World Academy of Science, Engineering and Technology
International Journal of Biomedical and Biological Engineering
Vol:9, No:02, 2015

SEM Detection of Folate Receptor in a Murine Breast Cancer Model Using Secondary Antibody-Conjugated, Gold-Coated Magnetite Nanoparticles

Authors : Yasser A. Ahmed, Juleen M Dickson, Evan S. Krystofiak, Julie A. Oliver

Abstract : Cancer cells urgently need folate to support their rapid division. Folate receptors (FR) are over-expressed on a wide range of tumor cells, including breast cancer cells. FR are distributed over the entire surface of cancer cells, but are polarized to the apical surface of normal cells. Targeting of cancer cells using specific surface molecules such as folate receptors may be one of the strategies used to kill cancer cells without hurting the neighing normal cells. The aim of the current study was to try a method of SEM detecting FR in a murine breast cancer cell model (4T1 cells) using secondary antibody conjugated to gold or gold-coated magnetite nanoparticles. 4T1 cells were suspended in RPMI medium witth FR antibody and incubated with secondary antibody for fluorescence microscopy. The cells were cultured on 30mm Thermanox coverslips for 18 hours, labeled with FR antibody then incubated with secondary antibody conjugated to gold or gold-coated magnetite nanoparticles and processed to scanning electron microscopy (SEM) analysis. The fluorescence microscopy study showed strong punctate FR expression on 4T1 cell membrane. With SEM, the labeling with gold or gold-coated magnetite conjugates showed a similar pattern. Specific labeling occurred in nanoparticle clusters, which are clearly visualized in backscattered electron images. The 4T1 tumor cell model may be useful for the development of FR-targeted tumor therapy using gold-coated magnetite nanoparticles.

Keywords : cancer cell, nanoparticles, cell culture, SEM
Conference Title : ICVBS 2015 : International Conference on Veterinary and Biomedical Sciences
Conference Location : Istanbul, Türkiye
Conference Dates : February 16-17, 2015

Open Science Index, Biomedical and Biological Engineering Vol:9, No:02, 2015 publications.waset.org/abstracts/17858/pdf