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- μ m-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 ($68 \pm 13/\text{mm}^2$) was greater than that in the upper dermis ($33 \pm 12/\text{mm}^2$). 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 100 μ g/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 nonirradiated 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

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