RESEARCH SCHOOL

PhD Opportunity

The BCAT1 CXXC motif and oncogenesis in acute myeloid leukaemia

Supervisory team
Dr Steven Coles, Dr Amy Cherry, Dr Joanne Whittaker

Director of Studies:
Dr Amy Cherry, Worcester Biomedical Research Group (WBRG) School of Science and the Environment, University of Worcester

Supervisors:
Dr Steve Coles, Worcester Biomedical Research Group (WBRG) School of Science and the Environment, University of Worcester

Dr Amy Cherry, Worcester Biomedical Research Group (WBRG) School of Science and the Environment, University of Worcester

Dr Joanne Whittaker, Worcester Biomedical Research Group (WBRG) School of Science and the Environment, University of Worcester

Research Group: Worcester Biomedical Research Group (WBRG)

The PhD Opportunity

The *BCAT1* gene is implicated in the pathogenesis of many cancer types, including acute myeloid leukaemia (AML)[1–4]. Recently, our group identified a novel antioxidant role for *BCAT1* in AML cells[5]. We demonstrated that *BCAT1* was able to protect AML cells from damaging effects mediated by oxidative stress, keeping the AML cells in a tumorigenic state.

Oxidative stress is known to interact with numerous signalling processes that promote tumorigenesis in AML[6,7], however the role *BCAT1* plays in these wider signalling processes remains unknown. Given that *BCAT1* represents a potential target for treating AML, this project aims to understand these processes, and how they may be targeted therapeutically.

This project incorporates numerous methodologies, including, human cell culture, multiparameter flow cytometry, fluorescence microscopy, toxicology screening assays and western blotting. Applications from candidates with knowledge or previous experience in these techniques are encouraged.

References

1. Mayers, J. R. & Vander Heiden, M. G. BCAT1 defines gliomas by IDH status. *Nat Med* **19**, 816–817 (2013).
2. Xu, M. *et al.* BCAT1 promotes tumor cell migration and invasion in hepatocellular carcinoma. *Oncol Lett* **12**, 2648–2656 (2016).
3. TSENG, Y. H. *et al.* Curcumin induces apoptosis by inhibiting BCAT1 expression and mTOR signaling in cytarabine-resistant myeloid leukemia cells. *Mol Med Rep* **24**, (2021).
4. Zhu, W., Shao, Y. & Peng, Y. MicroRNA-218 inhibits tumor growth and increases chemosensitivity to CDDP treatment by targeting BCAT1 in prostate cancer. *Mol Carcinog* **56**, 1570–1577 (2017).
5. Hillier, J. *et al.* The BCAT1 CXXC Motif Provides Protection against ROS in Acute Myeloid Leukaemia Cells. *Antioxidants* **11**, 683 (2022).
6. Hole, P. S. *et al.* Overproduction of NOX-derived ROS in AML promotes proliferation and is associated with defective oxidative stress signaling. *Blood* **122**, 3322–3330 (2013).
7. Trombetti, S. *et al.* Oxidative Stress and ROS-Mediated Signaling in Leukemia: Novel Promising Perspectives to Eradicate Chemoresistant Cells in Myeloid Leukemia. *Int J Mol Sci* **22**, 1–19 (2021).

Additional costs

Given that this is a laboratory-based project, there are some additional costs for the procurement of reagents essential to delivering the research objectives. This will include cell culture media and antibodies. It is expected that these extra costs will not exceed £1500 per annum.

Application Process

To begin the application process please go to https://www.worcester.ac.uk/courses/human-biology-mphilphd and click on 'How to Apply' in the top menu. This PhD could be caried out on a part time or full time basis so please select the relevant application link. On the application form, please make it clear that you are applying for one of our advertised projects so we can direct it straight to the relevant people.

The Interview

All successful applicants will be offered an interview with the proposed Supervisory Team. You will be contacted by a member of the Research School Team to find a suitable date. Interviews can be conducted in person or over Microsoft Teams.

Funding your PhD

For information about Doctoral Loans please visit: https://www.worc.ac.uk/study/fees-and-finance/doctoral-loans.aspx

During your PhD you can access the Research Student Support Scheme to support dissemination costs associated with your research, up to £500 a year.

Research at the University of Worcester
Research is central to the University's mission to make a difference in everything that we do. We are committed to delivering excellent research which extends the boundaries of human knowledge but which also improves people's lives by enabling better health outcomes, improving food security, developing environmentally sustainable solutions for crop production and socially sustainable solutions to our ageing population, enhancing public knowledge and understanding of the past and present.

The University hence focuses its research around five high-level challenges facing society, locally, nationally and globally:

- Human Health and Wellbeing
- Sustainable Futures
- Digital Innovation
- Culture, Identity and Social Exclusion
- Professional Education

The success of our research is reflected in our continuous improvement in external research assessment processes. In the most recent Research Excellence Framework, REF 2021, the University saw a near 50% increase in the scale of its research and 12% increase in quality, building on its performance in REF 2014 when it was the UK's most improved university in terms of Research Power, a combination of scale and quality.

Research Degrees at Worcester
Our research students are central to our overall mission for research. They are working at the cutting edge of their disciplines and driving forward the quality of our research whilst enriching our research culture. We are looking to increase our research student numbers as a strategic imperative.

Our commitment to our students is reflected in the results of the Postgraduate Research Experience Survey 2023 in which we ranked 3rd for overall research student satisfaction nationally. Key to our success in his area is the Research School, a focal point for all our research students.

It provides:

- day-to-day support for our students, both administrative and practical, through our dedicated team
- a Research Student Study Space with both PCs and laptop docking station
- a comprehensive Researcher Development Programme for students and their supervisors
- a programme of student-led conferences and seminars

RESEARCH SCHOOL

Worcester Biomedical Research Group
The Worcester Biomedical Research Group (WBRG) aims to promote multidisciplinary Biomedical Science research at the University of Worcester and fosters collaborations between staff (cross-institute), students and local health / industrial organisations.

Building sustainable societies through research into disease prevention, medical treatment and diagnostics, lies at the heart of the WBRG research ethos. We aim to achieve this goal through basic and translational Biomedical Research with particular focus on cancer, cardiovascular disease and neurodegeneration.

Widening Participation
As part of its mission statement the University is committed to widening participation for its higher degrees. Although most candidates will have an undergraduate and/or a Masters degree, the University is happy to accept applications from candidates with relevant professional qualifications and work related experience.

For further information or an informal discussion on this project, please contact Dr Steven Coles (Director of Studies) via email at s.coles@worc.ac.uk

Research School University of Worcester Henwick Grove Worcester WR2 6JA
Tel: 01905 542182 **www.worcester.ac.uk/researchstudentships**

University of Worcester