

Do natural products of plant origin support the therapy of urinary tract infections (UTIs)?

Urinary tract infections (UTIs) are widespread and affect a large proportion of the human population. About 150 million people worldwide develop UTI each year, with high social costs. The heritage of European traditional medicine is currently in a state of decay. The traditional knowledge about European plants healing properties was eroded by the deep economic and social changes of the past few decades. Many of the medicinal plants being popular for centuries have been superseded by synthetic pharmaceuticals. Due to incompatibility with drug discovery approaches based on high-throughput screening directed at single molecular target, natural products for a long time were beyond the focus of pharmaceutical companies. Medicinal plant materials were extensively applied in the pre-antibiotic era in traditional European medicine in treatment of UTIs. Such natural products as *Ulmariae flos*, *Urticae folium*, *Sambuci flos*, *Orthosiphonis folium*, *Hernariae herba*, *Solidaginis herba*, *Polygoni avicularis herba*, *Equiseti herba*, *Betulae folium*, *Uvae ursi folium*, *Vitis idaeae folium* and others were used in Europe since ancient times and are still used in the therapy and prevention of UTIs. However, the efficacy of most of mentioned plant materials in UTIs still remains unresolved due to the lack of suitable scientific evidence.

The spread of multidrug-resistant pathogens resulted in the recent development of concept leading to revival of 'old' antibiotics. In this context, the scientific-based reintroduction of previously used traditional therapeutic agents, which had been superseded by antibiotics since discovery of penicillin in 1928, represents a promising strategy for novel re-introduction-based drug development, respecting the problem of antimicrobial resistance

The main aim of the project is to find prove or proves justifying the traditional use of plant materials in the prevention and treatment of UTIs caused by *E. coli*. The project will be focused on comprehensive analysis of chemical composition and gut microbiota metabolism of compounds contained in chosen plant materials. The concept of the role of gut microbiota metabolism and further II phase transformations in the anti-microbial and anti-inflammatory activity of natural products will be investigated. Finally, the idea of self-destructive mechanism of deconjugation of II phase metabolites by enzymes produced by *E. coli* in UTIs shall be preliminary verified.

Results obtained with current proposal should provide efficient data on the chemical composition, gut microbiota metabolism and urine metabolites of orally ingested infusion from chosen plant materials