Abstract: P553

H2S donor (NaHS) restores endothelium-dependent relaxation of smooth muscles in old rats

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Topic(s):
Vascular Biology and Physiology, Other

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Background. The effects of H2S donor (NaHS) on indicators of oxidative/nitrosative stress, coupling of constitutive NO-synthase (cNOS) and endothelium-dependent relaxation of smooth muscles (SM) in old rats were studied.

Methods. Endothelium-dependent relaxation of SM was performed on isolated thoracic aorta by the conventional method in a mode close to isotonic. The markers of oxidative/nitrosative stress (the rate of ?2•-, •?? generation, pools of H2O2, the activity of iNOS, NO3- pools) and constitutive NO-synthesis (activity of cNOS and NO2- pools) were determined in aorta tissue by spectrophotometric method. The index of cNOS coupling was calculated as cNOS activity related to the rate of O2•- generation.

Main results. It was found that old rats had impairment endothelium-dependent relaxation of SM (7.5 ± 1.4%, compared with 64.9 ± 3.5% in adults). This functional disorder was accompanied by a decrease of H2S pools (by 1.6 times). It has been also revealed that a combined oxidative and nitrosative stress was developed, leading to ?NOS uncoupling (the index of cNOS coupling was decreased by 20 times) and decline of the constitutive NO synthesis (cNOS activity and NO2- pools were decreased by 3 and 1.7 times, respectively).

It has been shown, that NaHS, improved endothelium-dependent relaxation of SM (48.8 ± 1.9%, compared with 7.5 ± 1.4% in intact old rats). The molecular mechanisms of NaHS action included the increase of H2S pools (by 2 times), inhibition of the oxidative/nitrosative stress, restoration of the ?NOS coupling and reduction of the constitutive NO synthesis.

Conclusions. Thus, NaHS recovers endothelium-dependent relaxation of SM in old rats via oxidative/nitrosative stress inhibition, cNOS recoupling and constitutive synthesis of NO stimulation.
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