Abstract

Heat shock proteins (HSPs), are a family of molecular chaperones, highly conserved amongst living organisms through evolution (Sørensen, Nygaard Kristensen, & Loeschcke, 2003). They interact with proteins to aid in their correct folding and to reverse the process of denaturation (De Maio, 1999), and also to deviate from the apoptotic pathway (Grover, 2002).

Tumour cells are known to have high basal expression of HSPs, but a lower inducible expression of HSPs when compared to normal cells (Bensaude & Morange, 1983; Brodsky & Chiosis, 2006; Morange, Diu, Bensaude, & Babinet, 1984).

Although this was observed from my results for cancer cells (HL-60, COLO679 and HCT-116), their survival (determined through the use of XTT cell viability assay) with different concentrations of chemotherapy (cisplatin, cytarabine, doxorubicin, methotrexate and vincristin) and combination treatments was not linked to changes in HSP70 concentrations (observed through HSP70 ELISA analysis). Tex-OE®, a prickly pear extract known to speed up HSP synthesis, did not increase the HSP70 concentration in the cancer cells, probably due to their low inducibility. Moreover, Tex-OE® used in combination with cisplatin, vincristin and methotrexate resulted in increased sensitivity of the cells towards the individual chemotherapies. There was increased sensitivity to MTX in HCT-116, to vincristin in HL-60 and also in HCT-116, and to cisplatin in all cell lines.

The negative effects of chemotherapy on patients are attributed to the deleterious effects of the cytotoxic drugs on normal cells, including myelosuppression. A bone marrow mimic made up of Wharton’s Jelly and hematopoietic stem cells will be tested to determine whether Tex-OE® could improve the survival of these cells to chemotherapy treatment.