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IgE IN HUMAN ECCRINE SWEAT

LARS FÖRSTRÖM, M.D., MARC E. GOLDYNE, M.D., AND R. K. WINKELMANN, M.D., PH.D.

Department of Dermatology, Mayo Clinic and Mayo Foundation, Rochester, Minnesota

By the use of a sensitive and specific double antibody radioimmunoassay, immunoglobulin E was demonstrated in sweat from 6 of 11 healthy volunteers; the concentrations of IgE ranged from 1 to 3.9 ng/ml of sweat. Six of seven patients with dermatitis and elevated levels of serum IgE also had high IgE levels in sweat; the highest IgE value in sweat was 75.5 ng/ml and was noted in a patient with atopic dermatitis. Thus, all the main immunoglobulin classes can be demonstrated in eccrine sweat.

The immunoglobulin pattern of human eccrine sweat has been studied by Bazzi, Cattaneo, Mignone, and Farina [1] and by Brandtzaeg, Fjellanger, and Gjeruldsen [2], who found both IgG and IgA in all subjects they studied. These results were essentially confirmed by Page and Remington [3], who, in addition, showed the presence of IgD and occasionally IgM. The variation in presence and level of IgM in sweat was confirmed by Cabau, Muller, and Lévy [4]. So far, there have been no reports concerning the presence of IgE in eccrine sweat. We wish to report our results on IgE determinations in eccrine sweat, emphasizing the relationship of sweat IgE to atopy.

MATERIALS AND METHODS

Volunteers. Eighteen volunteers were studied. Eleven had normal skin and no history of atopy. Of the remaining 7 volunteers, 4 had atopic dermatitis, 1 had dermatitis with very high serum levels of IgE [5], 1 had nonspecific pruritus, and 1 had psoriasis. Of the 18 volunteers, 12 were males and 6 were females whose ages ranged from 20 to 57 years.

Collection of sweat. One arm of each volunteer was thoroughly washed with soap and tap water, 95% ethanol, and distilled water, and then was dried with paper towels. A plastic bag was placed over the cleansed arm and taped above the elbow so as to prevent the entrance of exogenous fluid into the bag. Each volunteer then sat in a steam cabinet set at 43°C for 15 to 20 min. The volume of sweat collected varied from 0.5 to 20 ml. The sweat was drained from the bag into a glass beaker, passed through filter paper (Whatman no. 4) to remove any cellular debris, and frozen at −70°C until the IgE content was determined. An aliquot of each sweat sample was evaluated for sodium, chloride, and potassium content to exclude the possibility of any contamination by steam from the cabinet.

Serum samples. These were obtained on the same day as or on the day immediately preceding or after the sweat collection. The samples were stored as described previously.

Measurement of IgE in serum and sweat. IgE concentrations were determined using a double antibody radioimmunoassay technique, which has been described in detail by Gleich, Averbeck, and Swedlund [6]. The IgE antiserum produced in rabbits was rendered specific by absorption with IgG and normal human serum. Cross-reactivity with IgG, IgA, and IgM was negligible. The normal range of IgE in serum was based on a study of 96 healthy persons without personal or family histories of allergy. The 94% range (the 3% and 97% points of the distribution curve of values) was from 6 to 780 ng/ml, although individual values as high as 2,700 ng/ml were occasionally seen.

RESULTS

Among the 11 normal volunteers, 6 had IgE levels in sweat higher than 1 ng/ml (Tab. I). The highest value, 3.9 ng/ml, was found in the sweat from a subject with a serum IgE level of 49 ng/ml. The highest serum IgE level, 1,975 ng/ml, was associated with a sweat IgE level of less than 1 ng/ml. There was no relationship between sweat IgE level and age or sex.

In the group of 7 patients with skin diseases and elevated serum IgE, the highest sweat IgE value was 75.5 ng/ml (Tab. II). The serum IgE level from the same patient was about 480 times higher than that in sweat. There was reasonable correlation between the IgE level in serum and in sweat in all but 1 patient, who had only 2.9 ng/ml of IgE in sweat but 61,880 ng/ml of IgE in serum; this serum IgE value was the highest in the series.

DISCUSSION

The present study revealed that eccrine sweat from patients with atopic dermatitis may have IgE values that are 20 times higher than the highest values found in the normal persons studied. In this normal group, the amount of IgE in sweat is so low that its presence can be demonstrated only by very sensitive methods, such as the radioimmunoassay used in this study.

In most of our patients, elevation of serum IgE was accompanied by a corresponding elevation of sweat IgE. Thus, our findings do not exclude the possibility that the sweat IgE is derived from

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Reprint requests to: Dr. L. Förström, c/o Section of Publications, Mayo Clinic, 200 First Street S.W., Rochester, Minnesota 55901.

TABLE I. *Serum and sweat IgE levels in 11 healthy volunteers*

Serum IgE (*ng/ml*)	Sweat IgE (*ng/ml*)		Total
	<1	1-3.9	
≤780	4	5	9
781-1,975	1	1	2
Total	5	6	11

TABLE II. *Sweat IgE level in seven patients with elevated serum IgE*

Case	Sex and age (yr)	Diagnosis	Serum IgE (*ng/ml*)	Sweat IgE (*ng/ml*)
1	M, 30	Atopic dermatitis	36,960	75.5
2	M, 29	Atopic dermatitis	31,760	54.2
3	F, 32	Atopic dermatitis	39,320	44.6
4	M, 35	Atopic dermatitis	61,880	2.9
5	M, 41	"IgE dermatitis"	33,793	37.0
6	M, 57	Pruritus	9,100	2.4
7	M, 26	Psoriatic erythroderma	3,720	<1

serum by simple transudation. The presence of this antibody may account for the immediate type of reaction seen after the intracutaneous injection of autogenous sweat and may explain the irritation of atopic dermatitis caused by sweating. However, eccrine sweat also contains inflammatory mediators such as histamine [7,8], kallikrein [9], and prostaglandins [10,11], which may be the basis for the occasional occurrence of a similar reaction in the skin of healthy persons. Whether or not a specific role exists for the IgE found in eccrine sweat is a question that hopefully will be answered by future investigations.

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