INHIBITORY EFFECTS OF CURCUMIN ON PROGRESSION OF CHORIOCARCINOMA CELLS THROUGH ERK1/2 AND JNK MAPK SIGNAL TRANSDUCTION

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Choriocarcinoma is associated with gestational trophoblastic neoplasia commonly arising from villous trophoblast hydatidiform mole formation. Because of difficulty to manage and overcome completely the adverse effects of choriocarcinoma in the advanced stage of the diseases, it is necessary to develop new therapeutics reducing side effects. Curcumin has been widely used as a nutraceutical with their biological activities including anti-cancer, anti-inflammatory, anti-angiogenic and anti-oxidant effects. Therefore, in the present study, we investigated chemotherapeutic effects of curcumin on choriocarcinoma cells (JAR and JEG3). Results of present study showed that curcumin suppressed cell viability and migration of JAR and JEG3 cells whereas it induced apoptosis from both JAR and JEG3 cells by TUNEL and annexin V/propidium iodide staining. In addition, curcumin increased loss of mitochondrial membrane potential in choriocarcinoma cells by JC-1 staining analysis. Consistent with these results, expression of pro-apoptotic proteins was elevated leading to activate intrinsic apoptotic pathway. Then, phosphorylation of mitogen-activated protein kinases responsible for control of chemotherapeutic effects of curcumin was demonstrated in dose- and time-dependent manners. Curcumin activated ERK1/2, JNK and their downstream signaling molecules such as P90RSK and c-Jun, respectively. Moreover, U0126 (an ERK1/2 inhibitor) and SP600125 (a JNK inhibitor) suppressed phosphorylation of ERK1/2 and JNK proteins respectively. Taken together, our results provide novel insights into curcumin as a valuable therapeutic agent in human placental choriocarcinoma cells.

Keywords: curcumin, choriocarcinoma, apoptosis, MAPK, signal transduction