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## Gasotransmitters in regulation of neuromuscular transmission

Sitdikova G., Zefirov A.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

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### Abstract

© Springer-Verlag Berlin Heidelberg 2012. All rights are reserved. Nitric oxide (NO), carbon monoxide (CO), and hydrogen sulfide (H<sub>2</sub>S) are endogenously synthesized and serve as signaling molecules of autocrine and paracrine regulation in many systems. All three gases are produced in central nervous systems in response to neural excitation and regulate neurotransmitter release and are involved in the regulation of synaptic plasticity acting on pre- or postsynaptic levels. The modulatory mechanisms of these gases are different. In this chapter, we present the literature and our own data concerning the effects and mechanisms of these gases in the peripheral nervous system focusing on neuromuscular synapses. In motor nerve endings it was shown that NO decreased transmitter release while CO had the opposite effect. It was further shown that the main result of NO and CO action is a change of the cyclic adenosine monophosphate (cAMP) level which increased or decreased by cyclic guanosine monophosphate (cGMP) -dependent phosphodiesterases (PDEs) (2 or 3). H<sub>2</sub>S induced an increase of acetylcholine release and whose effect was mediated by cAMP and Ca<sup>2+</sup>. It is suggested that all three gases are produced at the neuromuscular junction and regulate transmitter release from motor nerve ending.

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### Keywords

Carbon monoxide, Hydrogen sulfide, Neuromuscular junction, Nitric oxide, Transmitter release