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Peptidyl derivatives of diaryl 1-aminoalkylphosphonates as a new potential antibacterial and antiviral agent

Statement of the Problem: The bacterial and viral infections are still serious health risk around the world. There is a need for new antibacterial and antiviral agent development. Peptidyl derivatives of diaryl 1-aminoalkylphosphonates are potent, irreversible and selective inhibitors of serine proteases including bacterial and viral serine proteases. The activities of these enzymes are crucial for survival of bacteria and in life cycle of certain viruses. Effective inhibitors of these enzymes could be a next generation of antibacterial and antiviral agents.

Methodology & Theoretical Orientation: Applying the described earlier methodologies we have design and synthesized several new inhibitors for bacterial and viral serine proteases including chymotrypsin-like serine protease from *Staphylococcus aureus* SplA and SplB (1, 2), endoproteinase GluC (V8 proteinase) (3), subtilisin-like protease SufA from *Finegoldia magna* (4), protease CtHtrA from *Chlamydia trachomatis* (5) and viral protease NS3/4A of hepatitis C virus and N2B/NS3 protease from west Nile virus.

Conclusion & Significance: Some of these inhibitors showed excellent activity *in vitro* and for inhibitors of serine protease from *Chlamydia trachomatis* the significant activity *in vivo* was observed. In general more in vivo studies are required.

Biography

Józef Oleksyszyn has received his PhD (1974-1977) and DS (Doctor of Sciences, Habilitation, 1978-1986) from Faculty of Chemistry, Wrocław University of Technology, Poland. Currently, he is a Professor of Biochemistry at Wrocław University of Technology, Poland. He had two Post-doctoral Scholarship, the first (1982-1984) in the Department of Chemistry, Michigan University under Professor Arthur Ashe and the second one at Georgia Institute of Technology under Professor James C Powers. During the period of 1990-2000, he has been working in few biotechnology companies including CORTECH Inc., (Denver, CO), OsteoArthritis Inc., (Boston, MA) and DYAX (Boston, MA), in the positions from Research Scientist to the Director of Chemical Sciences. One of the compounds, inhibitor of human neutrophil elastase, designed and synthesized by him went for the clinical trial (Cortech). He discovered an amidoalkylation reaction of trivalent phosphorus derivatives, named in literature as "Oleksyszyn Reaction". In 2002, he returned to Wrocław Technology University, where he has build-up the Division of Medicinal Chemistry and Microbiology that he has headed during the period of 2006-2011. His research resulted in more than 70 publications in reputed journals and more than 50 patents and patent applications, including 8 USA patents. He is a Member of American Chemical Society. He has been serving as the Editorial Member of several reputed journals like *Anti-cancer Agents in Medicinal Chemistry, American Journal of Cancer Prevention, Journal of Pharmacological & Biomedical Analysis, Cell Biology: Research & Therapy*, and has been an Expert Reviewer for several journals. His research interest includes new approaches for the anticancer therapies, enzyme inhibitors as new drugs, including new antibacterial drugs, inhibitors of proteolytic enzymes as a new drug generation.

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