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Expression of substance P, vasoactive intestinal peptide and galanin in cultured myenteric neurons from the ovine abomasums

M.B. Arciszewski, S. Barabasz, J. Calka

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Enteric neurons are able to alter their neurotransmitter content during adaptation to new artificial conditions. The aim of the present study was to investigate changes in vasoactive intestinal peptide (VIP), substance P (SP) and galanin expression during culture of myenteric neurons from the ovine abomasum. In order to accurately reflect the *in vivo* situation cryostat sections from the ovine abomasum were used. Cultured and non-cultured myenteric neurons were immunohistochemically stained with a mixture of antibodies raised against Hu C/D (neuronal marker) and VIP, SP or galanin. Double labeling revealed that Hu C/D-IR/VIP-IR myenteric neurons were very rare in cryostat sections (1.4 ± 0.2%) but significantly increased to 21.3 ± 1.7% when cultured for three days. A significant increase in Hu C/D-positive/VIP-positive myenteric neurons were also found in 6- and 9-days cultures (23.9 ± 1.9 and 24.5 ± 2.0%, respectively). *In vivo*, the expression of SP was found in 9.7 ± 1.0% of myenteric perikarya. After 3, 6 and 9 days of incubation the proportion of Hu C/D-IR/SP-IR myenteric perikarya significantly increased to 19.3 ± 1.3%, 22.3 ± 1.2% and 24.1 ± 1.7% (respectively). When compared to the *in vivo* situation the proportion of galanin-expressing myenteric neurons was unchanged after 3, 6 and 9 days of culturing. In conclusion, alterations in VIP and SP (but not galanin) expression occur during neuronal culturing. Our results supports the idea that both VIP and SP may act as factors which increase neuronal survival.

Keywords:

enteric nervous system; myenteric neurons; neuronal plasticity; neuropeptides; abomasum; sheep

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Contact

Mgr. Zuzana Karlíková
Executive Editor
phone: + 420 227 010 352
e-mail: vetmed@cazv.cz

Address

Veterinární Medicína
Czech Academy of Agricu Sciences

Slezská 7, 120 00 Praha 2, Republic