

Targeting Trends

Reporting the latest news in Molecular Surgery

Nucleus tractus solitarii injections of substance P-conjugated saporin selectively disrupts baroflex-dependent pathways.

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The nucleus tractus solitarii (NTS) receives afferent input from visceral, somatic and cardiopulmonary structures and is the first central site for the processing of these sensory autonomic signals. Modulation of sensory neurotransmission has been well documented in the NTS. However, the specific role of the neuropeptide substance P (SP) in the sensory neurotransmission in the NTS remains debated. Previous studies have reported that stimulation of somatic and baroreceptor afferents release SP in the NTS and that neural feedback from skeletal muscle depresses arterial baroreflex function by activating local GABAergic NTS circuits. Since baroreflex depression can be prevented by a pharmacology blockade of neurokinin-1 (NK1) receptors, sensory feedback from skeletal

muscle may target a local population of NK1 receptor-expressing GABA neurons that selectively inhibit barosensitive NTS neurons.

To address this question, we injected the neurotoxin substance P-saporin (SP-SAP, Cat. #IT-07), that selectively lesions cells expressing NK1 receptors, into the NTS. SP-SAP (1-3 ng in 100 nl) was bilaterally microinjected medial to the solitary tract at the level of

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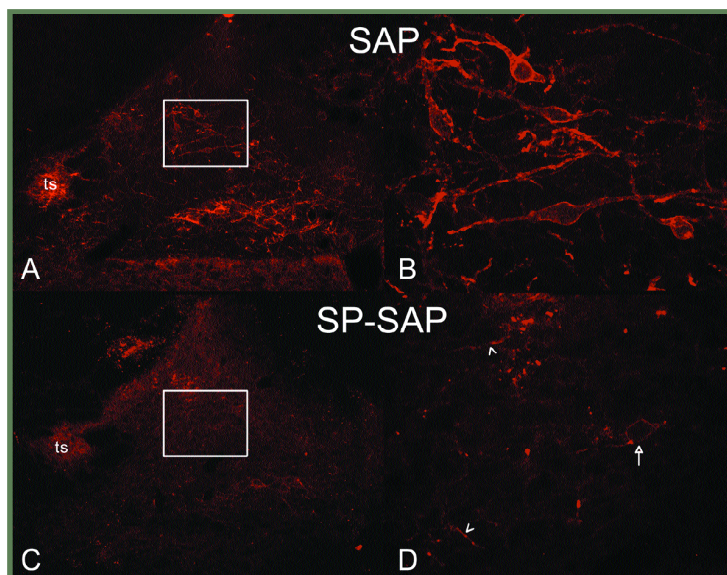


Figure 1 – NTS lesioning of NK1 receptor-expressing cells.

Panel A and C: Cross-sectional image of rat hindbrain containing the NTS at low magnification (4x). NK1 immunoreactivity was highly expressed on cell soma and fibers in regions medial to the solitary tract (ts) of rats treated with non-targeted SAP toxin. In addition, neurons in the dorsal motor nucleus of the vagus also expressed intense NK1 immunoreactivity. In contrast, NK1 immunoreactivity in the NTS was virtually undetectable in rats receiving SP-SAP.

Panel B and D: High magnification (40X) of NTS region medial to the solitary tract (region of white boxes). The number of NK1-positive soma and fibers are clearly reduced by SP-SAP. Arrow indicates a surviving NK1 receptor-expressing cell and arrowheads indicated spared NK1 fibers.

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Denise Higgins, Editor

