

LOPS® 20244th Edition of Annual Conference on**LASERS, OPTICS, PHOTONICS,
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Photodynamic therapy (PDT) and diagnosis (PDD) are highly topical research for the implementation of alternative and targeted cancer therapy. Central to efficient clinical application of PDT and PDD is the development of effective photochemotherapeutic drugs called photosensitizers (PS). PSs must not only provide sufficient killing capacity of cancer cells, but it must also easily and efficiently be absorbed by cancer cells (CC) more so than normal surrounding cells. Activation to produce significant ROS that would activate cell signaling pathways to induce apoptosis is another key characteristic of PSs. PSs with optimal activation and conjugation capabilities allowing both binding to nanoparticles (NP) and providing association with suitable, cancer specific antibodies (AB) were performed. Both CCs and cancer stem cells (CSCs) were targeted. In addition, synergistic effects of phytochemicals and phytochemicals with potential as PSs have also been studied. Metallophthalocyanine PSs conjugated to metal-based NPs and cell specific ABs have produced an array of highly effective and efficient multicomponent drugs (MCD) for PDT and PDD. In addition, these newly synthesized MCDs not only target CCs but also CSCs which often cause recurrence and metastasis. An array of highly efficient MCDs have been synthesized and demonstrated to be highly effective in targeting CCs and CSCs and inducing cell death.

Keywords: PDT; PDD; Photosensitizers; Nanoparticles; Targeted PDT

Biography

Prof. Abrahamse BSc (RAU), BSc Honours (Biochemistry; US and Psychology; UNISA), MSc (Medical Biochemistry; US), PhD (Molecularbiology/Biochemistry; Wits University), Executive Leadership (Gibs, UP), Global Clinical Scholar Research Program (Harvard Medical School) is currently the Director of the Laser Research Centre, UJ and DST/NRF SARCHI Chair for Laser Applications in Health (2016-2025). She is appointed as Adjunct Professor to the Manipal College of Health Professions, India. Her research interests include photobiology and photochemistry with specific reference to Photodynamic cancer

MULTICOMPONENT PHOTOCHEMOTHERAPEUTIC DRUGS FOR PHOTODYNAMIC DIAGNOSIS AND PHOTODYNAMIC THERAPY IN CANCER

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therapy and Photobiomodulation. She was the recipient of the Faculty of Health Sciences highest research output for 2009 and the University of Johannesburg Vice-Chancellor's Distinguished Award for Outstanding Researcher of the Year, 2010 and again in 2020 and the NLC Rental pool grant-holder bestresearch output for 2008, most masters graduates 2013 and most IP produced 2013 and most doctorategraduates, 2014. She was runner up to the DST WISA Distinguished Scientist award in 2015 and placed second in the SAWiSA awards, 2023. She was granted a DST/NRF SARCHI chair in 2016 which was renewed for another 5 years in 2020. In 2019 she received the International Photodynamic Association Humanitarian award recognize those who have made selfless efforts and personal sacrifices to enhance and promote the science of Photodynamic therapy and in 2022 she received the International Photodynamic Association for Basic PDT Research Excellence Award. She was also awarded the South African Higher Education Resources Services Lifetime Achiever award in 2023. According to Expertscape: The expertise of Heidi Abrahamse ranks in the Top 0.0044% of 44 977 published authors worldwide on Photosensitizing Agents from 2012 through 2023 based on contributions to 44 articles on the topic. <https://expertscape.com/au/photosensitizing+agents/Abrahamse%2C+H> She has supervised 63 masters, 38 doctorates and 26 post-doctorate fellows. She has acted as external examiner for masters and doctorate theses from several national and international universities and has an impressive record for external grant applications. Her international standing as a researcher of distinction is supported by the fact that she has hosted 6 international conferences including the World Association for Laser Therapy, Photodynamic therapy conference supported by the DST SA/ Germany year of science, a Phototherapy workshop, Biophotonics in Cancer symposium and Photobiomodulation:Trends in Disease Management in 2022. She has co-chaired 6 BRICS meetings in 2020, 2021 Brazil and 2021, 2023 Russia and the International Commission for Optics, Optics & Photonics AFRICA 2023. She was the president of the international society, WALT for 2010 to 2012. She has been invited to present her research at several international conferences as invited,