T Lymphocyte Subpopulations in Alopecia areata and Psoriasis: Identification with Monoclonal Antibodies and Fc Receptors

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Abstract. A comparison of T lymphocyte subpopulations as defined by Fc receptors and monoclonal antibodies was investigated in 9 patients with alopecia areata and alopecia universalis (AA and AU) and in 6 patients with psoriasis. It was shown that there was higher proportion of T lymphocytes with Fc receptors for IgG (Tg cells) in patients with alopecia (AA and AU) and psoriasis. The proportions of total T lymphocytes (Tt), T lymphocytes with Fc receptors for IgM, T suppressor/cytotoxic cells (Leu2A), T helper/inducer (Leu3A) as defined by monoclonal antibodies were within normal range as compared to the normal donors. The possible reason of the dissociation between Tg and T suppressor (Leu2A) cells could be that these cells belong to different subpopulations.

Two major functionally distinct subsets of T cells: helper/inducer and suppressor/cytotoxic cells have been identified. Using the model of pokeweed mitogen (PWM) induced immunoglobulin synthesis in vitro it has been possible to demonstrate that T lymphocytes with Fc receptors for IgG (Tg cells) exert suppressor activity and T lymphocytes with Fc receptors for IgM (Tm cells) helper activity (9). Recently the production of hybridoma monoclonal antibodies against antigens present on human T cells at functionally different stages of differentiation, has provided a powerful tool to isolate T cell subsets (12).

It has been demonstrated in our previous report that both patients with alopecia areata (AA) and alopecia universalis (AU) and patients with psoriasis (Ps) have higher frequency of Tg cells (2, 3). The purpose of the present study was to reexamine the T lymphocyte subsets by means of the above mentioned monoclonal antibodies.

MATERIAL AND METHODS

Nine patients with alopecia (AA and AU) and 6 patients with psoriasis were examined as well as the normal sex and age matched donors (Tables I and II). The methods of cell separation, determination of Fc receptors and the indirect immunofluorescence technique have been described elsewhere (2, 3, 4). The two antibodies used in this study were directed at helper/inducer T cells (Leu3A) and at suppressor/cytotoxic T cells (Leu2A). They were purchased at Beckton Dickinson Facs Systems, 490-B Lakeside Drive, Sunnyvale, CA 94086, USA.

RESULTS

The total number of peripheral blood lymphocytes of patients with alopecia (AA and AU) and psoriasis were within the same range as that of normal donors (data not presented). The percentages of total T lymphocytes (T cells rosetting with neuroaminidase treated SRBS), Tg cells, Tm cells, T helper cells (Leu3A), T suppressor cells (Leu2A) in nine cases of alopecia and 6 cases of psoriasis are shown in Table I and Table II, respectively. It may be seen from these tables that the proportion of Tg cells was significantly higher in both alopecia and psoriasis patients than in normal donors. The proportions of total T cells, Tm cells, T suppressor (Leu2A) and T helper cells (Leu3A) did not differ from age and sex matched healthy controls. The ratios between Leu2A and Leu3A cells were about the same in the patients and controls, respectively.

DISCUSSION

The results obtained confirm our previous findings that patients with AA and Ps have a high frequency of Tg cells.

The reason for this high percentage of blood Tg cells in unknown but it is possible that under particular immuno-pathologic condition which might prevail in vivo, T cells could modify their Fc receptor phenotype in a manner known to take place in certain in vitro conditions (8, 11).

Tg cells are known to exert suppressor functions in pokeweed mitogen (PWM) induced immunoglobulin synthesis in vitro and to be active in antibody dependent cell mediated cytotoxicity (ADCC) and spontaneous cell mediated cytotoxicity (SCMC) (10). In agreement with this we could previously demonstrate that patients with alopecia (AA and AU) and psoriasis seem to have a decrease in PWM induced immunoglobulin synthesis and patients with AA and AU an increased both spontaneous cell mediated (SCMC) and antibody de-

Table I. *Percentage of T cell subpopulations and the ratios of T suppressor and T helper cells in patients with alopecia areata and universalis and in controls*[a]

Tt = T cell rosetting with neuroaminidase treated sheep red blood cells
Tg = T cell with Fc receptors for IgG, Tm = T cell with Fc receptors for IgM
T_S = T suppressor cell defined by monoclonal antibodies Leu2A
T_S = T suppressor cell defined by monoclonal antibodies Leu2A
T_H = T helper cell defined by monoclonal antibodies Leu3A

Pats. no.	Sex, age	Tt	Tg	Tm	T_S	T_H	T_S/T_H
1 B.P.	F 47 AA	80(77)	34(32)	72(60)	26(35)	56(44)	0.46(0.79)
2 C.A.	M 36 AU	78(–)	26(–)	56(–)	42(–)	39(–)	1.08(–)
3 T.L.	M 35 AU	76(88)	37(15)	58(72)	18(15)	42(68)	0.43(0.22)
4 M.L.	F 27 AU	87(83)	34(22)	69(70)	28(27)	40(43)	0.7 (0.63)
5 U.H.	M 29 AU	77(85)	47(24)	49(62)	20(15)	41(52)	0.49(0.29)
6 H.L.	M 54 AA	70(79)	39(25)	56(75)	24(12)	46(59)	0.52(0.2)
7 B.S.	F 53 AU	73(89)	43(33)	50(56)	30(23)	49(52)	0.61(0.44)
8 L.B.	M 40 AU	84(82)	51(25)	55(71)	25(30)	35(47)	0.71(0.64)
9 A.P.	F 22 AU	83(76)	35(28)	62(58)	21(35)	49(42)	0.43(0.83)
Mean ± SD		79±5 (82±5)	38±8* (26±6)	59±8 (66±8)	26±7 (24±9)	44±7 (51±9)	0.6±0.21 (0.5±0.25)

* $p<0.01$.
[a] Controls within brackets.

pendent cytotoxicity (ADCC) (2, 3, 5). It may be speculated upon that Tg cells with the above mentioned functional properties might contribute to some pathogenic mechanisms in alopecia (AA and AU) and psoriasis. The other findings of this report is that the frequency of T suppressor cells as defined by monoclonal antibody is normal. Thus there is a clear dissociation between the proportions of Tg and T suppressor cells (Leu2A).

This observation is in agreement with the opinion that few or hardly any Tg cells are true T cells and that they instead share an antigen with monocytes (12) as defined by monoclonal antibodies. It has also been shown that in patients with sarcoidosis a significant proportion of Tg cells are esterase positive, phagocytic, adherent and stain with an antimonocyte serum. Consequently it has been suggested that, due to the fact that these Tg cells can rosette with neuroaminidase treated SRBC, they might have falsely been regarded as T cells (7).

On the other hand, according to other findings 40–80% of Tg cells appear to react with monoclonal antibody that defines T cytotoxic/suppressor

Table II. *Percentages of T cell subpopulations and ratios T suppressor and T helper cells in patients with psoriasis and in controls*[a]

Abbreviations: see Table I

Pats.	Sex, age	Tt	Tg	Tm	T_S	T_H	T_S/T_H
T.N.	M 70	56(83)	38(27)	73(68)	21(23)	38(36)	0.55(0.64)
R.J.	M 40	72(87)	42(28)	38(65)	33(27)	40(54)	0.83(0.5)
B.E.	F 58	71(70)	40(26)	61(69)	15(21)	70(65)	0.21(0.32)
T.V.	M 66	74(60)	47(36)	49(36)	23(26)	35(42)	0.66(0.62)
H.H.	M 48	67(79)	48(36)	42(55)	31(37)	35(43)	0.88(0.86)
L.R.	F 60	76(77)	52(34)	28(49)	38(21)	31(55)	1.22(0.38)
Mean ± SD		69±7 (76±10)	45±5* (31±5)	49±16 (57±13)	27±9 (26±6)	42±14 (49±11)	0.7±0.34 (0-6±0.2)

* $p<0.01$.
[a] Controls within brackets.

cell population in man (6). This conflicting evidence might be due to the fact that the monoclonal antibodies used in these two studies were different. One of them was directed against antigens present on cells with low affinity for SRBC and the other one was not.

It is possible that because of the common ontogeny of monocytes and lymphocytes they share some antigenic epitope which can be detected by some monoclonal antibodies. The raised problem related to the antigenic specificity of monoclonal antibodies used can eventually be resolved by further studies on the molecular structure of those cell markers.

In conclusion it is probable that there are several types of lympocytes wich are involved in different suppressive reactions in vitro and the evidence at hand suggests, that the frequency in at least one of these populations is increased in psoriasis and alopecia (AA and AU). The relevance of these findings for the pathogenesis and clinical course of these diseases is still unknown.

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Psoriasis and Vitiligo

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Abstract. Twenty-nine patients with vitiligo and psoriasis observed over a 5-year period were reviewed. The incidence of concurrence of both diseases was not increased, and the onset and course of the psoriasis and vitiligo were separate. Psoriatic lesions occurred on vitiliginous areas and normal skin with equal frequency. These patients had a larger number of associated diseases than normally seen in psoriatics.

Key words: Psoriasis; Vitiligo; Distribution; Relationship

Psoriasis is one of the commonest dermatoses, occurring in about 1 % of the population of Northern Europe and the USA (1, 7, 9). Psoriatics are known to have an increased incidence of arthritis (17, 24) and occlusive vascular disease (16). Recently an association has been described with inflammatory bowel disease of probable autoimmune origin (25). Vitiligo is an acquired idiopathic hypomelanosis which is also seen in approximately 1 % of the population (8, 13) and is often associated with autoimmune disease includeing Graves' disease, thyroiditis, Addison's disease, and pernicious anemia (19). We have recently seen several patients with