

Genotype and phenotype of susceptibility to a forgotten antibiotic in *Escherichia coli* strains isolated from male UTI patients

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Escherichia coli uropathogenic is the main etiologic agent for the Urinary Tract Infection (UTI), current treatments for UTI are based on antibiotic therapy to eliminate the pathogen and achieve sterility of the urinary tract; however it does not include the preservation or restoration of the normal microbial community, thus contributing to antibiotic resistance (1). A recent approach is the reuse of antibiotics with low reported resistance, a specific case being nitrofurantoin for the treatment of uncomplicated cystitis as first-line empirical therapy. The oxygen-insensitive nitroreductases NfsA and NfsB are responsible for conferring sensitivity to nitrofurantoin, they reduce compounds by a “ping-pong” mechanism using two electrons. The first step resistance is the result from a mutation of *nfsA*, while the increased resistance associated with mutational inactivation of *nfsB* (by itself does not produce a resistance phenotype) although were found some new patterns (2). The detection of the complete genes coding for nitroreductases, *nfsA* and *nfsB*, in 24 strains of UPEC isolated from males with UTI was performed by PCR and agarose gel electrophoresis to visualize the amplified genes. Subsequently, the genotype of each strain was compared with the phenotype.

Finally, 11 strains (46%) amplified the *nfsA* while 19 strains (79%) amplified *nfsB*; a total of 5 strains (21%) were previously determined as resistant to nitrofurans while the remaining 19 (79%) as susceptible (3). From the analysis between genotype and susceptibility phenotypes, 7 patterns were obtained: 5 of them reported in the literature and 2 different (the first with both genes with a resistant phenotype and the other without the genes that confer a sensible phenotype). The most interesting was the pattern where there are no nitroreductases genes, however, there is a resistant phenotype, this could suggest that another resistance mechanisms are involved to acquire resistance to this drug. This study demonstrates that although nitrofurantoin seems to be a good option to combat resistance, it is important to maintain vigilance to avoid the development of other mechanisms that could affect its susceptibility.

References

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