

## Non-spherical shape nanoparticles effect on enzymatic performance

Purpose of the visit: The proposed project aims to study the impact of non-spherical gold nanoparticles with different stabilizers on the performance of cellobiose dehydrogenase (CDH) redox enzyme as a probe of concept of the effects of engineering nanoparticles in the natural performance of enzymes. The group of Prof. Luis Liz-Marzan has broad experience in the synthesis of tailored metallic nanoparticles such as gold or silver in various shapes (rods, stars...). During the visit we will discuss the available nanoparticle shape as well as the different approaches to the synthesis of new materials.

Description of the work and achievements: During the visit we discuss the different structures available and its physicochemical characteristics. We evaluate the candidates more likely to strongly interact with CDH redox enzyme and with sufficient stability to be used in future experiments. Gold rods of different aspect reaction were prepared and both elongated and spherical nanoparticles are ready for further studies. Those nanoparticles are readily characterized in terms of size and shape by TEM and in terms of optical properties by UV-vis spectroscopy. Depending on the shape of the nanoparticles, the plasmon band are located at diverse wavelengths. We expect that the different plasmon resonance will have different effects on the electron transfer in the redox process of the enzyme.

Future collaboration: Depending on the outcome of the first trials, gold nanoparticles with sharp edges such as nanostars will be produced and delivered. Dr. Perez –Juste plans a visit to Lund University for further discussion and advice at experimental level in the laboratory.