Contribution ID: **49** Type: **Oral Presentation**

Investigation of a specifically targeted photosynthetic nanoparticle drug delivery system for enhanced photodynamic therapy treatment of metastatic melanoma

Friday, 29 June 2018 11:40 (20 minutes)

Metastatic melanoma is the 6th most common cancer diagnosed worldwide, with approximately 100, 000 annual related deaths. Photodynamic therapy (PDT) is a photochemotherapeutic cancer treatment that utilizes a photosensitizer (PS) drug that, when activated by laser light at a specific wavelength, yields reactive oxygen species (ROS), which in turn induces cell death. However, due to the passive diffusion of PSs, normal surrounding cells are sometimes affected and their targeted concentrations in cancer cells tends to be minimal, thus limiting the effectiveness of this treatment. Therefore a multicomponent drug targeting strategy is often applied to improve PS specific delivery and concentration in cancer cells only, which in turn can improve the effectiveness of PDT. Thus the intention of this study was to improve the photosynthetic drug delivery of zinc sulfothiolphthalocyanine (ZnPcSmix) in metastatic melanoma cells, by enhancing its chemical structure. ZnPcSmix was successfully conjugated to pegylated gold nanoparticles in order to maximize its solubility and stability, as well as bound to active tumour-associated antibody-antigens (anti-MIA) to aid in specific targeted PS delivery. In in vitro co-cultured metastatic melanoma (A375) and fibroblast (WS1) cells, this molecular drug conjugate proved to have enhanced cellular uptake within cancer cells only, while normal cells remained unaffected. Furthermore, after conducting in vitro PDT experiments with A375 cells, a significant amount of cell death and cytotoxicity was noted. Overall, this molecular drug conjugation combination of ZnPcSmix with AuNP and anti-MIA, proved to enhance the treatment capabilities of PDT for this form of cancer.

Please confirm that you
have carefully read the
abstract submission instructions
under the menu item
”Call for Abstracts”
(Yes / No)

Yes

Consideration for
student awards
Choose one option
from those below.
N/A
Hons
MSc
PhD

MSc

Supervisor details
If not a student, type N/A.
Student abstract submision
requires supervisor permission:
please give their name,
 institution and email address.

Prof Heidi Abrahamse
Laser Research Centre, University of Johannesburg
habrahamse@uj.ac.za

Primary author: Ms NAIDOO, Channay (Laser Research Centre, University of Johannesburg)

Co-authors: Dr KRUGER, Cherie A. (Laser Research Centre, University of Johannesburg); Prof. ABRAHAMSE, Heidi (Laser Research Centre, University of Johannesburg)

Presenter: Ms NAIDOO, Channay (Laser Research Centre, University of Johannesburg)

Session Classification: Photonics

Track Classification: Track C - Photonics