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THE EFFECTS OF INTRACEREBRAL INJECTIONS OF NEUROPEPTIDE K INTO THE MEDIAL PREOPTIC AREA ON SEXUAL BEHAVIOR IN THE MALE RAT

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The first mammalian neuropeptide to be characterized was substance P (sP), and it is now recognized that sP is a member of a structurally related family of peptides, the tachykinins. Extensive studies have demonstrated that sP and some related tachykinin peptides play key roles as neurotransmitters and neuromodulators. The synthesis of different members of the tachykinin family is in part due to the modifications of three sP-encoding preprotachykinin (PPT) mRNA's that are derived from a single sP gene. At least four tachykinin peptides can be synthesized as a result of modifications of the sP gene including sP, neurokinin A, neuropeptide γ , and neuropeptide K (NPK). Whereas the behavioral significance of sP has been extensively studied, there has been very little examination of the behavioral significance of NPK. This is especially true of the examination of male reproductive behavior. Dornan and Malsbury (1989) reported that bilateral injections of sP into the Medial Preoptic Area (MPOA) facilitated male rat sexual behavior. High concentrations of PPT mRNA's are found within the MPOA, and as previously mentioned, NPK is derived from PPT mRNA's. At present, however, it is not known whether NPK plays a role in the neural regulation of male copulatory behavior. In the following experiment, we examined the role of NPK within the MPOA in the regulation of male rat copulatory behavior. Sexually experienced adult male Long-Evans rats were used. Chronic cannulae implants were stereotaxically placed 2 mm above the MPOA, and following 7-12 days of recovery, the animals were behaviorally tested to obtain a baseline measure of copulatory behavior. One week following baseline testing, the animals were randomly placed into 4 groups and were subsequently bilaterally injected with .5 ul solutions of either saline, 10 ng NPK, 100 ng NPK or 1 ug NPK and the effects of these injections on copulatory behavior were determined. Following testing, brains were histologically analyzed to confirm the placements of the cannulae. Although histological analysis is not yet complete, our data indicate that injections of 10 ng and 100 ng NPK have no effect on copulatory behavior. In contrast, 1 ug injections of NPK completely abolished copulation in 50% of the animals. Although the complete role of tachykinins in the regulation of copulatory behavior has yet to be elucidated, it seems that sP and NPK, two tachykinins synthesized from the sP gene, exert opposite effects in the regulation of male copulatory behavior.