



Nanoscale Organisation
and Dynamics Group

***In vivo* [⁶⁴Cu]CuCl₂ PET imaging to monitor activity of anti-cancer drugs on tumor copper homeostasis**

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Abstract

Given the strong clinical evidence that copper levels are significantly elevated in a wide spectrum of tumours, copper homeostasis is considered as an emerging target for anticancer drug design. There is an increase in the number of clinical trials using copper-targeting drugs for the treatment of tumours, and monitoring copper levels *in vivo* is therefore of paramount importance when assessing the efficacy of those drugs. To date, no method has been reported to monitor and quantify treatment effects through detecting copper levels *in vivo*. In this study we demonstrated the ability of our compound Dextran-Catechin to dysregulate copper homeostasis in neuroblastoma cancer cells and we developed a [⁶⁴Cu]CuCl₂-PET preclinical imaging method for assessing the accumulation of copper in tumours and potential alterations of copper homeostasis following anti-copper drug treatment. We established this new method in a preclinical mouse model of neuroblastoma to specifically investigate the effect of a novel copper-targeting drug conjugate, Dextran-Catechin (Vittorio et al. Oncotarget 2016, Yee et al. Nature Sc. Rep. 2017) on copper homeostasis in tumours. Importantly, this imaging method has also allowed us to simultaneously assess potential off-target effects of this drug in the regulation of copper homeostasis in healthy organs. This study is the first of its type, showing the mechanism by which Dextran-Catechin decreases intracellular copper levels in tumour and, the first study which uses ⁶⁴Cu-PET imaging to monitor anticancer-treatment effect.

This new PET imaging approach has enormous application in assessing the potential of copper-targeting anticancer therapies, both in preclinical and clinical studies, as well as paving the way for personalized drug response profiles.

Profile

Dr Vittorio is a Project Leader at Children's Cancer Institute and Lecturer (conjoint) at the School of Women's and Children's Health UNSW. He joined the Institute and the UNSW Australian Centre for Nanomedicine in 2013 when awarded a highly competitive Vice Chancellor's Postdoc Research Fellowship to conduct research under the mentoring of Prof Maria Kavallaris at Children's Cancer Institute. Dr Vittorio's recent investigation focused on understanding the role of copper metabolism/homeostasis in cancer (Neuroblastoma and Glioma). As a result of his success Dr Vittorio has attracted competitive research funding and established multidisciplinary national and international collaborations. In the last five years he has been awarded highly competitive grants for about 1.7 million \$ as sole CI, which he used to expand his research and build his multidisciplinary group. In 2013 Dr Vittorio was awarded the Cancer Institute NSW Premier's Awards for Outstanding Cancer Research. As a result of his continued research success he was awarded a highly competitive CINSW Early Career Fellowship (2014-2016) and a NHMRC Career Development Fellowship (2019-2023) to develop his career. Dr Vittorio's leadership in this field is

reflected in 71 career peer-reviewed papers, 6 book chapters and 4 patents. Dr Vittorio is member of the Kids Cancer Alliance and he has established collaborations with oncologists and industry partners to progress his discoveries to the clinic.

Staff and students at all levels are welcome to attend.

Venue and Time

This talk will be held on Monday December 3 at 11 am at the Campbelltown Campus in Building 21, Lecture Theatre 6 (CA-21.G.18).

Enquiries

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