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Designing an Immuno-nanobiosensor for detection of HER2-positive breast cancer based on Magnetic and Graphene nanoparticles

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Abstract:

Breast cancer is regarded as the most common cause of death after lung cancer among the women. Using graphene quantom nanoparticles (GQNPs) to construct a biosensor increases the sensitivity, rapidness and flexibility of biological tests to detect a single cancer cell in biological studies. We developed a highly sensitive fluorescence immuno-nanobiosensor with wide linear response based on GQNPs and magnetic nanoparticles (MNPs) for selective detection of HER2-positive breast cancer. The GQNPs and MNPs were conjugated with Herceptin antibody and the conjugation was confirmed by many physicochemical studies. Then the conjugates were exposed to the SKBR-3 breast cancer cells to form the sandwich structure of MNP-Herceptin-SKBR-3 cell-Herceptine-GQNP. Then, a fluorescence microscope was used to detect the breast cancer cells after isolating them by a magnetic field. The studies showed the high sensitivity (1 cell mL-1) and specificity of the designed biosensor for detection of SK-BR3 cells within 30 min.

Biography :

sepideh studied Genetic at the Islamic Azad university of zanjan, Iran and graduated as Bachelor in 2013. she then worked in lab for 1 year. She received her master degree in 2018 at the same institution.

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