Differential Effects of Dehydroepiandrosterone (DHEA) between Mouse and Human Melanoma Cell Lines

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Background and Aim: Sex steroids are essential for healthy skin. Androgens such as dehydroepiandrosterone (DHEA), androstenedione (AD) and testosterone (T) play important roles in growth and differentiation of sebocytes, hair growth and wound healing. It has been reported that decrease in DHEA level over the years is responsible for cancer and other problems associated with aging. So, it is natural to check the effect of DHEA on melanoma, a fatal form of skin cancer. It has also been reported that DHEA’s purported beneficial effects were observed in mouse and other rodents, but not in humans. So, we decided to compare the effects of DHEA between mouse and human melanoma cell lines.

Methods: The research work with mouse melanoma (B16F10) cell line was already presented, where, we showed cell growth of 17% at 200 µM concentration of DHEA (untreated control cell growth was 100%) and the mechanism of growth inhibition was due to autophagy. Further coincubation of DHEA with other steroid progesterone or RU-486 showed an additive effect in decreasing cell growth. We checked the effect of DHEA on human melanoma (BLM) cell line using the same methods.

Results: DHEA showed a muffled decrease in cell growth (83%) at 100 µM and 59% at 200 µM concentrations. The mechanism of inhibition of cell growth was due to apoptosis, as shown by nuclear condensation by DAPI staining and rescue of cell growth with 20 µM coincubation of pan caspase inhibitor (CI). Coincubation and preincubation experiments with androgen receptor (AR) antagonist bicalutamide (10 µM) also showed rescue in cell growth, indicating that the effect of DHEA was mediated through androgen receptor. DHEA coincubation with progesterone or RU-486 did not show any additive effect in decreasing the cell growth.

Conclusions: Though DHEA actions were mediated through AR in mouse and human melanoma cell lines, DHEA showed maximum cell growth inhibition and induced autophagy in mouse cell line. Whereas, DHEA showed muffled inhibition and induced apoptosis in human cell line. Further, coincubation of progesterone or RU-486 with DHEA in mouse cell line showed additive effect in decreasing cell growth. But no additive effect was seen with coincubation experiments in human cell line. These in-vitro differential effects between mouse and human melanoma cell lines were in line with in-vivo reports, where beneficial effects observed with DHEA administration in mouse were not reproducible in humans.

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