

DCA and DMAPT as Radiosensitizing Drugs in the Treatment of Pancreatic Cancer

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Pancreatic cancer is currently one of the deadliest forms of cancer. This is due to high local recurrence and invasiveness. Recurrence is thought to be due in part to the resistance of pancreatic cancer cells. Treatment for pancreatic cancer includes chemotherapy, radiation therapy and surgery. Currently, about 94% of all patients diagnosed with pancreatic cancer die within 5 years of diagnosis. Thus, the focus of this research is to develop a better therapeutic approach to therapy in order to improve the killing of cancer cells and prevent recurrence. We investigated two drugs, Dichloroacetate (DCA) and Dimethylaminoparthenolide (DMAPT, a derivative of Parthenolide). Both DCA and DMAPT were studied for their ability to radiosensitize and help increase radiation induced cell killing in drug treated cancer cells. The experiment involved pancreatic cancer cells (MIA PACA2) being exposed to DMAPT, DCA, and dual treatment, with or without radiation. The cells were then tested for survival rates and doubling times. The hypothesis is that DCA and DMAPT will enhance radiation-induced cell killing of MIA PACA2 cells. The results show that DMAPT and DCA are in fact toxic to the pancreatic cancer cell lines. The dual treatment suppressed cell growth, and increased doubling time of MIA PACA2 cells. Dual treatment also decreased the survival rate of the MIA PACA2 cells (depending on radiation dosage). The data shows that dual treatment of DCA and DMAPT radiation are beneficial in slowing down the spread of pancreatic cancer. Future research will study the mechanisms of radiation sensitization and could help to develop a new technique to treat pancreatic cancer.

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