**Project title**

Activating human gamma delta T (γδT) cells to kill cancer

**About the project**

This project will build on our previous studies showing how gamma delta T cell (γδT) subsets, important in cancer and infectious disease pathogenesis can be activated through interaction with mycobacteria in a manner that enhances their ability to target infected/cancerous cells. The project will use specialised techniques to generate, identify and purify specific mycobacterial components that trigger these effects. It will then apply and define how these purified agents are able to activate their targets with the aim of deriving a rationale for their use as novel treatments against cancer and infectious diseases.

In previous studies we have shown γδT, can be activated by exposure to both live and dead Mycobacteria species. We and others have shown that activated γδT cell populations recognise and interact with cancer or bacterially infected cells resulting in them becoming degranulated (killing) and transiently expressing the marker CD107. We have also shown tumour cells resistant to γδT directed killing can be made susceptible using the aminobisphosphonate drug Zoledronic acid (ZA). The majority of peripheral blood γδT cells could target cancer cells if activated. We propose that combining the application of mycobacterial triggers to activate γδT cells concomitant with ZA treatment, will offer a novel effective therapeutic approach for targeting and killing tumour cells.

This project, will generate, identify and purify Mycobacterial derived component/s from varied pathogenic and benign mycobacterial species able to directly activate human γδT cells. It will then apply and define how these extracts activate specific type/s of γδT cells and quantify their ability to kill infected and/or cancer cells using previously developed assays able to quantify the anti-tumour activity of γδT cells. The study will complement related on-going projects at SGUL including a PHE collaborative study assessing the migratory potential of activated γδT cells *in vivo* and follow on from previous studies investigating phenotypic and functional changes occurring in γδT cells during a BCG vaccination model.

Ultimately, we expect this work to contribute to the rationale for novel treatment regimens for both cancer and infectious disease.

**Skills development**

Techniques for culture, handling, manipulation and investigation of mycobacteria (including category III pathogens). Molecular investigations of mycobacterial growth characteristics and composition. HPLC extraction and component analysis. Immune cell culture and techniques for investigating functionality and immuno-modulation including clono-typical analysis of TCR receptor/ligand interactions of gdT cells. Scientific principles of novel drug development, evaluation and validation.

**Funding notes**

Students will receive a stipend and will have three years of fees paid for them. This fully-funded PhD studentship is open to UK/EU students only

**Entry requirements**

You will have a minimum of a 2:1 or equivalent in your first degree. A Master’s qualification in an appropriate discipline will be a distinct advantage.

You will have excellent written and verbal communication skills in English. Applicants whose first language is not English are expected to meet the [minimum University](https://www.sgul.ac.uk/study/life-at-st-georges/international-student-support/english-language-requirements) requirements for postgraduate studies e.g. 6.5 [IELTS](https://www.ielts.org/about-the-test/how-ielts-is-scored), with higher scores being a distinct advantage.

**How to apply**

Please complete the application form and ask your referees to complete the reference form All forms should then be returned to researchdegress@sgul.ac.uk by 5 pm on Monday 10th August.

**Contact for information**

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