



Short communication

Metformin raises hydrogen sulfide tissue concentrations in various mouse organs

Bogdan Wiliński¹, Jerzy Wiliński², Eugeniusz Somogyi³,
Joanna Piotrowska³, Włodzimierz Opoka³

¹Department of Human Developmental Biology, Jagiellonian University Medical College, Kopernika 7, PL 31-034 Kraków, Poland

²1st Department of Cardiology and Hypertension, Jagiellonian University Medical College, Kopernika 17, PL 31-501 Kraków, Poland

³Department of Inorganic and Analytical Chemistry, Jagiellonian University Medical College, Medyczna 9, PL 30-688 Kraków, Poland

Correspondence: Bogdan Wiliński, e-mail: bowil@interia.pl

Abstract:

Background: The epidemic of diabetes mellitus type 2 forces to intensive work on the disease medication. Metformin, the most widely prescribed insulin sensitizer, exerts pleiotropic actions on different tissues by not fully recognized mechanisms. Hydrogen sulfide (H₂S) is involved in physiology and pathophysiology of various systems in mammals and is perceived as a potential agent in the treatment of different disorders. The interaction between biguanides and H₂S is unknown. The aim of the study is to assess the influence of metformin on the H₂S tissue concentrations in different mouse organs.

Methods: Adult SJL female mice were administered intraperitoneally 100 mg/kg b.w. per day of metformin (group D1, n = 6) or 200 mg/kg b.w. per day of metformin (group D2, n = 7). The control group (n = 6) received physiological saline. The measurements of the free and acid-labile H₂S tissue concentrations were performed with Siegel spectrophotometric modified method.

Results: There was a significant progressive increase in the H₂S concentration along with the rising metformin doses as compared to the control group in the brain (D1 by 103.6%, D2 by 113.5%), in the heart (D1 by 11.7%, D2 by 27.5%) and in the kidney (D1 by 7.1%, D2 by 9.6%). In the liver, massive H₂S accumulation was observed in the group D1 (increase by 420.4%), while in the D2 group only slight H₂S level enhancement was noted (by 12.5%).

Conclusion: Our experiment has shown that metformin administration is followed by H₂S tissue concentrations increase in mouse brain, heart, kidney and liver.

Key words:

hydrogen sulfide, diabetes mellitus, metformin, biguanide, nitric oxide, mice
