SYNTHESIS OF A BIOCONJUGATE USING AG-BSA/PVP NANOCLUSTERS WITH ANTI-PSG1 PREGNANCY SPECIFIC GLYCOPROTEIN PSG1 ANTIBODY

Cinthya Melissa Hernandez[1], Imelda Olivas Armendáriz[1], Claudia Alejandra Rodríguez González[1]
[1]Universidad Autónoma de Ciudad Juárez, Departamento de física y matemáticas, Mexico.

Breast cancer is one of the diseases with the highest incidence worldwide, being an early and correct detection of great relevance for the efficiency of the treatments administered, thus improving the survival rate of patients. Therefore, the purpose of this project is the conjugation of nanoclusters (NC) with a silver nucleus coated with BSA/PVP with PSG1 antibody for its possible use in the detection of breast cancer. The nanoclusters obtained with BSA/PVP coating were carried out employing an aqueous colloidal synthesis in an ice bath without light, followed by a subsequent characterization of their physical, optical, and chemical properties. Once the nanoclusters were obtained, they were conjugated with the PSG1 antibody, experimenting with three factors. These factors were: the amount of EDC and sulfo-NHS cross-linkers, the process of deactivation of BSA by filtration, use of 2-mercaptoethanol, and finally, the conjugation time, ending with the characterization of its properties, as well as an electrophoresis test. The obtained NCs presented the typical reddish-brown coloration of silver NCs, with an average size of 11.67 nm, showing a silver FCC crystalline phase, and absorption bands in a range of 400-500 nm typical of the surface plasmon of silver and fluorescence emission at 600 nm. With the variation in the conjugation factors, four conjugates were obtained with sizes of 933 nm, 659 nm, 1.19 nm, and 1,004 nm, respectively, being conjugates 1 and 2 who presented absorption bands characteristic of the surface plasmon of silver. Characteristic bands of the crosslinking reagents were shown in all four conjugates. Similarly, conjugates 1 and 2 showed fluorescence emission at 600 nm and ranges ~ 800 nm, the opposite being the case for conjugates 3 and 4, which presented emission at 450 nm, the emission being related to particle size. Shifts in the functional groups corresponding to Amides I and II and the amino group suggest the formation of the NC-antibody complex. Finally, the electrophoresis test shows the presence of the BSA in the NCs and the conjugate. It was possible to obtain and characterize Ag-BSA/PVP-NC and two conjugates that show promising properties for use as an optical marker.

Keywords: nanocluster, bioconjugate, antibody

Acknowledgment:

To Universidad Autónoma de Ciudad Juárez and Beca del Consejo Nacional de Ciencia y Tecnología

Presenting author's email: al220875@alumnos.uacj.mx