

College PhD Studentship in Cancer Research

Studentship Number: MBSP/10/01

Primary Supervisor: Professor Andrew Fry
Tel: 0116 229 7069
Email: amf5@le.ac.uk
Department of Biochemistry

Co-supervisor: Dr. Don Jones
Department of Cancer Studies & Molecular Medicine

Host Department: Department of Biochemistry
University of Leicester

Project Title: Validating the Nek11 kinase as a novel target for cancer treatment

Project Description:

Our laboratories have an established track record studying the regulation and function of the NIMA-related protein kinase (Nek) family and radiation-induced DNA damage. Neks contribute to cell cycle progression and ciliogenesis with a common underlying theme being control of microtubule organization. However, an unexpected role for Nek11 in regulating the G2/M DNA damage checkpoint was recently reported. In response to ionizing radiation (IR), Nek11 is phosphorylated and activated by Chk1 and, in turn, Nek11 phosphorylates Cdc25A triggering its proteasomal degradation and cell cycle arrest. This exciting data, together with the observation that Nek11 is upregulated in colorectal cancers, makes it an excellent candidate for anti-cancer drug development. We have already generated a number of Nek11 reagents and put collaborations in place that together will allow us to address the biological function and regulation of Nek11 and validate Nek11 as a potential anti-cancer target. This project is fully funded by the University of Leicester and will provide the student with an excellent grounding in state-of-the-art molecular and cell biology techniques. Hard-working, independent-minded and enthusiastic students who can work well in a large team are encouraged to apply.

Selected References

O'Regan, L., Blot, J. and Fry, A.M. (2007) **Mitotic regulation by NIMA-related kinases.** Cell Division 2, 25.

O'Regan, L. and Fry, A.M. (2009) **The Nek6 and Nek7 protein kinases are required for robust mitotic spindle formation and cytokinesis.** Molecular and Cellular Biology 29, 3975-3990.

Richards, M.W., O'Regan, L., Mas-Droux, C., Blot, J.M.Y., Cheung, J., Hoelder, S., Fry, A.M. and Bayliss, R. (2009) **An autoinhibitory tyrosine motif in the cell-cycle-regulated Nek7 kinase is released through binding of Nek9.** Molecular Cell 36, 560-570.

Melixetian, M., Klein, D.K., Sorensen, C.S. and Helin, K. (2009) **Nek11 regulates CDC25A degradation and the IR-induced G2/M checkpoint.** Nat. Cell Biol. 11, 1247-1253.