

DIETARY FAT AND NON-MELANOMA SKIN CANCER IN THE HAIRLESS MOUSE

M. MATHESON, V.E. REEVE, C. BOEHM-WILCOX and C.H. GALLAGHER

We have previously described the role of dietary fat content and saturation on the induction of skin tumours in the HRA/Skh hairless mouse by chronic mild exposures to simulated solar ultraviolet light (UVL). It was established that a lack of dietary unsaturated fat protects from the tumour promotion phase of carcinogenesis (Reeve et al. 1988).

Several mechanisms have been proposed to explain this phenomenon; these include the involvement of free radicals, of prostaglandins and possible involvement of the immune system.

As a result of UV irradiation the concentrations of the polyunsaturated fatty acid, arachidonic acid, and several prostanoid metabolites are elevated in the skin (Ruzicka et al. 1983). There is considerable evidence that these metabolites are involved in both humoral and cellular immune responses (Chung et al. 1986). Immunological surveillance may play an important role in limiting premalignant and malignant lesions of the skin as suggested by the increased incidence of skin cancers in immunosuppressed patients.

We chose to further examine the hypothesis that a deficiency of unsaturated fatty acids is reflected in a reduced availability of arachidonic acid for the further metabolism to critical immunogenic compounds by feeding the mice indomethacin which inhibits the cyclooxygenase pathway for the formation of prostanoids.

Four groups of 20 mice were established on a semipurified diet based on that recommended by the American Institute of Nutrition (1977). Each group differed by receiving a different regime of indomethacin treatment. The treatments and results are shown in the Table.

	Indomethacin during irradiation	Indomethacin after irradiation	Tumour multiplicity (Day 145)
Group 1 (17)	-	-	70.6
Group 2 (19)	+	+	11.1
Group 3 (19)	+	-	111.8
Group 4 (20)	-	+	15.0

These mice were irradiated for 10 weeks with a previously established UV irradiation routine and subsequent skin tumours counted (Reeve et al. 1985).

Analysis of tumour counts revealed a statistically significant difference between groups 1 and 2, 1 and 4, 3 and 2 and 3 and 4.

These results support the hypothesis that products of the cyclooxygenase pathway are essential for the promotion phase of UVL-induced skin cancer.

AMERICAN INSTITUTE OF NUTRITION (1977). *J.Nutr.* 107: 1340.

CHUNG, H.T., BURNHAM, D.K., ROBERTSON, B., ROBERTS, L.K. and DAYNES, R.A. (1986). *J.Immunol.* 137: 2478.

REEVE, V.E., MATHESON, M., GREENOAK, G.E., CANFIELD, P.J., WILCOX, C.B. and GALLAGHER, C.H. (1988). *Photochem.Photobiol.* 48: 689.

REEVE, V.E., GREENOAK, G.E., GALLAGHER, C.H., CANFIELD, P.J. and WILKINSON, F.J. (1985). *Aust.J.Exp.Biol.Med.Sci.* 63: 655.

RUZICKA, T., WALTER, J.F. and PRINTZ, M.P. (1983). *J.Invest.Dermatol.* 81: 300.