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Bacterial ureases and its role in long lasting human diseases

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Abstract

Rheumatoid arthritis (RA), atherosclerosis (AR) and urinary track infection (UTI) are long-lasting human diseases. RA and AR are chronic disease with strong autoimmunological background. There are hypothesis that bacterial infections may be connected with development of above mentioned diseases. Molecular mimicry between bacterial and human antigens may be one of possible mechanisms of RA and AR development. We postulated that the potential bacterial antigens involved in molecular mimicry are bacterial ureases – enzymes frequently present in pathogenic (H. pylori) and commensal bacteria (P. mirabilis). The aim of this study was to discover whether synthetic 18 and 8-mer peptides that mimicking bacterial ureaeses are recognizes by RA , AR and UTI patients antibodies. To achieve a better presentation of the epitopes to antibodies, a new ocyanuric linker was designed and used for to immobilize the peptides on a cellulose support. In RA as well as AR patients sera the level of antibodies reacting with synthetic peptides were significantly higher in comparison to volunteer blood donor sera. The minimal binding epitope was determined to be an 8-mer peptide (H-SIKEDVQF-OH). Analysis of the peptide library with 19-mer peptides differing in location only of individual amino acids in the sequence showed that patients with RA react with synthetic antigens in a different way in comparison with control, blood donor serum. A high level of antibodies against bacterial ureases in RA, AR and UTI patients sera may indicate on connection between the bacteria presence and infection and development of selective long-lasting human diseases. The presented results indicated that human anti-bacterial ureases antibodies may bind not only homologous bacterial epitopes but also human peptides. It may be for example the N-terminal extracellular domain of CC chemokine receptor-like 1(CCRL1) protein, expressed mainly in the tissues heart.

Biography

Wieslaw Kaca is a professor of microbiology in the Department of Microbiology Jan Kochnowski University in Kielce, Poland. He received his Ph.D. in biology, from the University of Lodz, Lodz, Poland in 1982. He has done long term postdoctoral studies in Germany, USA, Sweden and, Japan. He co-signed 140 publications in peer-reviewed journals and several book chapters or reviews.