The sodium concentration in 1 l of tissue water on the papilla and the inner medulla was significantly lower in the infused group than in the controls; the urea concentration changed similarly. The potassium concentration in the kidney tissue was not significantly changed. If the tissue osmolality were calculated according to the formula $2 \cdot (Na + K) +$ urea, the osmolality of the tissue of the papilla and of the inner medulla would be lower in the infused than in the control group. The calculated osmolality of the tip of the papilla was very similar to the cryoscopically measured osmolality of urine.

These results are consistent with the assumption of EARLEY and FRIEDLER that after infusion of isotonic saline a washout of sodium from the renal medulla takes place. On the other hand, it is not clear whether this occurred due to an increased flow rate of blood through the medulla or due to an increased inflow of isotonic fluid into the loop of Henle as a result of decreased sodium reabsorption in the proximal tubule, as the above quoted micropuncture experiments prove, or by a combination of both. But even a third possibility cannot be excluded: if the inhibition of the sodium reabsorption in the proximal tubule is caused by an unknown humoral factor, as some of the above-mentioned authors assume, this factor might inhibit the transport of sodium even from the ascending limb; thus also the sodium concentration in the renal medulla could decrease.

Zusammenfassung. In 38 Ratten wurde die Na- und Harnstoff-Konzentration im Gewebewasser der Nierenrinde, des Nierenmarks und der Papillenspitze nach einer Infusion von isotoner Kochsalzlösung festgestellt. Die Konzentration beider Stoffe war in der Papillenspitze und in dem Nierenmark bedeutend niedriger als bei den Kontrollratten.

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Synaptic Excitation in the Corpus Striatum Inhibited by Microelectrophoretically Administered Dopamine

Several facts point to the essential significance of dopamine (DA) for the function of the basal ganglia: The high amount of DA in caudate nucleus and the putamen[1], its occurrence in terminal structures of their nerve cells[2,3], the decrease of DA in the corpus striatum following experimentally induced degeneration of the nucleus niger[4,5], and the release of DA in the caudate nucleus after electrical stimulation of the centrum medianum and in the putamen after stimulation of the nucleus niger[6,7]. Also of importance in this context is the decrease of DA in the corpus striatum of patients with Parkinson's disease[8] and the improvement of some symptoms of this disease after application of DOPA[9]. The synopsis of these facts suggests the existence of 'dopaminergic' neurones in the corpus striatum.

From the electrophysiological point of view, an interesting contribution to this field was made by BLOOM et al.[10]. It was shown that in the cat microelectrophoretically administered DA depresses the spontaneous discharge rates of most neurones of the caudate nucleus. The effect of substances upon synaptic excitation has not been studied. This, however, was the main goal of the experiments reported here. The experiments were made on non-anaesthetized rabbits which were immobilized by Gallamine and artificially ventilated. The method for electrophoretic application of different drugs was identical with the one used earlier in different limbic structures[11,12]. Neurone discharges were recorded from the caudate nucleus and the putamen which were stereotactically approached. Intralaminar thalamic nuclei were stimulated with bipolar electrodes (2/sec stimuli, duration 0.5 msec). The tracts of the stimulating as well as the recording electrodes were controlled histologically.

Only a few neurones appeared to discharge spontaneously. By application of acid amino acids, such as glutamic or homocysteic acid, many neurones could be activated (Figure 1). In some instances, spontaneously 'silent' neurones could also be activated by electrical

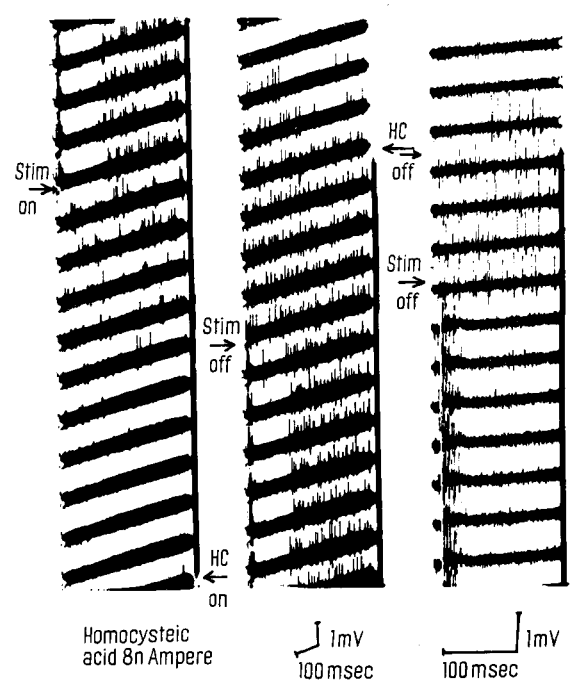

Fig. 1. Effect of homocysteic acid and combined mediothalamic stimulation upon caudate neurone discharges. Administration of homocysteic acid (HC on) produces gradually increasing activity. Electric stimulation (Stim. on) induces a characteristic response consisting of short latency discharge group (immediately following the stimulus artefact, primary activation) followed by a silent period and after-discharge. The same units are displayed with faster sweep on the right. The films are to be read from the bottom to the top.

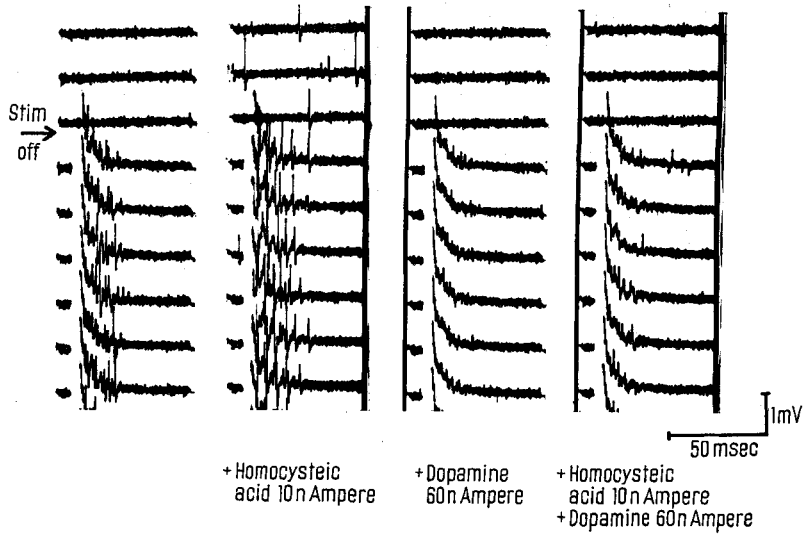

Fig. 2. Effect of dopamine on stimulus-induced neurone discharge activity in the caudate nucleus. Dopamine inhibits the short latency primary activation almost completely. Also the response, reinforced by homocysteic acid, is largely blocked by dopamine.

stimulation of the medial thalamus. During the amino acid induced activation, almost all neurones reacted to thalamic stimulation. This stimulation induced a characteristic response pattern with a primary activation consisting of 1–5 single discharges (latency about 2–20 msec) followed by a silent period of 80–350 msec and an after-discharge of variable length. DA, at a dose corresponding to an electrophoretic current of 30–60 nA, was able to inhibit not only the spontaneous and the amino acid induced discharges but also the activity evoked by thalamic stimulation in a larger number of neurones (Figure 2). The suppression began within a few seconds of switching on the electrophoretic current and it disappeared in most cells within 1–4 sec of the end of the current. Submaximal doses of DA sometimes seemed to affect the after-discharges more than the short latency discharges. It was never possible to ascertain an activation effect of DA.

The inhibitory effect of DA upon activity induced by thalamic stimulation together with the experimental studies mentioned above (which all point to a distinct role of DA in the striatum) suggests an inhibitory effect of DA on postsynaptic excitation. It was not possible for the question of whether DA has a direct inhibitory transmitter function or acts via other mechanisms to be the subject of the present study.

Zusammenfassung. Dopamin hemmt bei mikroelektrophoretischer Verabfolgung die spontane und die durch synaptische Erregung ausgelöste Entladungstätigkeit von Neuronen des Corpus Striatum des Kaninchens.

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Influence of Castration and of Testosterone on Prealbumin in Mouse Serum

In a previous publication[1], it was demonstrated that in mouse serum the prealbumin fractions depend upon the strain and the sex. 3 components of prealbumin, PA_1, PA_2 and PA_3, were separated by starch gel electrophoresis in the BALB/C+ strain. PA_1 was only detectable in adult male mice, whereas PA_2 and PA_3 appeared in a significantly lower concentration in female and immature mice.

The present paper deals with the effects of castration and of administration of male sex hormones on concentration of prealbumin in the serum. The Table shows that 14 days after castration PA_1 is no longer detectable and that PA_2 and PA_3 have decreased to the level found in female mice.

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