

Localizing adenosine and dopamine receptors in spinal thoracic sympathetic motor neurons

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Purpose: Adenosine and dopamine are neurotransmitters which interact to control many bodily functions including sleep and locomotion. Studies have found their receptors (specifically A1 and D1) in the sympathetic nervous system, providing information from the

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autonomic system travels through a small percentage of dorsal root ganglia neurons in the thoracolumbar spinal regions and preganglionic MN mostly located in the thoracic part of the spinal cord (Zimmerman et al. 2012). Confirming the colocalization of A1-D1 receptor heteromers within thoracic sympathetic preganglionic MN, could provide better understanding of the control of autonomic MN activity in the human body. This study aims to confirm this localization of A1 receptors (A1R) and D1 receptors (D1R) in thoracic spinal cord sympathetic MNs via immunochemistry.

Methods: Mice (P1-P6) were euthanized via rapid decapitation before undergoing ventral laminectomy, which exposed the thoracic spinal cord. Once removed, the cords were fixed and cryoprotected. Then, to process different segments of the thoracic spinal cord, the cords were sliced with a vibrating microtome. Primary antibodies against the A1 and D1 receptors were then incubated in the tissue of the slices followed by secondary antibodies. These secondary antibodies were coupled with different fluorescent markers (A1 = 594 or Red, D1 = 488 or Green), which were then viewed with confocal microscopy.

Results: We have evidence for both A1R and D1R staining within thoracic sympathetic preganglionic MNs, indicating A1R and D1R colocalization areas.

Graphs/images/figures: Red = A1R, Green = D1R, Blue = Cell Nucleus

(Nghi) 06-10-21. P1 Slice 3 Z-Stack image 20X
left side D1R-488-DAPI.

(TKJV) 06-18-21. P6 Slice 1 Z-stack image 20X
right side A1R-594+DAPI.

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References: Rivera-Oliver et al. (2018). Adenosine

