Department of Chemistry
Departmental Seminar:
Physiology Research

You are cordially invited to a lecture presented by

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Date: Friday, 27 May2022
Time: 11:30 – 12:20
Venue: Orbital
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***In vitro* and *in vivo* effects of a variety of compounds on the metastasis of melanoma and undifferentiated neuroblastoma**

The burden of cancer is well-known and therefore cancer-related research is ongoing with many studies investigating usefulness of unique compounds on various types of cancer to contribute towards effective therapeutic approaches.

The overarching research project entails cell culture-related laboratory experimental work by testing the effects of different compounds on 3 types of cancer cell lines *in vitro* (2D cell culture) and on spheroids (3D cell culture). The work will be further translated to mouse and zebra fish *in vivo* models. Furthermore, mathematical modelling will be used to predict the effects of the compounds.

Tumour cells overexpress lymphatic growth factors namely vascular endothelial growth factor C (VEGFC) and vascular endothelial growth factor-D (VEGF-D). VEGF-C and VEGF-D enhance tumour cell metastasis. VEGF-C/D binding to vascular endothelial growth factor receptor-3 (VEGFR-3) on the tumour cell. Overexpression of VEGF-C/D regulates the expression of a chemokine receptor CXCR-4 on the tumour cell.

The types of cancer under investigation in this project are melanoma's and neuroblastomas. Neuroblastomas accounts for 15% of paediatric cancer-related deaths. Cutaneous melanoma is a relentless form of cancer, which predominantly spreads via the lymphatic system and accounts for 1-2% of all cancer-related mortality globally. The metastatic behaviour of these malignancies has accentuated the need for specific therapeutic targets to inhibit metastasis.

The chemical compounds under investigation are the chemically synthesized MAZ-51 a VEGFR-3 inhibitor and CTCE-9908 a CXCR-4 inhibitor. Additionally in the study compounds that are non-competitive receptor inhibitors are being investigated and these include: , Epigallocatechin gallate , Zingerone and the tryptophan metabolites L-Kynurenine, Kynurenic acid and Quinolinic acid. Using these variety of compounds as a combined mechanism to hinder tumour metastasis, may prove to be a useful therapeutic approach.

At the end of the project we aim to have reliable and valid results to support the mathematical models to further incorporate in future studies. Mathematical models are incorporated in this study due to the current trend in laboratory-based-research moving towards computational design based on mathematics modelling.

Collaborations have played a big role in making the different aspects of this research possible.