



Gender differences in the vasorelaxant effect of hydrogen sulphide in type 2 diabetes

DYBVIG, ANE S.

Semmelweis University Faculty of Medicine IV.

BELICZAI-MAROSI GABRIELLA

Semmelweis University Faculty of Medicine IV.

INSTITUTE OF CLINICAL EXPERIMENTAL RESEARCH

Introduction: Hydrogen sulphide (H₂S) is an endogenous gas that has potent relaxant effect on vascular smooth muscles. The mechanism behind this effect of H₂S is pleiotropic and it most probably involves the inhibition of phosphodiesterase (PDE) and the opening of ATP-sensitive K⁺- (KATP) channels. Vascular dysfunction is a frequent finding in diabetes and it is partly related to the decreased level of cGMP in vascular smooth muscles. Our previous study showed that H₂S has a significantly greater vasorelaxant effect in male db/db mice compared to controls. We now aimed to investigate the vasorelaxant effect of exogenous H₂S on female mice. **Methods:** Thoracic aortic vessel segments of 3 mm length were isolated from adult female db/db and non-diabetic control mice (n=3). We have investigated dose-response curves for phenylephrine (Phe, 10⁻⁸, 10⁻⁷, 10⁻⁶ and 10⁻⁵ M) and tested the effects of the H₂S donor sodium hydrosulphide (NaHS, 10⁻⁵, 3x10⁻⁵, 10⁻⁴, 3x10⁻⁴ and 10⁻³ M) after precontraction by Phe 10⁻⁶ M in isometric condition in myographs. **Results:** Female derived vessels showed increased contractions in response to Phe compared to male-derived vessels both in control and db/db mice. NaHS induced relaxations were enhanced in female-derived control vessels, but not in vessels segments from female db/db mice. There was no significant difference in the vasorelaxant response to NaHS in the vessel segments derived from female db/db mice compared to female controls. **Conclusion:** The vessel segments derived from female db/db mice did not show the increased vasorelaxant response to H₂S that we demonstrated in male db/db mice, consequently suggesting a gender difference. According to the literature, estrogen can (1) increase the endogenous production of H₂S; (2) enhance KATP channel expression and (3) increase α -receptor affinity and these may account for the gender-related differences observed in our experiments. Fundings OTKA K-112964, Bolyai János Research Fellowship

Supervisors:

Dr. Kiss Levente senior lecturer

Dr. Ruisanchez Éva assistant lecturer