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JOURNAL ARTICLE

Localization of peripheral dopamine D1 and D2 receptors in rat and human seminal vesicles

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Dopamine, an established neurotransmitter in the central nervous system, is recognized for its role in penile erection and ejaculation in rats. However, its complete mechanism of action in the genitourinary tract is unknown. The objective of this study was to investigate the existence and expression of peripheral dopamine D1 and D2 receptor messenger RNAs (mRNAs) and corresponding proteins in rat and human seminal vesicles. The seminal vesicle tissues of male Sprague-Dawley rats and human radical prostatectomy specimens were used to extract total RNA and proteins, and to prepare slide sections. Rat hypothalamus tissue served as a control for dopamine D1 and D2 receptors. Testing for the presence and expression of peripheral dopamine D1 and D2 receptor mRNAs in rat and human seminal vesicle tissues was performed by reverse transcription-polymerase chain reaction. Western blotting was used to detect corresponding proteins of D1 and D2 receptors. Immunohistochemical staining using rabbit antipeptide polyclonal antibodies was employed to identify and anatomically localize dopamine D1 and D2 receptor proteins in rat and human seminal vesicles. Dopamine D1 and D2 receptor transcripts were detected in both human and rat seminal vesicle tissues. Western blot analysis demonstrated that peripheral dopamine D1 and D2 receptor proteins exist in both human and rat seminal vesicle tissues. Immunohistochemical analysis demonstrated the localization of peripheral dopamine D1 and D2 receptors to the smooth muscle layer of human and rat seminal vesicles. The results of this study demonstrate that peripheral dopamine D1 and D2 receptors are present in the seminal vesicle tissue in both rats and humans. Although these results suggest that seminal emission may be mediated in part by the stimulation of peripheral dopamine receptors located in the seminal vesicles, the functional significance of dopamine in male reproductive tract has yet to be fully defined.