medium toward the alkaline side by about 0.05 pH unit in the course of a few seconds. This was followed by a longer pH shift toward the acid side by 0.2 unit. The longer pH changes which we recorded toward the alkaline side may be similar in nature to those described in [7].

It can be tentatively suggested that the rapidly developing pH changes toward the acid side cannot spread throughout the volume of the slice. In that case local pH changes toward the acid side are substantially above the average values for the whole volume. If such local pH changes are associated with release of the acid contents of the synaptic vesicles [2, 3], they ought to be strongly expressed above all in the synaptic spaces and ought to influence the work of the membrane mechanisms of synaptic transmission. The possibility cannot be ruled out that this is the cause of differences between synaptic and extrasynaptic chemoreceptors in relation to the same mediators [4, 9].

Recently a receptor of protons [1], activated at pH values below 7.0 and producing a depolarizing, desensitizes response, has been discovered in mammalian brain neurons. It has been shown that the degree of spread of proton sensitivity in the brain is very wide. It can be postulated that secretion of H^+ by some cells and reception of H^+ by other cells is yet another type of interneuronal communication.

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CHANGES IN GROUP BEHAVIOR IN CALLOSOTOMIZED RHESUS MONKEYS

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Extensive experimental data on various aspects of the study of the corpus callosum, the most important commissure of the brain, has now been obtained [1, 3-5]. In particular, morphologic and physiological investigations have demonstrated the complex structural and polyfunctional organization of the callosal system in higher mammals and man [6, 11, 13], and its essential role in sensory functions of the brain [9, 10, 13]. The results of behavioral experiments on carnivores and primates after division of the corpul callosum have demonstrated conclusively the role of this commissure in interhemispheric transmission of perceptual skills [7, 12, 14]. Clinical observations on callosotomized patients have revealed a disturbance of complex forms of behavior and changes in mental activity [8, 15]. This suggests that disturbance of communicative forms of behavior take place after division

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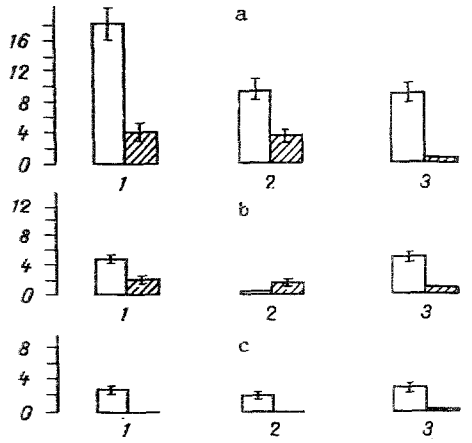

Fig. 1. Distribution of various types of group contacts in intact (unshaded columns) and callosotomized (shaded columns) rhesus monkeys: a) mean number of AC + FC (1), AC (2), and FC (3); b) aggressive DSC (1), DLC (2), and BC (3); c) friendly DSC (1), DLC (2), and BC (3).

of the corpus callosum. However, despite the ever-increasing number of experimental and clinical investigations of the callosal system, no goal-directed study of group behavior of callosotomized animals has hitherto been undertaken.

The aim of this investigation was to study the character of group behavior of callosotomized rhesus monkeys.

METHODS

Experiments were carried out on 4 intact and 3 callosotomized male rhesus monkeys aged 5-8 years, forming a single group. Group behavior of the intact and callosotomized animals was studied by the method of recording the frequency of contacts described previously [2], with determination of the frequency of contacts of one individual with the other members of the group. Depending on their character, contacts were divided into aggressive and friendly (AC and FC respectively). Depending on their closeness, the contacts were divided into distant and close. Thus the friendly and aggressive contacts were subdivided into three types: DSC) distant stationary contacts, DLC) distant locomotor contacts, and BC) bodily contacts. Aggressive DSC included aggressive facial expressions and gestures (bearing of the teeth, a fixed look, attacking, etc.), aggressive DLC consisted of chasing, and aggressive BC included grabbing, biting, hitting, etc. Friendly DSC included supporting, inspecting and sitting beside, friendly DLC comprised moving beside, and friendly BC included grooming, touching, tapping, embracing, etc. [2].

Observations on the callosotomized animals began 1-2 months after the operation, when the after-effects of neurosurgical trauma had disappeared. Each monkey was kept under observation for 1 h 10-15 times; aggressive and friendly responses were recorded simultaneously. The total period of observation was 15 days. The significance of differences was determined by the chi-square test.

RESULTS

The results of the observations showed significant differences in the character of group contacts in the callosotomized and intact rhesus monkeys (Fig. 1). These differences applied both to changes in the total number of contacts and to their structure. The average number of friendly and aggressive contacts per observation was 17.4 ± 1.7 in intact rhesus monkey and 4 ± 0.73 in callosotomized monkeys. The distribution of the number of FC and AC in the intact animals was about the same (48 and 52% respectively). AC predominated (87%) in the callosotomized monkeys. The mean number of AC in callosotomized animals was significantly ($P < 0.05$) less (2.6 times) than in the control. The greatest decrease (almost ten-

fold) was found in the mean number of aggressive BC. The number of FC in callosotomized monkeys was reduced by 17 times and the mean number of friendly BC was reduced by ten times. The total number of BC (friendly and aggressive) in callosotomized monkeys was ten times less than in normal animals, whereas the number of distant contacts was reduced almost threefold. No significant differences were found in the total number of friendly and aggressive DLC in the intact and callosotomized monkeys ($P > 0.05$).

The results show that the number of contacts within the group, both aggressive and friendly, was significantly reduced in the callosotomized rhesus monkeys. The greatest decrease affected the number of BC. The structure of group behavior also was changed. Most behavioral contacts of the callosotomized monkeys were aggressive responses, whereas in intact animals the number of FC and AC was about equal. The total number of distant locomotions showed no significant change after callosotomy.

Thus not only an appreciable reduction of social activity of the callosotomized monkeys was observed, but also a change in the structure of their group contacts toward aggression. The relatively small contribution of contact aggression compared with distant forms in the callosotomized monkeys indicates predominance of a passive defensive tendency in their group behavior.

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