Abstract


Vitamin D induction of the human antimicrobial Peptide cathelicidin in the urinary bladder.


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BACKGROUND: The urinary tract is frequently being exposed to potential pathogens and rapid defence mechanisms are therefore needed. Cathelicidin, a human antimicrobial peptide is expressed and secreted by bladder epithelial cells and protects the urinary tract from infection.

OBJECTIVE AND METHODS: Here we show that vitamin D can induce cathelicidin in the urinary bladder. We analyzed bladder tissue from postmenopausal women for expression of cathelicidin, before and after a three-month period of supplementation with 25-hydroxyvitamin D3 (25D3). Cell culture experiments were performed to elucidate the mechanisms for cathelicidin induction.

RESULTS: We observed that, vitamin D per se did not up-regulate cathelicidin in serum or in bladder tissue of the women in this study. However, when the bladder biopsies were infected with uropathogenic E. coli (UPEC), a significant increase in cathelicidin expression was observed after 25D3 supplementation. This observation was confirmed in human bladder cell lines, even though here, cathelicidin induction occurred irrespectively of infection. Vitamin D treated bladder cells exerted an increased antibacterial effect against UPEC and colocalization to cathelicidin indicated the relevance of this peptide.

CONCLUSIONS: In the light of the rapidly growing problem of resistance to common urinary tract antibiotics, we suggest that vitamin D may be a potential complement in the prevention of UTI.

PMID: 21179490

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