In the search for an alternative approach to chemotherapy against cancer, Photodynamic Therapy (PDT) has proven to be an effective treatment technique. PDT used a chemical compound called photosensitizer (PS), which is injected intravenously. When the PS reaches the tumor (generally after a few hours), a physician activates it with a non-harmful laser. The combination of PS and light instantly generates toxic molecular species that kill the tumor. Advantages of PDT over other therapies are its low side effects and its short post-operative recovery (hours or days rather than weeks for chemotherapy).

PDT is approved in several countries, including the USA and France, to treat certain types of cancer (i.e. prostate or head and neck cancers). About ten PSs have reached the market since 1993. Because all are from the same chemical family, they share the same drawbacks, among other prolonged photosensitivity. For up to 10 weeks following treatments, patients must nearly completely avoid contact with light/sun.

In this project, we propose to render the PS more selective to cancer cells by attaching novel PSs to nanomaterials known to accumulate in tumors. This will therefore lessen the prolonged period of light sensitivity for patients.