

Title: Use of Nanomaterials to Overexpress Peptide Fraction VECYGPNRPQF as a Bioactive Compound Found in Microalga *Chlorella vulgaris* for Antioxidant and Anticancer Purposes

Abstract:

Microalgae has been extensively studied for food and biofuels. Recently, its use in medicine has been under research. *Chlorella vulgaris* is a microalgae widely studied for its bioactive compounds. This research consists in using nanoparticles to overexpress VECYGPNRPQF peptide fraction found in *C. vulgaris*. The first goal is to see what effect nanoparticles have on algae growth. This will be done by exposing the culture to low dosages of nanomaterials to alter algae metabolism and then analyze its lipid, fatty acids, protein, and photosynthetic compounds abundance and concentration. This is important to do since microalgae predict what is happening to a contaminated ecosystem. Simultaneously, it will be observed if nanomaterials made it overexpress VECYGPNRPQF peptide fraction. By stressing the metabolic pathways, the microalga can over synthesize said compound. The second goal is to functionalize nanoparticles with said peptide to do drug delivery to cancer cells and have an antioxidant effect. This will be achieved by extracting the peptide fraction from microalga *C. vulgaris* and purify it, making it ready to be attached to nanomaterials. This peptide fraction has been found to have anticancer and antioxidant properties. This means that with the use of nanomaterials the peptide can have better targeting to the cells.