Folia Biologica et Oecologica 18: 9–10 (2024)

Acta Universitatis Lodziensis

MMP-9 as a potential diagnostic marker for urolithiasis

POST-CONFERENCE REPORT

KINGA GRZYBOWSKA[1], PAULINA WIGNER-JEZIORSKA[2]

[1]University of Lodz, Faculty of Biology and Environmental Protection, Biochemical Section of the Student Scientific Circle of Biologists, Pomorska 141/143, 90–236 Lodz, Poland
[2]University of Lodz, Faculty of Biology and Environmental Protection, Department of General Biochemistry, Pomorska 141/143, 90–236 Lodz, Poland
E-mail: kinga.grzybowska@edu.uni.lodz.pl

KEYWORDS: Urolithiasis, single nucleotide polymorphism, mRNA expression, urology, metalloproteinase 9

Urolithiasis is one of the most common disorders of the urinary system classified as civilization diseases. This condition is caused by the presence of insoluble deposits in the urine, which hinder its proper flow in the urinary tract. Nevertheless, its complete etiology still remains unclear. Previous studies suggest that the adhesion of insoluble crystal substances is one of the key stages in the formation of urinary stones. The extracellular matrix, located in close proximity to the forming stone, interacts with various signalling molecules, including matrix metalloproteinases (MMPs). MMP-9 appears to be particularly involved in the processes of adhesion and aggregation of insoluble deposits to urothelial cells.

Therefore, the aim of the presented study was to assess the association between the frequency of occurrence of the single nucleotide polymorphism (SNP) 836 A > G (rs17576) located in the MMP-9 gene and the development of urolithiasis, as well as its impact on the mRNA expression level of this gene.

The material for the research consisted of RNA and DNA isolated using a commercially available kit from whole blood collected from 50 patients diagnosed with urolithiasis, who were hospitalized in the Urology Department of M. Kacprzak Regional Hospital in Płock, as well as from 53 healthy volunteers constituting the control group. Subsequently, profiling of the investigated SNP and determination of MMP-9 mRNA expression were performed using real-time polymerase chain reaction (real-time PCR).

The selected polymorphism for the study did not significantly affect the frequency of urolithiasis occurrence in the examined population. However, the results suggest that a potential increase in the sample size may confirm that heterozygosity of the investigated SNP could be associated with reduced risk of urolithiasis in the female subgroup. On the other hand, a potential increase in risk was observed for G/G homozygotes in the non-smoking subgroup and for A/A homozygotes in the subgroup with normal body mass index. Furthermore, it was

DOI: https://doi.org/10.18778/1730-2366.18.03

confirmed that the development of urolithiasis is associated with decreased expression of the MMP-9 gene ($p < 0.05$), highlighting the significance of this MMP in the molecular pathomechanism of urolithiasis.