NITRIC OXIDE AND CARBON MONOXIDE – TWO IMPORTANT GASOTRANSMITTERS

Summary

Nitric oxide ($NO^{\cdot}$) and carbon monoxide (CO), like hydrogen sulfide (H2S), are commonly known as gasotransmitters. These compounds play a number of important functions in regulation of many life processes inter alia they are involved in cellular signaling pathways.

In vivo nitric oxide is synthesized by neuronal (nNOS), inducible (iNOS) and endothelial (eNOS) nitric oxide synthase. $NO^{\cdot}$ activates soluble guanylate cyclase (sGC), which is defined as the receptor for nitric oxide. $NO^{\cdot}$ regulates cell survival and death by taking part in the signaling pathway of protein kinase G (PKG) and Ras. Proinflammatory factors increase the level of $NO^{\cdot}$, which regulates inflammation. $NO^{\cdot}$ affects calcium and calmodulin dependent kinases, participating in the process of neurotransmission.

In vivo carbon monoxide is synthesized by heme oxygenase (HO). CO, like $NO^{\cdot}$, activates sGC, regulates blood pressure and inflammatory processes. Moreover, CO inhibits platelet aggregation. It affects p38 – MAPK (-Mitogen Activated Kinase) signaling pathway, and inhibits activity of ERK-1/2 (Extracellular Signal-Regulated Kinases 1 an 2). CO regulates gene expression, cell survival and apoptosis.