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Chlorophyllin derivatives mediated PDT: A new ray of hope in the horizon for cancer treatment

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Photodynamic therapy (PDT) is an approved clinical treatment with minimal invasiveness for different types of cancers. It has the advantage of high selectivity towards tumor tissue and lack of severe and systemic complications with the possibility of harmless repetitive applications. Its mechanism of action involves activation of a photosensitizer (PS) by an appropriate monochromatic light source with long wavelength for deeper tissue penetration. Chlorophylls are photosynthetic pigments present in all organisms that convert light energy into chemical energy. The tetrapyrrolic ring structure of chlorophylls show high level of light absorption in the red region of visible light, activation of chlorophyllin derivatives results into generation of Reactive Oxygen Species (ROS) that cause tumor cells toxicity and subsequent tumor regression. Therefore, PDT has been used for targeting several accessible tumors. It has been also used in treatment of precancerous and cancerous dermatological diseases. In our studies, we were able to prove the distinctive role of chlorophyllin derivatives as highly efficient photosensitizers at both *in vitro* and *in vivo* PDT approaches. In comparison to the conventional chemotherapeutic drugs, no major alterations to the normal physiological condition have been detected. Additionally, successful PDT approaches in tumor cells killing were also achieved via liposomal delivery system of chlorophyllin derivatives. Mechanisms underlying PDT mediated tumor cells killing and *in vivo* tumor regression have been also investigated. Attempts towards the development of an efficient drug delivery system for improved tissue permeation, has been also conducted in an established murine tumor model for possible future clinical applications.

Biography

Iman Emam Omar Gomaa has completed her BSc in Biology at the Faculty of Science, Cairo University. She has obtained her Master's degree from Panum Institute, Copenhagen University and completed her PhD at the Medical School of the Technical University of Munich, Germany. She did four years of Postdoctoral studies at Mount Sinai School of Medicine, NY, USA and the Faculty of Medicine, Marie Curie University, France. Currently she is an Associate Professor of Molecular and Cellular Biology at the Biotechnology Sector, Faculty of Pharmacy and Biotechnology, German University in Cairo. She has published more than 20 papers in reputed journals.

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