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Title: Multifunctional Photosensitizer based Agents for Theranostic Approaches in Photodynamic Therapy

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ABSTRACT

Theranostic approaches of combining therapy with diagnosis, have gained importance in the field of oncology for image-guided therapy. Photodynamic Therapy (PDT) has received increased attention as a promising alternative to overcome several limitations of conventional therapies. PDT efficacy depends on selective application of various parameters like localization and concentration of PS, light dose, oxygen concentration and heterogeneity of the tumor microenvironment, which can be achieved with advanced imaging techniques. Compared to other therapies, the use of PSs in PDT offers an advantage of combining imaging along with therapy due to its selective tumor localization, activation and photophysical properties. Recent advances in PS formulations as activatable phototheranostic agents have shown promising potential for finely controlled image-guided PDT due to their propensity to specifically turning on diagnostic signals simultaneously with photodynamic effects in response to the tumor-specific stimuli. This presentation highlights the recent progress in the development of PS-based multifunctional theranostic agents for biomedical applications in multimodal imaging combined with PDT. All these advancements in designing and application of PS as theranostic agents holds a great promise for improving and personalizing cancer management, therapeutic outcomes, patient survival, and quality of life.

Biography

Prof. Heidi Abrahamse (PhD) is the Director of the Laser Research Centre, UJ and DSI/NRF SARChI Chair for Laser Applications in Health since 2016. Her research interests include photobiology and photochemistry with specific reference to photodynamic cancer therapy, stem cell differentiation and wound healing. She was the recipient of the University of Johannesburg Vice-Chancellor's Distinguished Award for Outstanding Researcher of the Year, 2010 and 2020 and received the International Photodynamic Association Humanitarian in 2019. She was the president of the international society, WALT, for 2010 to 2012 and the Co-Editor in Chief of the international accredited journal Photobiomodulation, Photomedicine and Laser Surgery. Her Scopus H-index is 39.

PERSONAL PROFILE

Prof. Abrahamse BSc (RAU), BSc Honours (Biochemistry; US and Psychology; UNISA), MSc (Medical Biochemistry; US), PhD (Molecular biology/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).

Her research interests include photobiology and photochemistry with specific reference to Photodynamic cancer 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 best research output for 2008, most masters graduates 2013 and most IP produced 2013 and most doctorate graduates, 2014. She was runner up to the DST WISA Distinguished Scientist in Life Science award in 2015 and 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.

She has supervised 58 masters; 33 doctorates and 22 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 4 international conferences including the World Association for Laser Therapy, Photodynamic therapy conference supported by the DST SA/Germany year of science, a Phototherapy workshop and Biophotonics in Cancer symposium. She has co-chaired 3 BRICS meetings in 2020, 2021 Brazil and 2021, Russia.

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, keynote or plenary presenter. Her society membership include: SASBMB; ASBMB; ASCB; ISO; WALT; OSA; WALA; EMLA; NAALT; and ISLA. She has acted as external and panel reviewer for external national and international funding bodies and grants and played an instrumental role in negotiating memorandums of understanding with several international institutions. Her publication record is impressive with 245 peer reviewed accredited journal publications, 57 accredited full paper proceedings, 49 chapters and 2 books. She is currently a B2 NRF rated scientist with a Scopus H-index of 39 and a Google scholar H-index of 46. She serves on international councils, executive committees and board of directors including the World Association for Laser Therapy, World Academy of Laser Applications, European Medical Laser Association and the African Laser Centre and serves on the editorial boards of 8 peer-reviewed internationally accredited journals while acting as reviewer for over 50 journals. She was appointed Co-Editor in Chief of the international accredited journal Photobiomodulation, Photomedicine and Laser Surgery.

Her academic career spanning more than 20 years from junior lecturer at Wits University to research professor at UJ, provide her with substantial experience in tertiary education, lecturing and research. She has lectured 6 different subjects from first year to fourth year level. She serves on a number of research-related university committees (incl. Faculty Board and Management, Faculty Higher Degrees and Ethics, Senate Higher Degrees) for both universities and science councils (UJ/CSIR Steering) and World Health Organization International EMF Project – South Africa National Committee. She currently serves her second term on the University of Johannesburg Council as elected Senate representative and was appointed by the Minister of Health to serve on the National Health Research Committee of South Africa for 2020-2023. She is a member of the Academy of Science of South Africa (ASSAf).