Effect of PUVA Radiation on Anaphylactic Histamine Release from Rat Dermal Tissues

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An in vitro system for the study of type I anaphylactic reactions in skin was reported by Greaves et al. [1]. In this system, 500-µm-thick skin slices from sensitized rats were used. In rat skin, mast cells are present in the dermis. We observed that the number of mast cells in the lower dermis (68 ± 13/mm2) was greater than that in the upper dermis (33 ± 12/mm2). So we thought that the lower dermis might be better material than the whole skin. We considered using these dermal mast cells and devised a new in vitro system of type I cutaneous anaphylaxis. This in vitro system is as follows. Male albino Wistar rats weighing 150–200 g were sensitized with DNP-Ascaris [2]. Abdominal skin was shaved and thin-split-thickness skin was cut with Padgett-Hood dermatome, then the dermis was excised and sectioned into 100-mg pieces. This dermal tissue was incubated with antigen in Tyrode’s solution for 30 min at 37°C and antigen-induced histamine release from dermal tissue was measured fluorometrically. The magnitude of antigen-induced histamine release is related to the concentration of antigen. The maximum release was observed at an antigen level of 100µg/ml. There is a correlation between the serum PCA titer and the histamine release from dermal tissues. From these results, it is suggested that this system is useful for the study of type I cutaneous anaphylaxis. Using this system, we measured antigen-induced histamine release from PUVA-irradiated and non-irradiated dermal tissues. Half the abdominal skin was treated with a 0.5% 8-MOP solution topically plus UVA irradiation (2 J/cm2). One day after PUVA irradiation, antigen-induced histamine release from dermal tissues was measured. Antigen-induced percent of histamine release from nonirradiated dermal tissues was 30.2 ± 9.5. Compared with this, PUVA-irradiated dermal tissues showed a decrease in antigen-induced percent of histamine release (23.5 ± 4.4). Between PUVA-irradiated and nonirradiated dermis, there was no
significant change in dermal histamine levels and spontaneous histamine release. These results suggest that pretreatment with PUVA irradiation suppresses type I cutaneous anaphylaxis.

References