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Development of vasopressinergic neurones of the suprachiasmatic nucleus. Presence of a sex difference in the lateral septum.

The localization of vasopressin (AVP) in the central nervous system is not only confined to the classical neurosecretory neurones of the supraoptic and paraventricular nucleus. AVP is also found in neurones of the suprachiasmatic nucleus (SCN) from which AVP fiber pathways can be traced towards various brain regions outside the hypothalamus, e.g. to the lateral septum and the lateral habenular nucleus. Immunoelectronmicroscopy has demonstrated in these areas the presence of AVP containing synapses.
In order to determine when this system can be functionally active, vibratome sections and the unlabeled antibody enzyme method were used to investigate the development of the AVP neurones of the SCN and their extrahypothalamic fibers in the rat brain. The first immunopositive neurones of this nucleus were revealed on the 2nd postnatal day. An adult appearance of the SCN was detected on day 14. Although fibers appeared in the periventricular nucleus already on the 7th postnatal day, such fibers were visible in the lateral septum and the lateral habenular nucleus only on day 10. From the 12th postnatal day onwards a marked sex difference developed with respect to the density of the AVP fibers in the lateral septum and to a lesser extent in the lateral habenular nucleus. In male rats a higher fiber density was found in both areas. These results suggest that the AVP fibers derived from the SCN might be involved in (possibly sexually differentiated) central processes from the 2nd and 3rd postnatal week onwards. It still has to be settled whether the observed sex difference is dependent on an organizational effect of perinatally present steroids or on an influence of circulating steroids in the adult rat.

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Psychophysical experiments on the dynamics of inhibition.

To describe the response of the human visual system to stimuli of long duration or to stimuli which are extended in space, inhibition is needed. This inhibition cannot be measured with stimuli which are of short duration or which are localised. So inhibition can only be observed beyond a certain distance from the point of excitation, after a certain interval time. Measuring the visibility of a stimulus complex consisting of two short (duration 10 ms) point flashes (diameter 1.0 min of arc) which are presented with an interval time and at a mutual distance, we found that inhibition is not a stationary process. If the two flashes are presented at a larger distance, the inhibition is found for larger interval times. So the inhibition is moving away from the point of excitation. The velocity of this propagation seems to depend on the flash direction. We found for the radially jumping flashes an inhibition velocity of $3^{o}/s$ and for the tangential jumping flashes $4^{o}/s$ (both measured at eccentricities of 3 and 7 degrees).

The inhibition appears as two dips in the visibility curves as function of the interval time, with the mutual distance as parameter. Both dips propagate in the same way. There seems to be a link between the spatio-temporal inhibition on one hand and the spatial and the temporal summation areas on the other hand. The ratio of the summation areas is equal to the propagation velocity.