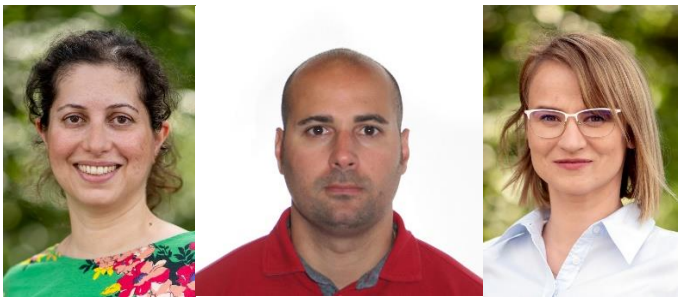
NOVEL MOLECULES FOR EFFICIENT PHOTODYNAMIC THERAPY

DEVELOPING A NEW GENERATION OF PHOTOSENSITIZERS WITH MINIMUM SIDE-EFFECTS TO BE USED IN PHOTODYNAMIC THERAPY TO TREAT MORE CANCER TYPES, SKIN AND EYE DISEASES.



Market need and potential

Cancer is a global health issue that affects around 20 millions of people every year. As our initial need analysis indicated, the market is in need for improved cancer drugs with either increased patient survival, diminished cancer recurrence, reduced toxicity or to bring improvements to the quality and length of patients´ lives. Common cancer treatments can result in severe side effects. Despite the availability of various cancer treatments, the survival rates for some types of cancer are still low. Efforts to reduce the global burden of cancer include research into new and more effective cancer treatments. Photodynamic therapy (PDT) is a clinically approved and minimally invasive treatment with the benefit of very few side-effects compared to other cancer therapeutics, such as chemotherapy and radiation treatments, and could become a more often used option for cancer patients.

Business idea

We aim to develop a novel PDT drug for cancer treatment that has superior photosensitive properties compared to existing drugs on the market. Our unique solution is a new heavy atom-free photosensitizer (PS) that targets DNA structures in pre-exosomal vesicles. It has an active concentration in the nanomolar range, making it highly effective at destroying cancer cells while minimizing toxicity to healthy tissue. Furthermore, the drug would only become toxic upon light activation, ensuring that it is non-toxic in the dark state, which would translate to minimal side effects for patients undergoing treatment. This novel PDT drug could potentially revolutionize cancer treatment, as it would offer a highly targeted and effective therapy with minimal side effects and pave the way toward more personalized and efficient photodynamic cancer therapy procedures.

Competition

Several companies are involved in the development and commercialization of PDT drugs for cancer treatment and other indications. Some of the key players in the market include: Biofrontera AG, Hologic, Inc., Quest PharmaTech Inc., Steba Biotech S.A. Photocure ASA, Galderma SA, and Soligenix, Inc., etc. However, nucleus-targeted PDT agents are still very rare, difficult to synthesize, have shown considerable dark cytotoxicity, and tendencies to cause genetic variation, limiting their clinical applications.

Advantages

- a new heavy atom-free PS that targets DNA structures in pre-exosomal vesicles,
- non-toxic at high concentrations in the dark and toxic only upon light-activation,
- very potent at nanomolar concentrations in both in vitro and in vivo,
- low likelihood of side effects,
- fast, easy, straightforward, and non-expensive synthesis which translate to lower production costs and potential increase of PDT market share.

Current status

Both *in vitro* and *in vivo* experiments showed that when light-activated, our PS is very potent at low concentrations and completely inactive in the dark. We are presently performing ADME studies in collaboration with SciLifeLab's Drug Discovery and Development platform and benchmark our PS to other available PSs on the market. We have performed need analysis investigating the clinicians' perspective and continue interviewing different experts and pharmaceutical companies to have a better understanding of the market and potential indications. Initial patent application was submitted in 2022. Currently, we are working on strengthening potential PCT application due in August 2023.

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IPR
Patent application submitted; decision expected in August 2023

Capital need
To be decided

Partnership
We are currently seeking funding/expertise/networking.

Team
Nasim Sabouri, PhD, Molecular Biologist, Associate Professor/Founder

Marco Deiana, PhD, Materials Engineer/Founder

Milada Jamroskovic, Project Coordinator

Background
PDT has emerged as a promising tool in oncology, dermatology, oftalmology, and it is clinically approved to treat several different cancer types, skin and eye diseases. Current PDT therapy has several limitations which decrease it´s availability to patients. DNA damage, mediated by our new heavy atom-free PS, can be, in principle, modulated by adjusting not only the molecule concentration but also the power, illumination time and even the wavelength of the light source. This unique feature provides a means to implement our molecule as a versatile tool for image-guided photo-pharma-cological applications.

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