



## Institute of Technology

### Ciência sem Fronteiras / Science Without Borders

#### Postgraduate Project Template

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| <b>Institution:</b>  | Institute of Technology Sligo  |
| <b>Title of Postgraduate Opportunity:</b><br>(include level of study)  | Novel anti-tumour drug analysis in leukaemia patient primary cell lines, normal patient primary cell lines and commercial leukaemia cell lines (PhD) |
| <b>PI Name &amp; Contact Details:</b>  | Dr James Murphy<br>+353 71 9155 239<br><a href="mailto:murphy.james@itsligo.ie">murphy.james@itsligo.ie</a>  |
| <b>Department/School:</b>  | Dept of Life Sciences  |
| <b>Research Centre /Group:</b>   | Mitochondrial Biology & Radiation Research   |
| <b>Research Centre/Group website:</b>  | <a href="http://itsligo.ie/mbr">http://itsligo.ie/mbr</a>  |
| <b>Brief Summary of PI research / research group /centre activity</b>  |  |
| <p>The PI along with MBRR researchers have a strong track record in Mitochondrial Biology as well as Radiation Biology particularly non-ionising radiation. Ongoing research includes determining subtle changes in mitochondrial dynamics, as well as mitochondrial function and mitochondrial DNA in skin cells at an in vitro and in vivo level. Outcomes will include the development of a new mitochondrial diagnostics platform for sensitive and predictive dermatological analysis. The group is also evaluating and developing the potential of radiowave radiation as both a stand-alone cancer therapy and also as an adjunct therapy. In addition, researchers are evaluating exciting new anti-tumour drug hybrids using novel analytical platforms. The Mitochondrial Biology and Radiation Research (MBRR) Group was formed in early 2009, following the awarding of an SFI Stokes Lectureship to the head of MBRR, Dr James Murphy. The research team is in the Dept of Life Sciences in IT Sligo and it has research offices and over 70m<sup>2</sup> of state-of-the-art research space in the Innovation Centre on campus. MBRR is currently funded by Science Foundation Ireland, IT Sligo seed funding, Invest NI, Irish Research Council and the Radiowave Therapy Research Institute.</p> |  |
| <b>Brief Description of Masters or PhD Project</b>   |  |
| <p>Novel anti-tumour drug analysis in leukaemia patient primary cell lines, normal patient primary cell lines and commercial leukaemia cell lines. This project will run in collaboration with the senior Haematologist in Sligo General Hospital and leading academic chemists in the field of novel anti-tumour drug design from the Dublin Institute of Technology and Trinity College Dublin. Novel drugs will be analysed in a novel way which is more relevant than in vitro evaluations heretofore. Normal patient and leukaemia patient marrow cells and white blood cells will be maintained in primary culture. A commercial leukaemia and marrow cell line will also be employed for comparison. Phase 1 will involve the analysis of 15 novel drugs and drug hybrids on the marrow and leukaemia cell lines.</p>   |  |

The 3-5 best performing drugs will be carried forward to phase 2 for analysis on normal and cancerous marrow and white blood cell lines. A range of drug concentrations and treatment modalities will be evaluated. Real time cell analysis and cell toxicity analysis will be performed as standard on all cells. Normal cells surviving drug exposure will be analysed for DNA damage markers 1 day and 1 week post exposure. All cells will be maintained at in vivo relevant oxygen concentrations using specially designed incubators.

**Key Attributes of Project for Brazilian Postgraduate Students**

Should outline why projects offer something that is not available in Brazil – specific equipment, multi-disciplinarity, aspects of structured programme, links with industry, placements, links with other research groups, etc. Good opportunity for IoTs to emphasise their close working relationships with industry and particularly SMEs and their pivotal role in regional economic development. The patient samples and novel drugs available to the study combined with the world leading expertise to be provided by collaborators is truly unique to this research proposal. Furthermore the unique analytical platform to be employed in this study has not been used heretofore in the analysis of novel ant-tumour drugs.

**Name and contact details for project queries, if different from PI named above:**

As above

**Please indicate graduate disciplines which are eligible for application:**

Life Sciences, Biomedical Sciences

**Alignment with Science Without Borders Priority Areas:**

|  |   |
|--|---|
| Engineering and other technological areas                        |   |
| Pure and Natural Sciences (e.g. mathematics, physics, chemistry) |   |
| Health and Biomedical Sciences                                   | ✓ |
| Information and Communication Technologies (ICTs)                |   |
| Aerospace  |   |
| Pharmaceuticals  |   |
| Sustainable Agricultural Production                              |   |
| Green Chemistry  |   |
| Oil, Gas and Coal  |   |
| Renewable Energy   |   |
| Minerals   |   |
| Biotechnology  |   |
| Nanotechnology and New Materials                                 |   |
| Climate Change   |   |
| Biodiversity and Bioprospection                                  |   |
| Marine Sciences  |   |
| Productive Inclusion and Social Technologies                     |   |
| Housing and Sanitation   |   |