World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:8, No:09, 2014

Expression of Hypoxia-Inducible Transmembrane Carbonic Anhydrases IX, Ca XII and Glut 1 in Ovarian Cancer

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Abstract : Establishment of an early and reliable biomarker for ovarian carcinogenesis whose expression can be monitored through noninvasive techniques will enable early diagnosis of cancer. Carbonic anhydrases (CA) isozymes IX and XII have been suggested to play a role in oncogenic processes. In von Hippel-Lindau (VHL)-defective tumors, the cell surface transmembrane carbonic anhydrase (CA) CA XI and CA XII genes are overexpressed because of the absence of pVHL. These enzymes are involved in causing a hypoxia condition, thereby providing an environment for metastasis. Aberrant expression of the facilitative glucose transporter GLUT I is found in a wide spectrum of epithelial malignancies. Studying the mRNA expression of CA IX, CA XII and Glut I isozymes in ovarian cancer cell lines (OAW-42 and PA-1) revealed the expression of these hypoxia genes. Immunohistochemical staining of carbonic anhydrases was also performed in 40 ovarian cancer tissues. CA IX and CA XII were expressed at 540 bp and 520 bp in OAW42, PA1 in ovarian cancer cell lines. GLUT-1 was expressed at 325bp in OAW 42, PA1 genes in ovarian cancer cell lines. Immunohistochemistry revealed high to moderate levels of expression of these enzymes. The immuostaining was seen predominantly on the cell surface membrane. The study concluded that these genes CA IX, CA XII and Glut I are expressed under hypoxic condition in tumor cells. From the present results expression of CA IX, XII and Glut I may represent potential targets in ovarian cancer therapy.

Keywords : ovarian cancer, carbonic anhydrase IX, XII, Glut I, tumor markers
Conference Title : ICBEESE 2014 : International Conference on Biological, Ecological and Environmental Sciences, and Engineering
Conference Location : Singapore, Singapore
Conference Dates : September 11-12, 2014