World Academy of Science, Engineering and Technology
International Journal of Health and Medical Engineering
Vol:9, No:09, 2015

Synergistic Cytotoxicity of Cisplatin and Taxol in Overcoming Taxol Resistance through the Inhibition of LDHA in Oral Squamous Cell Carcinoma

Authors : Lin Feng, Ling-Ling E., Hong-Chen Liu

Abstract : The development of chemoresistance in patients represents a major challenge in cancer treatment. Lactate dehydrogenase-A (LDHA) is one of the principle isoforms of LDH that is expressed in breast tissue, controlling the conversion of pyruvate to lactate and also playing a significant role in the metabolism of glucose. The aim of this study was to identify whether LDHA was involved in oral cancer cell resistance to Taxol and whether the downregulation of LDHA, as a result of cisplatin treatment, may overcome Taxol resistance in human oral squamous cells. The OECM-1 oral epidermal carcinoma cell line was used, which has been widely used as a model of oral cancer in previous studies. The role of LDHA in Taxol and cisplatin resistance was investigated and the synergistic cytotoxicity of cisplatin and/or Taxol in oral squamous cells was analyzed. Cell viability was analyzed by MTT assay, LDHA expression was analyzed by western blot analysis and siRNA transfection was performed to knock down LDHA expression. The present study results showed that decreased levels of LDHA were responsible for the resistance of oral cancer cells to cisplatin (CDDP). CDDP treatments downregulated LDHA expression and lower levels of LDHA were detected in the CDDP-resistant oral cancer cells compared with the CDDP-sensitive cells. By contrast, the Taxol-resistant cancer cells showed elevated LDHA expression levels. In addition, small interfering RNA-knockdown of LDHA sensitized the cells to Taxol but desensitized them to CDDP treatment while exogenous expression of LDHA sensitized the cells to CDDP, but desensitized them to Taxol. The present study also revealed the synergistic cytotoxicity of CDDP and Taxol for killing oral cancer cells through the inhibition of LDHA. This study highlights LDHA as a novel therapeutic target for overcoming Taxol resistance in oral cancer patients using the combined treatments of Taxol and CDDP.

Keywords : cisplatin, Taxol, carcinoma, oral squamous cells
Conference Title : ICDOH 2015 : International Conference on Dental and Oral Health
Conference Location : London, United Kingdom
Conference Dates : September 25-26, 2015

Open Science Index, Health and Medical Engineering Vol:9, No:09, 2015 publications.waset.org/abstracts/27921.pdf