T and B Cell Populations in the Peripheral Blood of Rhesus Monkeys

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Abstract

B and T cell populations in the peripheral blood of rhesus monkeys are comparable to those of normal human beings. B cells of monkeys, like those of human beings, also have receptors for IgM, IgG and IgA.

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Two populations of lymphocytes, T and B cells, have been identified in man and their role in immune response has been established [1]. As such observations are not yet common in sub-human primates, the present study was carried out to identify T and B cells in the peripheral blood of rhesus monkeys (*Macaca mulatta*).

30 rhesus monkeys free of any disease as established by clinical examination, blood counts, ESR, ECG and throat swab cultures were investigated. For comparison, 17 normal human subjects were also studied. 20 ml of heparinized blood was allowed to sediment and lymphocyte-rich buffy layer was separated on a Ficoll-isopaque gradient [2]. Determinations of B (EAC rosettes) and T cells (E rosettes) were carried out by the methods of Jondhal et al. [3] and Auiti et al. [4], respectively. Receptors for IgG, IgM and IgA on lymphocytes were detected using heavy chain specific FITC-labelled antisera for human obtained commercially (Boehringwerke, Marburg, FRG).

As shown in table I, EAC rosette-forming lymphocytes in the blood of monkeys are in smaller proportion than in the blood of human beings. However, there is no difference in the number of E rosette-forming lymphocytes in the two species. As the present study was carried out using methods standardized for human beings, reliability of methodology was established by estimating B and T cells in the blood obtained from six monkeys consecutively every week for 6 weeks, and the results so obtained were subjected to a two-factor analysis of variance. The analysis showed that there was no significant variation in the B and T cell population of the same monkey during this period. The percentage of lymphocytes having receptors to various immunoglobulins in monkeys is very similar to that of human beings (table II) except that the proportion of lymphocytes with IgM receptors is slightly lower in monkeys.

The present study shows that using standard immunological methods, it is pos-

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Table I. The percentage of T and B cells in the peripheral blood of monkeys and human beings

No. Species	Rosette-forming cells	
EAC	E	
Monkey (30)	22.8 ± 6.97	57.7 ± 6.99
Human (17)	27.1 ± 4.54	60.0 ± 6.72

0 value < 0.05 NS

Figures in parentheses indicate the number of individual observations. Value are mean $\pm$ SD.

Table II. Comparison of immunoglobulin receptors of rhesus monkeys and human beings

No. Species		Receptors for		
IgG	IgA	IgM		
1	Monkeys present			
study	8.35 ± 2.99	3.6 ± 1.93	12.28 ± 3.68	
2	Human [4]			
	7.16 ± 3.27	4.2 ± 2.29	$8.90 \pm U7$	

Data was obtained from 14 monkeys. Value are mean $\pm$ SD.

sible to identify EAC and E rosette-forming lymphocytes in the peripheral blood of monkeys, analogous to B and T cells found in blood of human beings. Reliability of methodology is further confirmed by analysis of variance when differences in the consecutive results of the same monkey were not found to be significant. The only other report on this topic appears to be that of Malviya et al. [5] who have given the values of B and T cells of nine monkeys. However, these workers have used lymphocyte-rich plasma directly without further purification so that the cell population would be of questionable purity.

Fig. 1 Immunofluorescence of lymphocytes with receptors for immunoglobulins. a IgG. b IgM. X 1,000.

In the present study the relative proportions of T cell populations of monkeys and human beings were quite similar but the percentage of B cells was somewhat lower in the monkeys. This difference may be due to sample variations.

Immunoglobulin receptors on the lymphocytes of monkeys were also identified in this study (fig. 1a, b). The total number of receptor-positive cells equals the total number of EAC rosette-forming cells, thus suggesting them to be B lymphocytes. The possibility of such receptors on

the T lymphocytes of rabbits has been shown [6]. Our studies though not conclusive, indicate that in the case of monkeys, T lymphocytes do not bear significant immunoglobulin receptors.

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