Title of PhD project	**An 'unconventional' approach to the COVID 19 pandemic: the role of γδ T cells in virus recognition**	
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Co-Supervisor	Dr Javier Salguero Bodes	Public Health England
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Brief description of project	This dynamic project will bring together two established groups to investigate the potentially crucial role of non-conventional immune responses to SARS-CoV-2. The response to the COVID19 pandemic has been rapid and has led to the successful development of vaccines that target the viral Spike protein. Whilst this has had a substantial impact on COVID19, it is has also highlighted that the specificity of Spike-based vaccines might also be their Achilles heel. Indeed, sustained world-wide virus transmission has resulted in the emergence of variants that can render the vaccine programmes ineffective due to mismatch between the circulating Spike sequences and those used for the vaccines. It is therefore crucial to investigate strategies that are independent of virus sequences. This exciting project will investigate the potential of the innate immune response against viral diseases and how unconventional T cells (i.e. □□ T cell) respond rapidly to infected cells by recognising 'danger signals' expressed by these cells. In particular, the project asks three related but free-standing questions: 1. What are the signals on the infected cells that trigger this fast "detection and kill" approach by unconventional T cells? 2. What are the molecular mechanisms that unravel within unconventional T cells to generate that "detection and kill" approach? 3. Are danger signals and responses present in tissues from SARS-CoV-2 infected non-human primates? The project will require a wide range of techniques including cell culture (cell lines; primary cells), flow-cytometry, western blotting; work with replication competent SARS-CoV-2 (BSL3 containment laboratory at SGUL). Immunohistochemistry and in situ hybridisation of SARS-CoV-2 non-human primate tissues will be undertaken at the Comparative Pathology	

	team at UK Health Security Agency (Porton Down), where the successful applicant will be expected to spend 3 months (placement). This project suits a self-motivated person with a strong will to learn and deliver. You will have a strong interest in immunology and its impact in global health, coupled with a pro-active attitude to problem-solving.
Skills we expect a student to develop/acquire whilst pursuing this project	Strong interpersonal and presentation skills Independent scientific thought Self-motivation Tissue culture Flow cytometry Viral infection Immunohistochemistry, *in situ* hybridization and quantitative imager analysis
Particular prior educational requirements for a student undertaking this project	None
Project key words	Non-conventional T cells SARS-CoV-2 Trained innate immunity *in vitro* investigation of *ex vivo* pathology
Possible under 1+4 route? Master's options identified.	No
MRC Core Skills developed through this project	Whole organism physiology
MRC LID themes	Global Health Infectious Disease
Further reading	How to Train Your Dragon: Harnessing Gamma Delta T Cells Antiviral Functions and Trained Immunity in a Pandemic Era Cheap and Commonplace: Making the Case for BCG and γδ T Cells in COVID-19