Curcumin inhibits UV radiation-induced skin cancer in SKH-1 mice.

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Nearly 1 in 5 Americans get diagnosed for nonmelanoma skin cancer (NMSC), the most common human malignancy, in their lifetime. Though several risk factors have been known to be responsible for the development of NMSC, cumulative effect of chronic exposure to UV radiation remains the most important etiologic factor.

Though a number of agents have been explored to treat NMSC but clinical trials have been limited and have shown mixed results. Hence, continuous search for novel chemopreventive agents that inhibit formation and progression of NMSC has geared up nowadays.

Curcumin has been considered as a promising anticarcinogenic agent in a variety of malignancies, including gastrointestinal, hematologic, pancreatic, and oral cancer as well in skin carcinogenesis. Recently, topical application of Curcumin has also been investigated to promote prolonged contact and bioavailability at the target site using various skin preparations.

Objective:

To study if curcumin has inhibitory effects on formation of skin cancers arising *de novo*from chronic exposure to UV radiation using a similar *in vivo* murine model.

Study Design:

Eighty-eight SKH-1 nude mice were divided into 8 groups (n=11/group)

Mice were irradiated daily (days 1-10) with UVB (180 mJ/cm^2) for a 1-hour period, representing the *tumor initiation stage*

Mice were then “rested” for 1-week (days 11-17), during which mice in the UVB-radiated group did not receive UVB irradiation

Following the “rest period”, mice were irradiated with the same dose of UVB radiation 3 times/week for 1-hour, for a total of 24 weeks (day 17-week 24), representing the tumor promotion stage

All mice were randomly divided into 8 groups as follows;

Group 1: received control vehicle, orally (control group)

Group 2: received control vehicle, orally + UVB irradiation

Group 3: received a daily topical control vehicle cream applied to the back and flanks

Group 4: received the topical control cream + UVB irradiation

Group 5: received Curcumin (15 mg), daily oral gavage

Group 6: received oral Curcumin (15 mg) + UVB irradiation

Group 7: received Curcumin paste (15 mg/100 mL) applied on the back and flanks

Group 8: received topical Curcumin + UVB irradiation

Mice receiving oral Curcumin (groups 5 and 6) and topical Curcumin (groups 7 and 8) started receiving their Curcumin treatments 14 days prior to initiation of the UVB irradiation (days –14 to 0) and continued receiving daily dose through the completion of the experiment (day 0-week 24).

Initially onset of first tumor was measured, while the number of tumors formed on each mouse was recorded at the end of the experiment (week 24)

At the end of the study, tumors were removed and harvested

Body weight was measured daily and mice were monitored for adverse effects throughout the experiment

Results and Discussion:

Oral as well as topical Curcumin treatment significantly delayed time to tumor onset ($p=0.025$ and $p=0.015$, respectively) when compared to control mice

Average number of tumors per mice was found to be significantly less in oral and topical Curcumin treatment groups (both $p=0.01$) compared with their respective controls

Conclusion:

Curcumin inhibited photocarcinogenesis and delayed tumor multiplicity when treated both orally and topical route, thus suggesting its chemopreventive potential against skin cancer, necessitating future experimentation with human subjects.