MONASH University

Dr Rommel Mathias

NHMRC Early Career Fellow

Head, Viral Pathogenesis and Host Cellular Defense

Monash Biomedicine Discovery Institute
Infection and Immunity Program

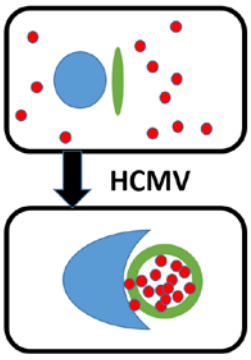
EMAIL	rommel.mathias@monash.edu
TELEPHONE	+61 3 9902 9322
WEB	med.monash.edu/microbiology/staff/mathias.html

HCMV is a β-herpesvirus that infects over 60% of the adult population. HCMV is a significant cause of morbidity and mortality in immuno-compromised individuals such as organ transplant recipients. However, the largest burden of disease occurs from intrauterine HCMV transmission during pregnancy. Occurring in 1% of pregnancies worldwide, HCMV can cause permanent hearing loss, vision impairment, and mental retardation. There is no vaccine currently available, and discovery of new antivirals is urgently required. Importantly, the process by which infectious virus is packaged and released is not well understood, and this presents a novel molecular loci to develop antiviral therapeutics.

Research in our laboratory uses cutting-edge proteomics together with virology, molecular biology, microscopy, and bioinformatics to investigate the molecular mechanisms used by viruses to replicate and assemble infectious virions.

Research Projects

1. **Dissecting the viral assembly complex induced by Human Cytomegalovirus**
2. **Investigating hijacking of exosomes and secretion pathways for Human Cytomegalovirus egress**
3. **Exploring the biological functions of the novel lipoamidase $SIRT_4$**



HCMV induces profound host organelle remodelling to create the viral assembly complex (vAC).

Uninfected cells contain dispersed endosomes (red), and Golgi stacks (green) in close proximity to the nucleus (blue)

HCMV induces the vAC containing endosomes clustered within Golgi-derived vesicles, juxtaposed to the enlarged kidney bean shaped nucleus.

Selected significant publications:

1. Gopal SK, Greening DW, Zhu HJ, Simpson RJ, **Mathias RA**. 2016. Transformed MDCK cells secrete elevated MMP1 that generates LAMA5 fragments promoting endothelial cell angiogenesis. ***Sci Rep.*** doi: 10.1038/srep28321
2. Gopal SK, Greening DW, Hanssen EG, Zhu HJ, Simpson RJ, **Mathias RA**. 2016. Oncogenic epithelial cell-derived exosomes containing Rac1 and PAK2 induce angiogenesis in recipient endothelial cells. *Oncotarget*. In Press, doi: 10.18632/oncotarget.7573
3. **Mathias RA**, Greco TM, Oberstein A, Budayeva HG, Chakrabarti R, Rowland EA, Kang Y, Shenk T, Cristea IM. 2014. Sirtuin 4 is a lipoamidase regulating pyruvate dehydrogenase complex activity. *Cell*. 159, 1615-25
4. Tauro BJ*, **Mathias RA***, Greening DW, Gopal SK, Ji H, Kapp EA, Coleman BM, Hill AF, Kusebauch U, Hallows JL, Shteynberg D, Moritz RL, Zhu HJ, Simpson RJ. 2013. Oncogenic H-ras reprograms Madin-Darby canine kidney (MDCK) cell-derived exosomal proteins following epithelial-mesenchymal transition. *Mol Cell Proteomics*. 12, 2148-59 (* Co-first author)
5. Chen YS*, **Mathias RA***, Mathivanan S, Kapp EA, Moritz RL, Zhu HJ, Simpson RJ. 2011. Proteomics profiling of Madin-Darby canine kidney plasma membranes reveals Wnt-5a involvement during oncogenic H-Ras/TGF-beta-mediated epithelial-mesenchymal transition. *Mol Cell Proteomics*. 10, M110.001131 (* Co-first author)