

THE BLOOD SEROTONIN CONCENTRATION IN MONKEYS

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The isolation of serotonin (5-oxytryptamine) in pure form from ox serum by Rapport, Green and Page in 1948 [11, 12] and its subsequent synthesis in a number of laboratories [7, 13] formed the beginning of a large number of investigations to study the biological properties of this amine in the healthy animal and in several pathological states.

The results of these investigations, summarized in numerous surveys [1, 6, 9, 10], show that serotonin or 5-oxytryptamine possesses important pharmacological, physiological and biochemical properties, which justify its being classified among such biologically active compounds as adrenalin, histamine and acetylcholine.

Of great importance in the elucidation of the physiological role of 5-oxytryptamine is the quantitative data concerning the distribution of serotonin among the animal world. The concentration of 5-oxytryptamine in the blood of different species of vertebrate and invertebrate animals has been investigated in some detail [5, 6, 8, 14].

Among the abundant literature on this subject, however, we could find no work on estimation of the concentration of 5-oxytryptamine in the blood of monkeys, and the present research was accordingly conducted with this object.

EXPERIMENTAL METHOD

The investigations were conducted at the Sukhumi medicobiological station in April — May 1958. Experiments were carried out on monkeys of the Macacus rhesus and Papio hamadryas species.

Blood for determination of the 5-oxytryptamine was taken from the cubital vein of the monkeys, in a volume of 3-5 ml. To prevent clotting, a 3.8 % solution of sodium citrate was added, in a dose of 0.1 ml per ml of blood.

The 5-oxytryptamine was extracted from the blood with acetone for a period of 24 hours at a temperature of 4 to 5°. After the precipitate had been removed by filtration, the acetone was evaporated from the samples in vacuo at 35° C. The dry residue was dissolved in Gaddum's fluid, which was also used for nutrition of the isolated gut. The quantitative determination of the 5-oxytryptamine was carried out on the isolated colon of a rat by the method of Dalglish et al. [2]. The standard used was 5-oxytryptamine creatinephosphate, made by the firm Fluka (Italy).

EXPERIMENTAL RESULTS

The results of the estimations of 5-oxytryptamine in the whole blood of monkeys are shown in Table 1. As will be seen from the figures in Table 1, the concentration of 5-oxytryptamine in the blood of monkeys showed considerable fluctuation, which could be dependent on the lability of the composition of the peripheral

TABLE 1

Serial No.	Species	Sex	Serotonin concentration, γ/ml
1	Macacus rhesus	Male	1,6
2	»	»	0,5
3	»	»	0,32
4	»	»	1,12
5	»	»	1,6
6	»	»	1,28
7	»	»	0,66
8	»	Female	0,01
9	»	»	0,12
10	»	»	0,62
11	»	Male	0,49
12	»	»	0,99
13	»	»	0,06
14	»	»	0,59
15	»	Female	0,81
Mean			$0,70 \pm 0,10$
1	Hamadryas	Male	1,32
2	»	Female	0,33
3	»	»	2,00
4	»	Male	0,42
Mean			$1,01 \pm 0,33$

TABLE 2

Species	No. of invest.	Serotonin concentration, γ/ml
Man.	10	$0,1 \pm 0,07$
Dog.	29	$0,32 \pm 0,005$
Rabbit	5	$2,3 \pm 0,19$
Guinea pigs.	15	0,2
Rats.	15	1,3
Mice.	25	0,1

blood in these animals, a feature which has often been pointed out by several authors [3, 4], and which was confirmed in our laboratory by M. N. Novikova when studying the morphological composition of the blood of 8 Macacus rhesus monkeys.

The differences found in the content of 5-oxytryptamine in the blood of the Macacus rhesus monkeys (0.70) and the Papio hamadryas monkeys (1.01) were not statistically significant (from the Student-Fisher table, $\alpha = 0.7$).

For comparison, we consider it worthwhile to quote the concentrations of 5-oxytryptamine in the blood of different laboratory animals and in man, as obtained by us, using a variety of methods. These findings are shown in Table 2.

It can be seen from Table 2 that the concentration of 5-oxytryptamine in the blood of monkeys is approximately the same as its level in the blood of rats, which adds to the observations made by other authors [3, 4] that the blood of these animals is morphologically similar.

SUMMARY

Blood serotonin (5-oxytryptamine) content was studied in Macacus rhesus and Papio hamadryas. When comparing the blood serotonin content of various laboratory animals and man it was revealed that the blood serotonin content in monkeys is very close to that in rats.

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