corticosteroids

Bodor, N., Zubovics, Z., Kurucz, I., Solyom, S. and Bodor, E. (2017) *Potent analogues of etiprednol dicloacetate, a second generation of soft corticosteroids* J. Pharmacy Pharmacol., **69**, 1745–1753

Endocannabinoid system

Chiang, K.P., Gerber, A.L., Sipe, J.C. and Cravatt, B.F. (2004) *Reduced cellular expression and activity of the P129T mutant of human fatty acid amide hydrolase: evidence for a link between defects in the endocannabinoid system and problem drug use* Hum. Mol. Genet., **13**, 2113-2119

Exercise/fasting effects

Elliott, R.M., de Roos, B., Duthie, S.J., Bouwman, F.G., Rubio-Aliaga, I., Crosley, L.K., Mayer, C., Polley, A.C. et al (2014) *Transcriptome analysis of peripheral blood mononuclear cells in human subjects following a 36 h fast provides evidence of effects on genes regulating inflammation, apoptosis and energy metabolism* Genes Nutr., **9**: 432

Radom-Aizik, S., Zaldivar, Jr. F., Leu, S-Y., Adams, G.R., Oliver, S. and Cooper, D.M. (2012) *Effects of exercise on microRNA expression in young males peripheral blood mononuclear cells* Clin.Trans. Sci., **5**, 32–38

Radom-Aizik, S., Zaldivar, F., Leu, S-Y. and Cooper, D.M. (2009) *Brief bout of exercise alters gene expression in peripheral blood mononuclear cells of early- and late-pubertal males* Pediatr. Res., **65**, 447–452

Radom-Aizik, S., Zaldivar, F., Leu, S. and Cooper, D.M. (2009) *A brief bout of exercise alters gene expression and distinct gene pathways in peripheral blood mononuclear cells of early- and late-pubertal females* J. Appl. Physiol., **107**, 168–175

Immunogenicity

Liu, P., Chen, S., Li, X., Qin, L., Huang, K., Wang, L., Huang, W., Li, S., Jia, B., Zhong, M., Pan, G., Cai, J. and Pei, D. (2013) *Low immunogenicity of neural progenitor cells differentiated from induced pluri-potent stem cells derived from less immunogenic somatic cells* PLoS One, **8**: e69617

Inflammatory processes

Das, N., Dewan, V., Grace, P.M., Gunn, R.J., Tamura, R., Tzarum, N., Watkins, L.R., Wilson, I.A. and Yin, H. (2016) *HMGB1 activates proinflammatory signaling via TLR5 leading to allodynia* Cell Rep., **17**, 1128–1140

Grundtner, R., Dornmair, K., Dahm, R., Flügel, A., Kawakami, N., Zeitelhofer, M., Schoderboeck, L., Nosov, M. et al (2007) *Transition from enhanced T cell infiltration to inflammation in the myelin-degenerative central nervous system* Neuobiol. Dis., **28**, 261-275

Radom-Aizik, S., Zaldivar, Jr. F., Leu, S-Y., Adams, G.R., Oliver, S. and Cooper, D.M. (2012) *Effects of exercise on micro-RNA expression in young males peripheral blood mononuclear cells* Clin. Trans. Sci., **5**, 32–38

Saurer, L., Rihs, S., Birrer, M., Saxer-Seculic, N., Radsak, M. and Mueller, C. (2012) *Elevated levels of serum-soluble triggering receptor expressed on myeloid cells-1 in patients with IBD do not correlate with intestinal TREM-1 mRNA expression and endoscopic disease activity* J. Crohn's Colitis, **6**, 913–923

Macrophage/monocyte differentiation

Chaudhuri, N., Jary, H., Lea, S., Khan, N., Piddock, K.C., Dockrell, D.H., Donaldson, K., Duffin, R., Singh, D., Parker, L.C. and Sabroe, I. (2012) *Diesel exhaust particle exposure in vitro alters monocyte differentiation and function* PLoS One, **7**: e511107

Voloshyna, I., Hai, O., Littlefield, M.J., Carsons, S. and Reiss, A.B. (2013) *Resveratrol mediates anti-atherogenic effects on cholesterol flux in human macrophages and endothelium via PPAR γ and adenosine* Eur. J. Pharmacol., **698**, 299–309

Sample processing

De Roos, B., Duthie, S.J., Polley, A.C.J., Mulholland, F., Bouwman, F.G., Heim, C., Rucklidge, G.J., Johnson, I.T. et al (2008) *Proteomic methodological recommendations for studies involving human plasma, platelets and peripheral blood mononuclear cells* J. Proteome Res., **7**, 2280-2290

Holland, N.T., Smith, M.T., Eskenazi, B. and Bastaki, M. (2003) *Biological sample collection and processing for molecular epidemiological studies* Mutat. Res., **543**, 217-234

Holland, N.T., Pflieger, L., Berger, E., Ho, A. and Bastaki, M. (2005) *Molecular epidemiology biomarkers – sample collection and processing considerations* Tox. Appl. Pharmacol., **206**, 261-268

α -Synuclein

Barbour, R., Kling, K., Anderson, J.P., Banducci, K., Cole, T., Diep, L., Fox, M., Goldstein, J.M., Soriano, F., Seubert, P. and Chilcote, T.J. (2008) *Red blood cells are the major source of alpha-synuclein in blood* Neurodegener. Dis., **5**, 55-59

T-cell apoptosis

Oh, J., Kim, S-H., Ahn, S. and Lee, C-E. (2012) *Suppressors of cytokine signaling promote Fas-induced apoptosis through downregulation of NF- κ B and mitochondrial Bfl-1 in leukemic T cells* J. Immunol., **189**, 5561–5571

VEGF

Kusumanto, Y.H., Dam, W.A., Hospers, G.A.P., Meijer, C. and Mulder, N.H. (2003) *Platelets and granulocytes, in particular the neutrophils, form important compartments for circulating vascular endothelial growth factor* Angiogenesis, **6**, 283-287

Webb, N.J.A., Watson, C.J., Roberts, I.S.D., Bottomley, M.J., Jones, C.A., Lewis, M.A., Postlethwaite, R.J. and Benchley, P.E.C. (1999) *Circulating vascular endothelial growth factor is not increased during relapses of steroid-sensitive nephrotic syndrome* Kidney Int., **55**, 1063-1071

Vitamin B₁₂ uptake

Obeid, R., Kuhlmann, M., Kirshc, C-M. and Herrmann, W. (2005) *Cellular uptake of vitamin B₁₂ in patients with chronic renal failure* Nephron Clin. Pract., **99**, c42-c48

2a-6 Blood (non-human primate)

Meng, W., Pan, W., Zhang, A.J.X., Li, Z., Wei, G., Feng, L., Dong, Z., Li, C. et al (2013) *Rapid generation of human-like neutralizing monoclonal antibodies in urgent preparedness for influenza pandemics and virulent infectious diseases* PLoS One, **8**: e66276

Stittelaar, K., Wyatt, L.S., de Swart, R.L., Vos, H.W., Groen, J., van Amerongen, G., van Binnendijk, R.S., Rozenblatt, S., Moss, B. and Osterhaus, A.D.M.E. (2000) *Protective immunity in macaques vaccinated with a modified vaccinia virus Ankara-based measles virus vaccine in the presence of passively acquired antibodies* J. Virol., **74**, 4236-4243

Stittelaar, K.J., Kuiken, T., de Swart, R.L., van Amerongen, G., Vos, H.W., Niesters, H.G.M., van Schalkwijk, P., van der Kwast, T., Wyatt, L.S., Moss, B. and Osterhaus, A.D.M.E. (2001) *Safety of modified vaccinia virus Ankara (MVA) in immune-suppressed macaques* Vaccine, **19**, 3700-3709

- Sun, C.**, Feng, L., Zhang, Y., Xiao, L., Pan, W., Li, C., Zhang, L. and Chen, L. (2012) *Circumventing antivector immunity by using adenovirus-infected blood cells for repeated application of adenovirus-vectored vaccines: proof of concept in rhesus macaques* J. Virol., **86**, 11031-11042
- Van der Kruij, A.C.**, van den Burg, R., Hoyer, M.J. Gruters, R.A., Osterhaus, A.D.M.E. and Berhout, B. (2004) *SIVdrl detection in captive mandrills: are mandrill infected with a third strain of simian immunodeficiency virus?* Retrovirology, **1**: 36

2a-7 Blood (porcine)

- Kim, S.J.**, Han, Y.W., Rahman, Md.M., Kim, S.B., Uyangaa, E., Lee, B.M., Kim, J.H., Roh, Y.S. et al (2010) *Live attenuated Salmonella enterica serovar Typhimurium expressing swine interferon- α has antiviral activity and alleviates clinical signs induced by infection with transmissible gastroenteritis virus in piglets* Vaccine **28**, 5031–5037
- Kim, S.J.**, Kim, S.B., Han, Y.W., Uyangaa, E., Kim, J.H., Choi, J.Y., Kim, K. and Eo, S.K. (2012) *Co-administration of live attenuated Salmonella enterica serovar Typhimurium expressing swine interleukin-18 and interferon- α provides enhanced Th1-biased protective immunity against inactivated vaccine of pseudorabies virus* Microbiol. Immunol., **56**, 529–540
- Kim, S.B.**, Kim, S.J., Lee, B.M., Han, Y.W., Rahman, M., Uyangaa, E., Kim, J.H., Choi, J.Y. et al (2012) *Oral administration of Salmonella enterica serovar Typhimurium expressing swine interleukin-18 induces Th1-biased protective immunity against inactivated vaccine of pseudorabies virus* Vet. Microbiol., **155**, 172–182
- Lannes, N.**, Python, S. and Summerfield, A. (2012) *Interplay of foot-and-mouth disease virus, antibodies and plasmacytoid dendritic cells: virus opsonization under non-neutralizing conditions results in enhanced interferon-alpha responses* Vet. Res., **43**: 64
- Lee, B.M.**, Han, Y.W., Kim, S.B., Rahman, M.M., Uyangaa, E., Kim, J.Y., Roh, Y.S. et al (2011) *Enhanced protection against infection with transmissible gastroenteritis virus in piglets by oral co-administration of live attenuated Salmonella enterica serovar Typhimurium expressing swine interferon- α and interleukin-18* Comp. Immunol. Microbiol. Infect. Dis., **34**, 369– 380

2a-8 Blood (rodent)

- Horibe, T.**, Kawamoto, M., Kohno, M. and Kawakami, K. (2012) *Cytotoxic activity to acute myeloid leukemia cells by Antp-TPR hybrid peptide targeting Hsp90* J. Biosci. Bioeng., **114**, 96-103
- Islama, M.A.**, Hooiveld, G.J.E.J., van den Berg, J.H.J., Boekschoten, M.V., van der Velpen, V., Murk, A.J., Rietjens, I.M.C.M. and van Leeuwen, F.X.R. (2015) *Plasma bioavailability and changes in PBMC gene expression after treatment of ovariectomized rats with a commercial soy supplement* Toxicol. Rep., **2**, 308–321
- King, A.**, Houlihan, D.D., Kavanagh, D., Haldar, D., Luu, N., Owen, A., Suresh, S., Than, N.N. et al (2017) *Sphingosine-1-phosphate prevents egress of hematopoietic stem cells from liver to reduce fibrosis* Gastroenterology, **153**, 233–248
- Konieczna, J.**, Sánchez, J., Palou, M., Picó, C. and Palou, A. (2015) *Blood cell transcriptomic-based early biomarkers of adverse programming effects of gestational calorie restriction and their reversibility by leptin supplementation* Sci. Rep., **5**: 9088
- Kuan, W-L.**, Poole, E., Fletcher, M., Karniely, S., Tyers, P., Wills, M., Barker, R.A. and Sinclair, J.J. (2012) *A novel neuroprotective therapy for Parkinson's disease using a viral noncoding RNA that protects mitochondrial Complex I activity* J. Exp. Med., **209**, 1-10
- Lühder, F.**, Kebir, H., Odoardi, F., Litke, T., Sonneck, M., Alvarez, J.I., Winchenbach, J., Eckert, N. et al (2017) *Laquinimod enhances central nervous system barrier functions* Neurobiol. Dis., **102**, 60–69
- Mendez-David, I.**, David, D.J., Guilloux, J-P., Hen, R. and Gardier, A.M. (2015) *5-HT₄ Receptor subtype, β -arrestin level, and rapid-onset effects of antidepressant drugs* In Neuromethods., **95**, Serotonin Receptor Technologies: (ed. Blenau, W. and Baumann, A.) Springer Science+Business Media, New York, pp 101-121
- Patel, K.**, Trivedi, R.N., Durgampudi, C., Noel, P., Cline, R.A., DeLany, J.P., Navina, S. and Singh, V.P. (2015) *Lipolysis of visceral adipocyte triglyceride by pancreatic lipases converts mild acute pancreatitis to severe pancreatitis independent of necrosis and inflammation* Am. J. Pathol., **185**, 808-819
- Petrov, P.D.**, Bonet, M.L., Reynés, B., Oliver, P., Palou, A. and Ribot, J. (2016) *Whole blood RNA as a source of transcript-based nutrition- and metabolic health-related biomarkers* PLoS One, **11**: e0155361
- Qin, J.**, Yang, X., Zhang, R-X., Luo, Y-X., Li, J-L., Hou, J., Zhang, C. et al (2015) *Monocyte mediated brain targeting delivery of macromolecular drug for the therapy of depression* Nanomed: Nanotechnol. Biol. Med., **11**, 391–400
- Ruiz, E.**, Oliver, P. and Palou, A. (2015) *Gene expression of peripheral blood mononuclear cells is affected by cold exposure* Reynés, B., García- Am. J. Physiol. Regul. Integr. Comp. Physiol., **309**, R824–R834
- Subota, V.**, Mirkov, I., Demenesku, J., Aleksandrov, A.P., Ninkov, M., Mileusnic, D., Kataranovski, D. and Kataranovski, M., (2016) *Transdermal toxicity of topically applied anticoagulant rodenticidewarfarin in rats* Environ. Toxicol. Pharmacol., **41**, 232–240

Tang, X., Wang, X., Zhao, Y.Y., Curtis, J.M. and Brindley, D.N. (2017) *Doxycycline attenuates breast cancer related inflammation by decreasing plasma lysophosphatidate concentrations and inhibiting NF- κ B activation* Mol. Cancer, **16**: 36

2a-9 Blood (ruminant)

Imakawa, K., Nagaoka, K., Nojima, H., Hara, Y. and Christensen, R.K. (2005) *Changes in immune cell distribution and IL-10 production are regulated through endometrial IP-10 expression in the goat uterus* Am. J. Reprod. Immunol., **53**, 54-64

Lin, J., Zhao, D., Wang, J., Wang, Y., Li, H., Yin, X., Yang, L. and Zhou, X. (2015) *Transcriptome changes upon in vitro challenge with Mycobacterium bovis in monocyte-derived macrophages from bovine tuberculosis-infected and healthy cows* Vet. Immunol. Immunopathol., **163**, 146–156

Nagaoka, K., Sakai, A., Nojima, H., Suda, Y., Yokomizo, Y., Imakawa, K., Sakai, S. and Christenson, R.K. (2003) *A chemokine, interferon (IFN)- γ -inducible protein 10 kDa, is stimulated by IFN- τ and recruits immune cells in the ovine endometrium* Biol. Reprod., **68**, 1413-1421

Wang, J., Zhou, X., Pana, B., Yang, L., Yin, X., Xu, B. and Zhao, D. (2013) *Investigation of the effect of Mycobacterium bovis infection on bovine neutrophil functions* Tuberculosis, **93**, 675-687

2b Semen (human)

Semen (human)

Byrn, R.A. and Kiessling, A.A. (1998) *Analysis of human immunodeficiency virus in semen: indications of a genetically distinct virus reservoir* J. Reprod. Immunol., **41**, 161-176

Eyre, R.C., Zheng, G. and Kiessling, A.A. (2000) *Multiple drug resistance mutations in human immunodeficiency virus in semen but not blood of a man on antiretroviral therapy* Urology, **55**, 591xvii-591xx

2c Tissues

Bone marrow

Aliotta, J.M., Pereira, M., Johnson, K.W., de Paza, N., Dooner, M.S., Puente, N., Ayala, C., Brilliant, K. et al (2010) *Microvesicle entry into marrow cells mediates tissue-specific changes in mRNA by direct delivery of mRNA and induction of transcription* Exp. Hematol., **38**, 233–245

Aliotta, J.M., Lee, D., Puente, N., Faradyan, S., Sears, E.H., Amara, A., Goldberg, L., Dooner, M.S., Pereira, M. and Quesenberry, P.J. (2012) *Progenitor/stem cell fate determination: interactive dynamics of cell cycle and microvesicles* Stem Cells Dev., **21**, 1627-1638

Aliotta, J.M., Pereira, M., Amaral, A., Sorokina, A., Igbinoba, Z., Hasslinger, A., El-Bizri, R., Rounds, S.I., Quesenberry, P.J. and Klinger, J.R. (2013) *Induction of pulmonary hypertensive changes by extracellular vesicles from monocrotaline-treated mice* Cardiovasc. Res., **100**, 354–362

Aliotta, J.M., Pereira, M., Sears, E.H., Dooner, M.S., Wen, S., Goldberg, L.R. and Quesenberry, P.J. (2012) (2015) *Lung-derived exosome uptake into and epigenetic modulation of marrow progenitor/stem and differentiated cells* J. Extracell. Vesicles, **4**:26166

Evans, C.A., Tonge, R., Blinco, D., Pierce, A., Shaw, J., Lu, Y., Hanzah, H.G., Gray, A. et al (2004) *Comparative proteomics of primitive hematopoietic cell populations reveals differences in expression of proteins regulating motility* Blood, **103**, 3751-3759

Liu, L., Papa, E.F., Dooner, M.S., Machan, J.T., Johnson, K.W., Goldberg, L.R., Quesenberry, P.J. and Colvin, G.A. (2012) *Homing and long-term engraftment of long- and short-term renewal hematopoietic stem cells* PLoS One, **7**: e31300

Mukai, M., Suruga, N., Saeki, N. and Ogawa, K. (2017) *EphA receptors and ephrin-A ligands are upregulated by monocytic differentiation/maturation and promote cell adhesion and protrusion formation in HL60 monocytes* BMC Cell Biol., **18**: 28

Unwin, R.D., Smith, D.L., Blinco, D., Wilson, C.L., Miller, C.J., Evans, C.A., Jaworska, E., Baldwin, S.A. et al (2006) *Quantitative proteomics reveals posttranslational control as a regulatory factor in primary hematopoietic stem cells* Blood, **107**, 4687-4694

Whetton, A.D., Lu, Y., Pierce, A., Carney, L. and Spooncer, E. (2003) *Lysophospholipids synergistically promote primitive hematopoietic cell chemotaxis via a mechanism involving Vav1* Blood, **102**, 2798-2802

Brain

Kim, J.H., Choi, J.Y., Kim, S.B., Uyangaa, E., Patil, A.M., Han, Y.W., Park, S-Y., Lee, J.H., Kim, K. and Eo, S.K. (2015) *CD11chi dendritic cells regulate Ly-6Chi monocyte differentiation to preserve immune-privileged CNS in lethal neuroinflammation* Sci. Rep., **5**: 17548

Kim, S.B., Choi, J.Y., Kim, J.H., Uyangaa, E., Patil, A.M., Park, S-Y., Lee, J.H. et al (2015) *Amelioration of Japanese encephalitis by blockage of 4-1BB signaling is coupled to divergent enhancement of type I/II IFN responses and Ly-6Chi monocyte differentiation* J. Neuroinflamm., **12**: 216

Kim, S.B., Choi, J.Y., Uyangaa, E., Patil, A.M., Hossain, F.M.A., Hur, J., Park, S-Y. et al (2016) *Blockage of indoleamine 2,3-dioxygenase regulates Japanese encephalitis via enhancement of type I/II IFN innate and adaptive T-cell responses* J. Neuroinflam. **13**: 79

Heart

Dobaczewski, M., Xia, Y., Bujak, M., Gonzalez-Quesada, C. and Frangogiannis, N.G. (2010) *CCR5 signaling suppresses inflammation and reduces adverse remodeling of the infarcted heart, mediating recruitment of regulatory T cells* Am. J. Pathol., **176**, 2177–2187

Intestine

Goodyear, A.W., Kumar, A., Dowa, S. and Ryan, E.P. (2014) *Optimization of murine small intestine leukocyte isolation for global immune phenotype analysis* J. Immunol. Methods, **405**, 97–108

Henderson, A.J., Kumar, A., Barnett, B., Dow, S.W. and Ryan, E.P. (2012) *Consumption of rice bran increases mucosal immunoglobulin A concentrations and numbers of intestinal Lactobacillus spp.* J. Med. Food, **15**, 469–475

Lee, J-A., Kim, Y-M., Kim, T-H., Lee, S-H., Lee, C-A., Cho, C-W., Jeon, J-w., Park, J-k. et al (2016) *Nasal delivery of chitosan-coated poly(lactide-co-glycolide)-encapsulated honeybee (Apis mellifera) venom promotes Th 1-specific systemic and local intestinal immune responses in weaned pigs* Vet. Immunol. Immunopath., **178**, 99–106

Okamoto, T., Uemoto, S. and Tabata, Y. (2012) *Prevention of trinitrobenzene sulfonic acid-induced experimental colitis by oral administration of a poly(lactic-coglycolic acid) microsphere containing prostaglandin E2 receptor subtype 4 agonist* J. Pharmacol. Exp. Ther., **341**, 340–349

Wang, X., O’Gorman, M.R.G., Bu, H-F., Koti, V., Zuo, X-L. and Tan, X-D. (2009) *Probiotic preparation VSL#3 alters the distribution and phenotypes of dendritic cells within the intestinal mucosa in 57BL/10J mice* J. Nutr. **139**, 1595–1602

Zellweger, R.M., Prestwood, T.R. and Shresta, S. (2010) *Enhanced infection of liver sinusoidal endothelial cells in a mouse model of antibody-induced severe dengue disease* Cell Host Microbe **7**, 128–139

Liver

Dai, K., Huang, L., Sun, X., Yang, L. and Gong, Z. (2015) *Hepatic CD206-positive macrophages express amphiregulin to promote the immunosuppressive activity of regulatory T cells in HBV infection* J. Leukoc. Biol., **98**, 1071–1080

Henning, J.R., Graffeo, C.S., Rehman, A., Fallon, N.C., Zambirinis, C.P., Ochi, A., Barilla, R., Jamal, M. et al (2013) *Dendritic cells limit fibroinflammatory injury in nonalcoholic steatohepatitis in mice* Hepatology, **58**, 589-602

Lian Z-X., Okada, T., He, X-S., Kita, H., Liu, Y-J., Ansari, A.A., Kikuchi, K., Ikehara, S. and Gershwin, M.E. (2003) *Heterogeneity of dendritic cells in the mouse liver: identification and characterization of four distinct populations* J. Immunol., **170**, 2323-2330

Mehal, W., Sheikh, S.Z., Gorelik, L. and Flavell, R.A. (2005) *TGF- β signaling regulates CD8+ T cell responses to high- and low-affinity TCR interactions* Int. Immunol., **17**, 531-538

Mouralidarane, A., Soeda, J., Visconti-Pugmire, C., Samuelsson, A-M., Pombo, J., Maragkoudaki, X., Butt, A., Saraswati, R. et al (2013) *Maternal obesity programs offspring nonalcoholic fatty liver disease by innate immune dysfunction in mice* Hepatology, **58**, 128-138

Nasr, I.W., Reel, M., Oberbarnscheidt, M.H., Mounzer, R.H., Baddoura, F.K., Ruddle, N.H. and Makkis, F.G. (2007) *Tertiary lymphoid tissues generate effector and memory T cells that lead to allograft rejection* Am. J. Transplant., **7**, 1071-1079

Obhrai, J.S., Oberbarnscheidt, M.H., Hand, T.W., Diggs, L., Chalasani, G. and Lakkis, F.G. (2006) *Effector T cell differentiation and memory T cell maintenance outside secondary lymphoid organs* J. Immunol., **176**, 4051-4058

Rafferty, M.J., Wolter, E., Fillatreau, S., Meisel, H., Kaufmann, S.H.E. and Schönrich, G. (2014) *NKT cells determine titer and subtype profile of virus-specific IgG antibodies during herpes simplex virus infection* J. Immunol., **192**, 4294–4302

Tzeng, H-T., Tsai, H-F., Liao, H-J., Lin, Y-J., Chen, L., Chen, P-J. and Hsu, P-N. (2012) *PD-1 blockage reverses immune dysfunction and hepatitis B viral persistence in a mouse animal model* PLoS One, **7**: e39179

Lung

Koyama, S., Akbay, E.A., Li, Y.Y., Herter-Sprrie, G.S., Buczkowski, K.A., Richards, W.G., Gandhi, L., Redig, A.J., Rodig, S.J. et al (2016) *Adaptive resistance to therapeutic PD-1 blockade is associated with upregulation of alternative immune checkpoints* Nat. Comm., **7**: 10501

Licono-Limón, P., Henao-Mejia, J., Temann, A.U., Gagliani, N., Licono-Limón, I., Ishigame, H., Hao, L., Herbert, D.R. and Flavell, R.A. (2013) *Th9 cells drive host immunity against gastrointestinal worm infection* Immunity, **39**, 744–757

Spleen

Horibe, T., Kawamoto, M., Kohno, M. and Kawakami, K. (2012) *Cytotoxic activity to acute myeloid leukemia cells by Antp-TPR hybrid peptide targeting Hsp90* J. Biosci. Bioeng., **114**, 96-103

Kitazawa, Y., Ueta, H., Hünig, T., Sawanobori, Y. and Matsuno, K. (2015) *A novel multicolor immunostaining method using ethynyldeoxyuridine for analysis of in situ immuno-proliferative response* Histochem. Cell Biol., **144**, 195–208

Kivi, G., Teesalu, K., Parik, J., Kontkar, E., Ustav Jr, M., Noodla, L., Ustav, M. and Männik, A. (2016) *HybriFree: a robust and rapid method for the development of monoclonal antibodies from different host species* BMC Biotechnol., **16**: 2

Lee, J-A., Kim, Y-M., Kim, T-H., Lee, S-H., Lee, C-A., Cho, C-W., Jeon, J-w., Park, J-k. et al (2016) *Nasal delivery of chitosan-coated poly(lactide-co-glycolide)-encapsulated honeybee (Apis mellifera) venom promotes Th 1-specific systemic and local intestinal immune responses in weaned pigs* Vet. Immunol. Immunopath., **178**, 99–106

3 Mononuclear cells (mixer flotation)

3a-1 Blood (human and non-human primates)

Bouwens, M., Afman, L.A. and Müller, M. (2007) *Fasting induces changes in peripheral blood mono-nuclear cell gene expression profiles related to increases in fatty acid β -oxidation: functional role of peroxisome proliferator-activated receptor α in human peripheral blood mononuclear cells* Am. J. Clin. Nutr., **86**, 1515-1523

Guo, H., Zhang, H., Lu, L., Ezzelarab, M.B. and Thomson, A.W. (2015) *Generation, cryopreservation, function and in vivo persistence of ex vivo expanded cynomolgus monkey regulatory T cells* Cell. Immunol., **295**, 19–28

Huang, K., Liu, P.F., Li, X., Chen, S.B., Wang, L.H., Qin, L., Su, ZH. Et al (2014) *Neural progenitor cells from human induced pluripotent stem cells generated less autogenous immune response* Sci. China Life Sci., **57**, 62–170

Hutchinson, M.R., La Vincente, S.F. and Somogyi, A.A. (2004) *In vitro opioid induced proliferation of peripheral blood immune cells correlates with in vivo cold pressor pain tolerance in humans: a biological marker of pain tolerance* Pain, **110**, 751-755

Kang, K.B., van der Zyppe, A., Iannazzo, L. and Majewski, H. (2006) *Age-related changes in monocyte and platelet cyclooxygenase expression in healthy male humans and rats* Translat. Res., **148**, 289-294

Kwok, Y.H., Hutchinson, M.R., Gentgall, M.G. and Rolan, P.E. (2012) *Increased responsiveness of peripheral blood mononuclear cells to in vitro TLR 2, 4 and 7 ligand stimulation in chronic pain patients* PLoS One, **7**: e44232

Müller, T.H., Döscher, A., Schunter, F. and Scott, C.S. (1997) *Manual and automated methods for the determination of leukocyte counts at extreme low levels: comparative evaluation of the Nageotte chamber* Transfus. Sci., **18**, 505-515

Nievergelt, A., Marazzi, J., Schoop, R., Altmann, K-H. and Gertsch, J. (2011) *Ginger phenylpropanoids inhibit IL-1 β and prostanoid secretion and disrupt arachidonate-phospholipid remodeling by targeting phospholipases A2* J. Immunol., **187**, 4140–4150

Zhang, Y., Li, S-K. and Tsui, S.K-W. (2015) *Genome-wide analysis of DNA methylation associated with HIV infection based on a pair of monozygotic twins* Genomics Data **6**, 12–15

3a-2 Blood (rodent)

DiJoseph, J.F., Dougher, M.M., Kalyandrug, L.B., Armellino, D.C., Boghaert, E.R., Hamann, P.R., Moran, J.K. and Damle, N.K. (2006) *Antitumor efficacy of a combination of CMC-544 (inotuzumab ozogamicin), a CD22-targeted cytotoxic immunoconjugate of calicheamicin, and rituximab against non-Hodgkin's B-cell lymphoma* Clin. Cancer Res., **12**, 242-249

Grace, P.M., Fabisiak, T.J., Green-Fulgham, S.M., Anderson, N.D., Strand, K.A., Kwilas, A.J. Galer, E.L., Walker, F.R., Greenwood, B.N. et al (2016) *Prior voluntary wheel running attenuates neuropathic pain* Pain, **157**, 2012–2023

Houghton, J., Macera-Bloch, L.S., Harrison, L., Kim, K.H. and Korah, R.M. (2000) *Tumor necrosis factor alpha and interleukin 1 β up-regulate gastric mucosal Fas antigen expression in Helicobacter pylori infection* Infect. Immun., **68**, 1189-1195

Kang, K.B., van der Zyppe, A., Iannazzo, L. and Majewski, H. (2006) *Age-related changes in monocyte and platelet cyclooxygenase expression in healthy male humans and rats* Translat. Res., **148**, 289-294

- Kwok, Y.H.**, Tuke, J., Nicotra, L.L., Grace, P.M., Rolan, P.E., and Hutchinson, M.R. (2013) *TLR 2 and 4 responsiveness from isolated peripheral blood mononuclear cells from rats and humans as potential chronic pain biomarkers* PLoS One, **8**: e77799
- Mendez-David, I.**, El-Ali, Z., Hen, R., Falissard, B., Corruble, E., Gardier, A.M., Kerdine-Römer, S. and David, D.J. (2013) *A method for biomarker measurements in peripheral blood mononuclear cells isolated from anxious and depressed mice: β -arrestin 1 protein levels in depression and treatment* Front. Pharmacol, **4**: 124
- Mishra, R.S.**, Carnevale, K.A. and Cathcart, M.K. (2008) *iPLA2 β : front and center in human monocyte chemotaxis to MCP-1* J. Exp. Med., **205**, 347-359
- Montminy Paquette, S.**, Dawit, H., Hickey, M.B., Merisko-Liversidge, E., Almarsson, O. and Deaver, D.R. (2014) *Long-acting atypical antipsychotics: characterization of the local tissue response* Pharm. Res., **31**, 2065–2077
- Nosov, M.**, Wilk, M., Morcos, M., Cregg, M., O’Flynn, L., Treacy, O. and Ritter, T. (2012) *Role of lentivirus-mediated overexpression of programmed death-ligand 1 on corneal allograft survival* Am. J. Transplant., **12**, 1313–1322
- Shahrara, S.**, Proudfoot, A.E.I., Woods, J.M., Ruth, J.H., Amin, M.A., Park, C.C., Haas, C.S., Pope, R.M., Haines, G.K., Zha, Y.Y. and Koch, A.E. (2005) *Amelioration of rat adjuvant-induced arthritis by Met-RANTES* Arthritis Rheumatism, **52**, 1907-1919
- Shao, X.**, Rivera, J., Niang, R., Casadevall, A. and Goldman, D.L. (2005) *A dual role for TGF- β 1 in the control and persistence of fungal pneumonia* J. Immunol., **175**, 6757-6763
- Wada, Y.**, Lu, R., Zhou, D., Chu, J., Przewlaka, T., Zhang, S., Li, L., Wu, Y., Qin, J., Balasubramanyam, V., Barsoum, J. and Ono, M. (2007) *Selective abrogation of Th1 response by STA-5326, a potent IL-12/IL-23 inhibitor* Blood, **109**, 1156-1164

3a-3 Blood (ruminant)

- Olsen, I.** and Storset, A.K. (2001) *Innate IFN- γ production in cattle in response to MPP14, a secreted protein from Mycobacterium avium subsp. paratuberculosis* Scand. J. Immunol., **54**, 305-313
- Wan, Y.**, Tan, J., Asghar, W., Kim, Y-t., Liu, Y. and Iqbal, S.M. (2011) *Velocity effect on aptamer-based circulating tumor cell isolation in microfluidic devices* J. Phys. Chem. B **115**, 13891–13896
- Wang, Y.**, Zhou, X., Lin, J., Yin, F., Xu, L., Huang, Y., Ding, T. and Zhao, D. (2011) *Effects of Mycobacterium bovis on monocyte-derived macrophages from bovine tuberculosis infection and healthy cattle* FEMS Microbiol. Lett., **321**, 30–36

3a-4 Cord blood

- Elias, M.**, Choudhury, N. and Smit Sibinga, CTh. (2003) *Cord blood from collection to expansion: Feasibility in a regional blood bank* Indian J. Padiatr., **70**, 327-336

3a-5 Tissues

Bone marrow

- Liu, L.**, Papa, E.F., Dooner, M.S., Machan, J.T., Johnson, K.W., Goldberg, L.R., Quesenberry, P.J. and Colvin, G.A. (2012) *Homing and long-term engraftment of long- and short-term renewal hematopoietic stem cells* PLoS One, **7**: e31300

Liver

- Au-Yeung, B.B.** and Fowell, D.J. (2007) *A key role for Itk in both IFN γ and IL-4 production by NKT cells* J. Immunol., **179**, 111-119
- Cabrera, M.**, Pewe, L.L., Harty, J.T. and Frevert, U. (2013) *In vivo CD8⁺ T cell dynamics in the liver of Plasmodium yoelii immunized and infected mice* PloS One, **8**: e70842
- Ginnandrea, M.**, Pierce, R.H. and Crispe, I.N. (2009) *Indirect action of tumor necrosis factor-alpha in liver injury during the CD8⁺ T cell response to an adeno-associated virus vector in mice* Hepatology, **49**, 2010-2020
- Ishigame, H.**, Mosaheb, M.M., Sanjabi, S. and Flavell, R.A. (2013) *Truncated form of TGF- β RII, but not its absence, induces memory CD8⁺ T cell expansion and lymphoproliferative disorder in mice* J. Immunol., **190**, 6340–6350
- John, B.** and Crispe, I.N. (2005) *LR-4 regulates CD8⁺ T cell trapping in the liver* J. Immunol., **175**, 1643-1650
- John, B.**, Klein, I. and Crispe, I.N. (2007) *Immune role of hepatic TLR-4 revealed by orthotopic mouse liver transplantation* Hepatology, **45**, 178-186
- Klein, I.** and Crispe, I.N. (2006) *Complete differentiation of CD8⁺ T cells activated locally within the transplanted liver* J. Exp. Med., **203**, 437-447
- Polakos, N.K.**, Klein, I., Richter, M.V., Zaiss, D.M., Giannandrea, M., Crispe, I.N. and Topham, D.J. (2007) *Early intrahepatic accumulation of CD8⁺ T cells provides a source of effectors for nonhepatic immune responses* J. Immunol., **179**, 201-210

- Sanjabi, S.,** Mosaheb, M.M. and Flavell, R.A. (2009) *Opposing effects of TGF- β and IL-15 cytokines control the number of short-lived effector CD8⁺ T cells* Immunity **31**, 131–144
- Spahn, J.,** Pierce, R.H. and Crispe, I.N. (2011) *Ineffective CD8⁺ T-cell immunity to adeno-associated virus can result in prolonged liver injury and fibrogenesis* Am. J. Pathol., **179**, 2370–2381
- Wuensch, S.A.,** Pierce, R.H. and Crispe, I.N. (2006) *Local intrahepatic CD8⁺ T cell activation by a non-self-antigen results in full functional differentiation* J. Immunol., **177**, 1689–1697
- Zenewicz, L.A.,** Yancopoulos, G.D., Valenzuela, D.M., Murphy, A.J., Karow, M. and Flavell, R.A. (2007) *Interleukin-22 but not interleukin-17 provides protection to hepatocytes during acute liver inflammation* Immunity, **27**, 647–659

Lung

- Ishigame, H.,** Mosaheb, M.M., Sanjabi, S. and Flavell, R.A. (2013) *Truncated form of TGF- β RII, but not its absence, induces memory CD8⁺ T cell expansion and lymphoproliferative disorder in mice* J. Immunol., **190**, 6340–6350
- Licona-Limón, P.,** Henao-Mejia, J., Temann, A.U., Gagliani, N., Licona-Limón, I., Ishigame, H., Hao, L., Herbert, D.R. and Flavell, R.A. (2013) *Th9 cells drive host immunity against gastrointestinal worm infection* Immunity, **39**, 744–757
- Sanjabi, S.,** Mosaheb, M.M. and Flavell, R.A. (2009) *Opposing effects of TGF- β and IL-15 cytokines control the number of short-lived effector CD8⁺ T cells* Immunity **31**, 131–144

Spleen

- DiJoseph, J.F.,** Dougher, M.M., Kalyandrug, L.B., Armellino, D.C., Boghaert, E.R., Hamann, P.R., Moran, J.K. and Damle, N.K. (2006) *Antitumor efficacy of a combination of CMC-544 (inotuzumab ozogamicin), a CD22-targeted cytotoxic immunoconjugate of calicheamicin, and rituximab against non-Hodgkin's B-cell lymphoma* Clin. Cancer Res., **12**, 242–249
- Liang, Y.,** Song, D-Z., Liang, S., Zhang, Z-F., Gao, L-X. and Fan, X-H. (2017) *The hemagglutinin-neuramidinase protein of Newcastle disease virus upregulates expression of the TRAIL gene in murine natural killer cells through the activation of Syk and NF- κ B* PLoS One, **12**: e0178746

4 Mononuclear cells (barrier flotation)

4a Human blood

- Ahmed, Y.,** Walton, L.J. and Graham, J. (2004) *An improved method for isolation of mononuclear cells from peripheral blood* 12th Int. Congr. Immunol., Abstr. 1758
- De Roos, B.,** Duthie, S.J., Polley, A.C.J., Mulholland, F., Bouwman, F.G., Heim, C., Rucklidge, G.J., Johnson, I.T., Mariman, E.C., Daniel, H. and Elliott, R.M. (2008) *Proteomic methodological recommendations for studies involving human plasma, platelets and peripheral blood mononuclear cells* J. Proteome Res., **7**, 2280–2290
- Hartrick, C.T.** (2002) *Increased production of nitric oxide stimulated by interferon- γ from peripheral blood monocytes in patients with complex regional pain syndrome* Neurosci. Lett., **323**, 75–77
- Wong, J.,** McLennan, S.V., Molyneaux, L., Min, D., Twigg, S.M. and Yue, D.K. (2009) *Mitochondrial DNA content in peripheral blood monocytes: relationship with age of diabetes onset and diabetic complications* Diabetologia, **52**, 1953–1961

4b Tissues (mouse)

- Pinkaew, D.,** Le, R.J., Chen, Y., Eltorkey, M., Teng, B-B. and Fujise, K. (2013) *Fortilin reduces apoptosis in macrophages and promotes atherosclerosis* Am. J. Physiol. Heart Circ. Physiol., **305**, H1519–H1529

5 Polymorphonuclear leukocytes (granulocytes)

5a Bovine peripheral blood

- Wang, J.,** Zhou, X., Pan, B., Wang, H., Shi, F., Gan, W., Yang, L. et al (2013) *Expression pattern of interferon-inducible transcriptional genes in neutrophils during bovine tuberculosis infection* DNA Cell Biol., **32**, 480–486
- Wang, J.,** Zhou, X., Pana, B., Yang, L., Yin, X., Xu, B. and Zhao, D. (2013) *Investigation of the effect of Mycobacterium bovis infection on bovine neutrophils functions* Tuberculosis, **93**, 675–687

5b Guinea pig peripheral blood

- Takahashi, M.,** Jeevan, A., Sawant, K., Mc Murray, D.N. and Yoshimura, T. (2007) *Cloning and characterization of guinea pig CXCR1* Mol. Immunol., **44**, 878–888

5c Human peripheral blood

- Barbour, T.D.**, Ling, G.S., Ruseva, M.M., Fossati-Jimack, L., Cook, H.T., Botto, M. and Pickering, M.C. (2016) *Complement receptor 3 mediates renal protection in experimental C3 glomerulopathy* *Kidney Int.*, **89**, 823–832
- Channon, J.Y.**, Seguin, R.M. and Kasper, L. (2000) *Differential infectivity and division of Toxoplasma gondii in human peripheral blood leukocytes* *Infect. Immun.*, **68**, 4822-4826
- Channon, J.Y.**, Miselis, K.A., Minns, L.A, Dutta, C. and Kasper, L.H. (2002) *Toxoplasma gondii induces granulocyte colony-stimulating factor and granulocyte-macrophage colony-stimulating factor secretion by human fibroblasts: implications for neutrophil apoptosis* *Infect. Immun.*, **70**, 6048-6057
- Chiu, H-C.**, Liang, J-S., Wang, J-S. and Lu, J-F. (2006) *Mutational analyses of Taiwanese kindred with X-linked adrenoleukodystrophy* *Pediatr. Neurol.*, **35**, 250-256
- Fossati-Jimack, L.**, Ling, G.S., Cortini, A. Szajna, M., Malik, T.H., McDonald, J.U., Pickering, M.C. et al (2013) *Phagocytosis is the main CR3-mediated function affected by the lupus-associated variant of CD11b in human myeloid cells* *PLoS One*, **8**: e57082
- Hudgens, J.**, Langkamp-Henken, B., Stechmiller, J.K., Herrlinger-Garica, K.A. and Nieves, C. (2004) *Immune function is impaired with a mini nutritional assessment score indicative of malnutrition in nursing home elders with pressure ulcers* *J. Parenter. Enteral Nutr.*, **28**, 416-422
- Hung, K-L.**, Wang, J-S., Keng, W.T., Chen, H-J., Liang, J-S., Ngu, L.H. and Lu, J-F. (2013) *Mutational analyses on X-linked adrenoleukodystrophy reveal a novel cryptic splicing and three missense mutations in the ABCD1 gene* *Pediatr. Neurol.*, **49**, 185-190
- Kusumanto, Y.H.**, Dam, W.A., Hospers, G.A.P., Meijer, C. and Mulder, N.H. (2003) *Platelets and granulocytes, in particular the neutrophils, form important compartments for circulating vascular endothelial growth factor* *Angiogenesis*, **6**, 283-287
- Martins, R.**, Maier, J., Gorki, A-D., Huber, K.V.M., Sharif, O., Starkl, P., Saluzzo, S. et al (2016) *Heme drives hemolysis-induced susceptibility to infection via disruption of phagocyte functions* *Nat. Immunol.*, **17**, 1361-1372
- Mikami, J.**, Kurokawa, Y., Takahashi, T., Miyazaki, Y., Yamasaki, M., Miyata, H., Nakajima, K. et al (2016) *Antitumor effect of antiplatelet agents in gastric cancer cells: an in vivo and in vitro study* *Gastric Cancer*, **19**, 817–826
- Pioli, P.A.**, Jensen, A.L., Weaver, L.K., Amiel, E., Shen, Z., Shen, L., Wira, C.R. and Guyre, P.M. (2007) *Estradiol attenuates lipopolysaccharide-induced CXC ligand 8 production by human peripheral blood monocytes* *J. Immunol.*, **179**, 6284-6290
- Ponath, V.** and Kaina, B. (2017) *Death of monocytes through oxidative burst of macrophages and neutrophils: killing in trans* *PLoS One*: e0170347
- Qin, J.**, Chen, D.W., Hu, H.Y., Cui, Q., Qiao, M.X. and Chen, B.Y. (2007) *Surface modification of RGD-liposomes for selective drug delivery to monocytes/neutrophils in brain* *Chem. Pharm. Bull.*, **55**, 1192-1197
- Qin, J.**, Chen, D.W., Hu, H.Y., Qiao, M.X., Zhao, X.L. and Chen, B.Y. (2007) *Body distribution of RGD-mediated liposomes in brain-targeting drug delivery* *Yakugaku Zasshi*, **127**, 1497-1501
- Radom-Aizik, S.**, Zalvidar, Jr., F., Leu, S-Y., Galassetti, P. and Cooper, D.M. (2008) *Effects of 30 min of aerobic exercise on gene expression in human neutrophils* *J. Appl. Physiol.*, **104**, 236-243
- Radom-Aizik, S.**, Zaldivar, F., Oliver, S., Galassetti, P. and Cooper, D.M. (2010) *Evidence for microRNA involvement in exercise-associated neutrophil gene expression changes* *J. Appl. Physiol.*, **109**, 252–261
- Rosy, J.**, Schlicht, D., Engelhardt, B., Niggli, V. (2009) *Flotillins interact with PSGL-1 in neutrophils and upon stimulation, rapidly organize into membrane domains subsequently accumulating in the uropod* *PLoS One* **4**: e5403
- Salzberg, A.C.**, Harris-Becker, A., Popova, E.Y., Keasey, N., Loughran, T.P., Claxton, D.F. and Grigoryev, S.A. (2017) *Genome-wide mapping of histone H3K9me2 in acute myeloid leukemia reveals large chromosomal domains associated with massive gene silencing and sites of genome instability* *PLoS One*, **12**: e0173723
- Shen, L.**, Fahey, J.V., Hussey, S.B., Asin, S.N., Wira, C.R. and Fanger, M.W. (2004) *Synergy between IL-8 and GM-CSF in reproductive tract epithelial cell secretions promotes enhanced neutrophil chemotaxis* *Cell. Immunol.*, **230**, 23-32
- Shen, L.**, Smith, J.M., Shen, Z., Hussey, S.B., Wira, C.R. and Fanger, M.W. (2006) *Differential regulation of neutrophil chemotaxis to IL-8 and fMLP by GM-CSF: lack of direct effect of oestradiol* *Immunology*, **117**, 205-212
- Shen, L.**, Smith, J.M., Shen, Z., Eriksson, M., Sentman, C. and Wira, C.R. (2007) *Inhibition of human neutrophil degranulation by transforming growth factor- β 1* *Clin. Exp. Immunol.*, **149**, 155-161
- Smith, J.M.**, Wira, C.R., Fanger, M.W. and Shen, L. (2006) *Human fallopian tube neutrophils – a distinct phenotype from blood neutrophils* *Am. J. Reprod. Immunol.*, **56**, 218-229

- Smith, J.M.**, Shen, Z., Wira, C.R., Fanger, M.W. and Shen, L. (2007) *Effects of menstrual cycle status and gender on human neutrophil phenotype* Am. J. Reprod. Immunol., **58**, 111-119
- Ward, J.R.**, Heath, P.R., Catto, J.W., Whyte, M.K.B., Milo, M. and Renshaw, S.A. (2011) *Regulation of neutrophil senescence by microRNAs* PloS One **6**: e15810
- Wardle, D.J.**, Burgon, J., Sabroe, I., Bingle, C.D., Whyte, M.K.B. and Renshaw, S.A. (2011) *Effective caspase inhibition blocks neutrophil apoptosis and reveals Mcl-1 as both a regulator and a target of neutrophil caspase activation* PloS One **6**: e15768
- Yuan, Z-N.**, Tolo, K., Schenck, K. and Helgeland, K. (1999) *Increased levels of soluble Fcγreceptor III in gingival fluid from periodontal lesions* Oral Microbiol. Immunol., **14**, 172-175

5d Mouse

- Sellami, M.**, Meghraoui-Kheddar, A., Terryn, C., Fichel, C., Bouland, N., Diebold, M., Guenounou, M., Héry-Huynh, S., and Le Naour, R. (2016) *Induction and regulation of murine emphysema by elastin peptides* Am. J. Physiol. Lung Cell. Mol. Physiol. **310**: L8–L23, 2016

5e Primate (non-human) blood

- Lau, M.**, Vayntrub, T., Grumet, F.C., Lowsky, R., Strober, S., Hoppe, R., Larson, M., Holm, B., Reitz, B. and Borie, D (2004) *Short tandem repeat analysis to monitor chimerism in Macaca Fascicularis* Am. J. Transplant., **4**, 1543-1548 (2004)

5f Rabbit blood

- Frevert, C.W.**, Goodman, R.B., Kinsella, M.G., Kajikawa, O., Ballman, K., Clark-Lewis, I., Proudfoot, A.E.I., Wells, T.N.C. and Martin, T.R. (2002) *Tissue-specific mechanisms control the retention of IL-8 in lungs and skin* J. Immunol., **168**, 3550-3556
- Matute-Bello, G.**, Frevert, C.W., Kajikawa, O., Skerrett, S.J., Goodman, R.B., Park, D.R. and Martin, T.R. (2001) *Septic shock and acute lung injury in rabbits with peritonitis* Am. J. Respir. Crit. Care Med., **163**, 234-243

5g Rat blood

- Belij, S.**, Miljković, D., Popov, A., Subota, V., Timotijević, G., Slavić, M., Mirkov, I., Kataranovski, D. and Kataranovski, M. (2012) *Effects of subacute oral warfarin administration on peripheral blood granulocytes in rats* Food Chem. Toxicol., **50**, 1499–1507
- Djokic, J.**, Ninkov, M., Mirkov, I., Aleksandrov, A.P., Zolotarevski, L., Kataranovski, D. and Kataranovski, M. (2014) *Differential effects of cadmium administration on peripheral, blood granulocytes in rats* Environ. Toxicol. Pharmacol., **37**, 210-219
- Mishra, A.**, Guo, Y., Zhang, L., More, S., Weng, T., Chintagari, N.R., Huang, C., Liang, Y., Pushparaj, S. et al (2016) *A critical role for P2X7 receptor–induced VCAM-1 shedding and neutrophil infiltration during acute lung injury* J. Immunol., **197**, 2828–2837
- Piubelli, C.**, Galvani, M., Hamdan, M., Domenici, E. and Righetti, P.G. (2002) *Proteome analysis of rat polymorphonuclear leukocytes: A two-dimensional electrophoresis/ mass spectrometry approach* Electrophoresis, **23**, 298-310
- Subota, V.**, Mirkov, I., Demenesku, J., Aleksandrov, A.P., Ninkov, M., Mileusnic, D., Kataranovski, D. and Kataranovski, M., (2016) *Transdermal toxicity of topically applied anticoagulant rodenticide warfarin in rats* Environ. Toxicol. Pharmacol., **41**, 232–240

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