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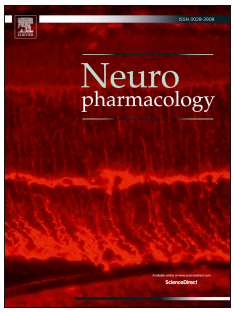

Norman Bowery's discoveries about extrasynaptic and asynaptic GABA systems and their significance

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Norman Bowery's Discoveries about Extrasynaptic and Asynaptic GABA Systems and their Significance[1]

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Abstract

Before finding the GABA-B receptor, Norman Bowery completed a series of studies on an extrasynaptic or asynaptic "GABA system" in the rat superior cervical sympathetic ganglion. First, he discovered an uptake system for GABA in neuroglial cells in the ganglia and in peripheral nerves, with a different substrate specificity than that in neurons. Second, he showed that accumulated GABA in sympathetic glial cells was metabolized to succinate by a transaminase enzyme. Third, he provided detailed structure-activity information about compounds activating an extrasynaptic GABA-A receptor on neurons in the rat sympathetic ganglion. Fourth, he showed that some amino acid substrates for the neuroglial transporter could indirectly stimulate neurons by releasing GABA from adjacent glial cells, and that GABA could also be released from neuroglial cells by membrane depolarization. In this review, these discoveries are briefly described and updated and some of their implications assessed.

[143 words]

Highlights

- GABA is taken up by a Na^+-dependent transporter in peripheral neuroglial cells.
- GABA is metabolized to succinate by neuroglial cells
- Peripheral neurons devoid of GABAergic input can be depolarized by GABA via asynaptic GABA-A receptors.
- Some amino acids can activate neuronal GABA receptors by releasing GABA from adjacent glial cells.

  [50 words]

Key words: sympathetic ganglion; sensory ganglia; neuroglial cells; GABA uptake; GABA release; GABA-A receptor; GABA depolarization

5394 words including title, abstract, highlights, key words, references and figure legends

[1] **Material in italics summarizes subsequent relevant work and its implications**