

Letter to the Editor

Reduction of allergen-specific IgE production by laughter

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Sir,

Stress *enhances* allergen-induced skin wheal responses and IgE production by skewing Th1/Th2 cytokine pattern toward Th2 type in atopic patients [1]. In contrast, laughter *reduces* allergen-induced skin wheal responses in atopic patients, while it *elevates* plasma levels of IgG, IgM, IgA, and Th1 cytokine in normal subjects [2,3]. Here, the effect of laughter on production of allergen-specific IgE and cytokine was studied.

Twenty patients with mild atopic eczema/dermatitis syndrome (AEDS) (SCORAD index: mean 9, range 3–12) (10 female and 10 male, mean age 27 years, range 23–31 years) were studied after obtaining informed consent [1]. All of

the patients with AEDS were allergic to Japanese cedar pollen (JCP) and were treated with washing with povidone iodine and application of pinetar (Yoshida Pharmaceutical Co. Ltd. Tokyo, Japan) with zinc oxide ointment, but without oral medication.

Ten patients with AEDS were randomly assigned to view a 73-min humorous video (Best Bits of Mr Bean, featuring Rowan Atkinson). After 2 weeks, they viewed a 73-min nonhumorous video featuring weather information. Alternatively, another 10 AEDS patients first viewed the non-humorous video, and after 2 weeks they viewed the humorous video. Just before and immediately after viewing, blood was sampled and B cells, monocytes and T cells were purified

Table 1 Effect of laughter on production of allergen-specific IgE and cytokine atopic eczema/dermatitis syndrome (AEDS) patients who viewed a nonhumorous or humorous video. Blood was sampled before and after viewing. In Experiment A, B cells (B) and monocytes were cultured with or without T cells (T), and Japanese cedar pollen (JCP)-specific IgE production was measured. In Experiment B, T cells were cultured with monocytes, and cytokine production was measured

Culture	IgE and cytokine production			
	Non-humorous video		Humorous video	
	Before	After	Before	After
Experiment A: JCP-specific IgE production (ng mL ⁻¹)				
B + monocytes + T	8.2 (3.6)	8.5 (3.8)	8.7 (3.9)	5.3 (1.8)*
B + monocytes	1.0 (0.3)	1.2 (0.4)	1.1 (0.3)	1.3 (0.4)
Experiment B: cytokine production (pg mL ⁻¹)				
IFN- γ	242 (46)	231 (42)	251 (50)	413 (62)**
IL-12	125 (38)	115 (35)	112 (34)	239 (40)**
IL-4	478 (55)	493 (59)	498 (61)	327 (39)*
IL-10	261 (37)	273 (38)	257 (35)	125 (28)*
IL-13	352 (47)	345 (44)	349 (43)	236 (32)*

Values are the means (SD).

*Significant decrease ($P < 0.05$) and **significant increase ($P < 0.01$) compared with previous values.

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[3]. B cells (2×10^4) were cultured with monocytes (2×10^3) with or without T cells (2×10^4) in a total volume of 0.2 mL well⁻¹ for 14 days. Cultures were stimulated with JCP (0.1 ng mL^{-1}) (TORII PHARM, Co., LTD, Tokyo, Japan) and production of JCP-specific IgE was measured. On the other hand, T cells (2×10^4) were cultured with

monocytes (2×10^3) in a total volume of 0.2 mL well^{-1} for 3 days with JCP (0.1 ng mL^{-1}), and production of cytokines (IL-4, IL-10, IL-12, IL-13 and IFN- γ) was measured [1]. This study was approved by the Ethics Committee of Ujitakeda Hospital. Statistical analysis was performed with the Wilcoxon t -test.

Viewing the humorous video reduced JCP-specific IgE production in cultures with T cells, but not in cultures without T cells, while viewing the nonhumorous video failed to do so (Table 1, Experiment A). These results indicate that T-cell-derived cytokines may have been altered by viewing the humorous video. Indeed, viewing the humorous video increased production of Th1 cytokines (IFN- γ and IL-12), while it decreased production of Th2 cytokines (IL-4, IL-10, IL-13). In contrast, viewing the nonhumorous video had no effect on these cytokines (Table 1, Experiment B).

Laughter decreased blood IL-6 levels in patients with rheumatoid arthritis, while it lowered the increase in postprandial blood glucose in patients with diabetes [4,5]. This is the first study indicating that laughter decreases allergen-specific IgE production with concomitant modulation of Th1/Th2 cytokine production in atopic patients.

Collectively, these results may have some implication for the study of stress and laughter in allergic responses.

References

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