Effects of Neuromedin S on the proliferation of splenic lymphocytes and the cytokine secretion by pulmonary alveolar macrophages in pigs in vitro

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Abstract

Neuromedin S (NMS), a 36-amino acid neuropeptide, has been found to be involved in the regulation of the endocrine activity. It has been also detected in immune tissues in mammals, what suggests that NMS may play an important role in the regulation of immune response. The aim of this study was to demonstrate the presence of NMS receptor 1 (NMU1R) and effect of NMS in pig splenic lymphocytes (SPLs) and pulmonary alveolar macrophages (PAMs). The presence of NMU1R in pig SPLs and PAMs was respectively confirmed by reverse transcription-polymerase chain reaction (RT-PCR), western blot analysis and immunocytochemical methods. Furthermore, SPL proliferation was analyzed using the 3-(4,5)-dimethyl-thiahiato(-2-yl)-3,5-di-phenylthio tetrazoliumromide (MTT) method. Additionally, the secretion of interleukin (IL)-1β, IL-6 and tumor necrosis factor-α (TNF-α) in PAMs was all measured by enzyme-linked immunosorbent assay (ELISA) kits. In the present study, the results of RT-PCR and western blot analysis revealed that NMU1R mRNA and protein were both expressed in pig SPLs and PAMs, and the immunocytochemical investigations further revealed that the positive signal of NMU1R immunoreactivity was observed in plasma membranes of both SPLs and PAMs. In the in vitro study, we found that at concentrations of 0.001-1000 nM NMS alone or combined with lipopolysaccharide or phytohemagglutinin significantly increased SPL proliferation. Application of ELISA method showed that NMS could induce the secretion of the pro-inflammatory cytokines IL-1β, IL-6 and TNF-α in PAMs. These results suggest that NMS can act as a potently positive pro-inflammatory factor and immunomodulatory agent that affects the immune response of immune cells by combining with its receptor NMU1R.

Key words: NMS, pig, SPLs, proliferation, PAMs, cytokines

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