

UDZIAŁ DROBNOUSTRÓJÓW W POWSTAWANIU KAMIENI MOCZOWYCH

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1. Wprowadzenie. 2. Powstawanie kamieni moczowych w wyniku infekcji bakteriami ureazododatnimi. 2.1. Rola ureazy. 2.2. Wpływ zewnątrzkomórkowych polisacharydów. 2.3. Metody leczenia i zapobiegania nawrotom. 3. Nanobakterie — ogólna charakterystyka. 3.1. Nanobakterie jako nowy czynnik etiologiczny kamicy moczowej. 4. Podsumowanie

The role of bacteria in urinary stones formation

Abstract: Urinary calculi occur once in a lifetime in 15% of men and 6% of women in the world and recur in about half of these people. Stones are known to develop because of various metabolic or environmental factors and bacterial infections. The crystalline components of the urinary tract stones can be classified into five types: calcium oxalate, calcium phosphate (apatite), magnesium ammonium phosphate (struvite), purine or cystine. Struvite and carbonate apatite form as a consequence of a urinary tract infection by urease-producing species of bacteria. Ammonia, produced by the bacterial hydrolysis of urea, raises urine pH. The alkaline pH causes the precipitation of normally soluble polyvalent cations and anions in urine, leading to the crystallization of struvite and carbonate apatite. Additionally, bacteria secrete glycocalyx which accelerates crystals growth and serves to bind crystals together into a stone. Although this kind of stones represent only 15% of all urinary stones, the morbidity that they cause is disproportional to the small number of patients.

However, in many cases, carbonate apatite can be formed at neutral pH and physiological phosphate and calcium concentrations. Recently, it was found that carbonate apatite stones might have an infectious origin. Nanobacteria, small intracellular bacteria found in human kidney stones, produce carbonate apatite on their cell walls. These particles covered with carbonate apatite could serve as crystallization centres for renal calculi formation. This discovery could change the diagnostics of stone disease and its treatment.

1. Introduction. 2. The development of urinary calculi as a consequence of infection by urease-producing bacteria. 2.1. Role of urease. 2.2. Influence of extracellular polysaccharides. 2.3. Methods of treatment. 3. Nanobacteria general characteristics. 3.1. Nanobacteria as a new cause of kidney stones formation. 4. Summary

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