

Comparison of T-Cell Responses Induced by Major and Less Major Allergens of the House Dust Mite

W.R. Thomas B.J. Hales H.-D. Shen W. Smith

TVW Telethon Institute for Child Health Research¹, West Perth, Australia

Key Words

T cell · Cytokine · Allergen · Der p 1 · Der p 7 ·
Dermatophagoides pteronyssinus · *Dermatophagoides farinae*

Introduction and Results

The importance of the allergens has been based on IgE-binding characteristics. The group 1–3 house dust mite allergens bind IgE in 80% of sera from allergic subjects while the other allergens Der p 5 and 7 bind in 40–50% sera, but at the same intensity as the major allergens [1]. Der p 7 has been studied here as an example of a less major allergen, a designation used because it still sensitizes a very large number of people. Our aim was to compare the T-cell responses to the group 1 and 7 allergens from *Dermatophagoides pteronyssinus* and *D. farinae*. Microtiter tray cultures of peripheral blood mononuclear cells (PBMC) in AIM V serum-free medium were stimulated with affinity-purified Der p 1, Der p 7, Der f 1 and Der f 7. Proliferation was measured by ³H-thymidine incorporation and IL-5 and IFN- γ in day 4 and 6 supernatants. IL-5 was assayed by the proliferation of BAF3 mouse cells transfected with huIL-5 R and IFN- γ by ELISA. IL-4 was <5 pg/ml and could not be reliably detected. Der p 1 and 7 induced equally strong proliferative responses in all allergic and non-allergic subjects (table 1).

The release of IL-5 by PBMC from all allergic subjects was the same after Der p 1 and 7 stimulation. Little IL-5 was produced by PBMC of non-allergic subjects. IFN- γ was variable but PBMCs from non-allergic subjects tended to produce higher levels to both allergens. The responses to Der f 1 and 7 were essentially the same as the responses to Der p 1 and 7.

Conclusions

(1) Der p 7 induced the same T-cell proliferation and IL-5 release as Der p 1 in all allergic subjects despite the fact that it only binds IgE in 50% of sera. Subjects without IgE to Der p 7 are therefore not non-responders and the allergen can induce allergic inflammation via the release of cytokines. This unexpected result has been corroborated by studies with recombinant Der p 7 in house-dust-mite-allergic individuals shown to lack IgE reactivity to Der p 7.

(2) The equal responses induced by *D. pteronyssinus* and *D. farinae* allergens were notable because the study environment of Perth is almost devoid of *D. farinae*. Previously we found the same group reacted to 19-mer peptides of Der p 1 but poorly to Der f 1 peptides [2]. The difference may lie in the efficacy of the synthetic and natural peptides or in cross-reactive polymorphisms.

¹ An institution affiliated with the University of Western Australia.

Table 1. T-cell responses to purified house dust mite allergens

	Proliferation		IL-5, pg/ml		IFN- γ , pg/ml	
	allergic	non-allergic	allergic	non-allergic	allergic	non-allergic
Der p 1	7.2 $\pm$ 3.8	8.6 $\pm$ 1.9	60 (10–125)	0.3 (0–10)	352 (0–500)	756 (0–1,150)
Der p 7	8.6 $\pm$ 2.0	8.6 $\pm$ 1.4	59 (25–100)	10 (0–40)	627 (0–1,010)	1085 (0–1,450)
Der f 1	6.4 $\pm$ 2.9	8.1 $\pm$ 2.0	55 (10–150)	2 (0–10)	706 (0–650)	1000 (0–1,000)
Der f 7	7.2 $\pm$ 2.1	7.6 $\pm$ 1.1	45 (5–100)	7 (0–35)	842 (0–1,000)	1306 (0–1,500)

The proliferations are means $\pm$ SE of stimulation indices, and cytokines show means, with ranges in parentheses.

References

1

Thomas WR, Smith W, Hales BJ: House dust mite allergen characterisation: Implications for T-cell responses and immunotherapy. *Int Arch Allergy Immunol* 1998;115:9–14.

2

Hales BJ, Thomas WR: T-cell sensitisation to epitopes from the house dust mites *Der-matophagoides pteronyssinus* and *Eurogly-phus maynei*. *Clin Exp Allergy* 1997;27:868–875.

Copyright: S. Karger AG, Basel 1999. Reproduced with the permission of S. Karger AG, Basel. Further reproduction or distribution (electronic or otherwise) is prohibited without permission from the copyright holder.