**University of Leicester**

**MRC AIM Studentship Project 2025-6 entry.**

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| **Additional Supervisor** |  |

**Section 2 – *Project Information***

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| **Project Title** | The Multifunctionality of Lipoproteins in the Multidrug-resistant Pathogen *Staphylococcus aureus* |
| **Project Summary**  |
| Are you passionate about advancing our understanding of bacterial pathogens? This project investigates the roles of bacterial lipoproteins in Staphylococcus aureus, a human pathogen linked to various infections and rising antibiotic resistance. By elucidating the interaction partners of these lipoproteins, this research will reveal mechanisms of bacterial adaptation and contribute to the development of innovative therapeutic strategies.As part of a dynamic collaboration between the University of Leicester and University of Birmingham, you will have the opportunity to gain expertise in bacterial genetics, protein co-immunoprecipitation and transcriptomics to analyse gene expression and identify protein interactions. The insights gained will be tested in *in vitro* and *ex vivo* virulence models. These experimental approaches will be complemented by bioinformatic analysis, crucial for interpreting transcriptomic data and mapping protein interaction networks, providing deeper insights into the pathways involved in lipoprotein function.You will have the opportunity to conduct research at both the University of Leicester and the University of Birmingham. Join us in tackling the challenge of antibiotic resistance while advancing our understanding of bacterial biology. This project offers a unique opportunity to contribute to impactful research with significant implications for public health. |
| **References** |
| 1. Smithers, L., S. Olatunji, and M. Caffrey, *Bacterial lipoprotein posttranslational modifications. New insights and opportunities for antibiotic and vaccine development.* Frontiers in Microbiology, 2021. **12**: p. 788445.2. Schilcher, K., et al., *Processing, Export, and Identification of Novel Linear Peptides from Staphylococcus aureus.* mBio, 2020. **11**(2): p. e00112-20.3. Kurokawa, K., et al., *The triacylated ATP binding cluster transporter substrate-binding lipoprotein of Staphylococcus aureus functions as a native ligand for Toll-like receptor 2.* Journal of Biological Chemistry, 2009. **284**(13): p. 8406-8411.4. Schilcher, K., et al., *The Staphylococcus aureus CamS lipoprotein is a repressor of toxin production that shapes host-pathogen interaction.* PLoS Biol, 2024. **22**(1): p. e3002451.5. Diep, B.A., et al., *Identifying potential therapeutic targets of methicillin-resistant Staphylococcus aureus through in vivo proteomic analysis.* The Journal of infectious diseases, 2014. **209**(10): p. 1533-1541.6. Braun, V. and K. Hantke, *Lipoproteins: structure, function, biosynthesis.* Bacterial Cell Walls and Membranes, 2019. **92**: p. 39-77.7. Nguyen, M.T. and F. Gotz, *Lipoproteins of Gram-Positive Bacteria: Key Players in the Immune Response and Virulence.* Microbiol Mol Biol Rev, 2016. **80**(3): p. 891-903.8. Shahmirzadi, S.V., M.T. Nguyen, and F. Gotz, *Evaluation of Staphylococcus aureus Lipoproteins: Role in Nutritional Acquisition and Pathogenicity.* Front Microbiol, 2016. **7**: p. 1404.9. Nguyen, M.T. and F. Götz, *Lipoproteins of Gram-positive bacteria: key players in the immune response and virulence.* Microbiology and Molecular Biology Reviews, 2016. **80**(3): p. 891-903.10. Aliprantis, A.O., et al., *Cell activation and apoptosis by bacterial lipoproteins through toll-like receptor-2.* Science, 1999. **285**(5428): p. 736-739.11. Dunny, G.M., et al., *Plasmid transfer in Streptococcus faecalis: production of multiple sex pheromones by recipients.* Plasmid, 1979. **2**(3): p. 454-65. |