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Most Important Achievements

· The ability of the opportunistic yeast Candida albicans to induce reactive arthritis in normal and in predisposed individuals has been studied. The relationship between infections and rheumatic diseases has been analyzed in detail with the aim to propose new therapeutic approaches. We have also worked on new therapeutic strategies in sepsis as there is an urgent unmet medical need for new treatments for this disease. Our therapeutic approach consists of the development and use of improved immunoglobulins “next generation” immunoglobulin preparations with enhanced anti-inflammatory activity.

· The immunomodulatory properties of natural substances and their synthetic analogs have been studied, including coumarin, 7-hydroxycoumarin, yeast superoxide dismutase and molluscan hemocyanins. The perspectives for their use as antitumor agents and for prophylaxis of infectious diseases have been revealed. An educational programme for life-long learning in the field of medical microbiology and immunology for nurses, laboratory technicians, etc. has been created with the participation of scientists from four European countries (Leonardo da Vinci Programme of EC).

· Pathological DNA-specific B cells in SLE are logical targets for a selected therapeutic intervention. We have constructed chimeric molecules by coupling of epitope-specific peptides to monoclonal antibodies. Our data show that it is possible to suppress selectively the activity of targeted autoreactive B-lymphocytes and to change the natural course of an autoimmune disease by administering chimeric molecules that cross-link the inhibitory receptor with the immunoglobulin B cell receptor.

· Introduction of DNA vaccines is a new approach to vaccination. Such a hybrid DNA molecule was constructed by us, encoding a T and B cell epitope-containing influenza hemagglutinin peptide and a scFv antibody fragment binding to mouse complement receptors I and II (CR1 and CR2). A single immunization with a plasmid containing the described construct induced a strong anti-influenza cytotoxic response lasting for more than six months and a weak antibody response.

Projects:

Project № BG/00/B/F/PP/132060, Leonardo da Vinci Programme of European Comission: Open and Distance Learning in Healthcare Microbiology and Immunology – coordinator and contractor Assoc. Prof. Dr. Hristo Onufri Neychev

Project № К-811 with National Scientific Council: Effect of the antioxidants Cu/Zn superoxide dismutase and coumarin on mediators of inflammation – project leader Dr. Tsvetanka Hristova Stefanova

Project № К-1103/01 with National Scientific Council: Immunomodulatory activity of coumarin and 7-hydroxycoumarin in experimental tumor models: activation of antitumor effector cells and cytokine induction – project leader Assoc. Prof. Dr. Hristo Onufri Neychev

Project № ТК-Б-1613/06 with National Scientific Council: Enhancement of immune defense against infections with intracellular bacteria using 7- hydroxycoumarin. - project leader Assoc. Prof. Dr. Hristo Onufri Neychev

Project № СС-1601/06 with National Scientific Council: Enhancement of the immune response against bacterial and viral infections in poultry using immunistimulators aiming at safe food products - project leader Assoc. Prof. Dr. Hristo Onufri Neychev.

Project № ИФ-00-147/06: Immunostimulatory drug for prophylaxis and treatment of tumor diseases in animals. - project leader Assoc. Prof. Dr. Hristo Onufri Neychev.

МУ-ЛІ-1501/05 Application of Candida albicans DNA in experimental infections

А/7/2005 Macrophage-dependent immunoprotective action of Candida albicans DNA

МУФР - 01/05 Macrophage inhibition as a therapeutic approach in multiple organ dysfunction syndrome (MODS)

NATO PDD(CP)-(CBP.EAP.RIG 98 1820) Immunoprotective properties of Fungal DNA

Project L 1304/03 Selective suppression of DNA-specific B cells in experimental model of lupus by anti-CD32 chimeric antibody.

HHMI Project #55000340, How Tolerance to Native DNA is Established and Maintained.

Swiss National Fund project “Selective silencing of auto-aggressive B cells in animal models of autoimmune diseases”.

NATO Science for Peace Project SfP 982158 “Design of novel countermeasures against sepsis caused by biological weapons”.

POST-DOC 1005/07: Role of acute phase proteins in septic shock induced by Candida albicans

EAG.RIG 982937/2007: Prevention of shock and multiple organ dysfunction by protein kinase inhibitor tyrphostin.

КТ-Х-1707. Nuclear factor kappa-b (RANKL)-dependent action of glucoseamine in osteoarthritis.

ТК-Х-1710/07-New tri-specific antibody for selective suppression of pathological B lymphocytes.

N ВУ-704/07- New method for selective suppression of Autoreactive B lymphocytes using chimeric anti-CD35 antibody

N ВУХ-11/07-Creating of new chimeric molecules for autoimmune therapy with nano technologies

N ТК-317/07-Construction of gene-engineered chimeric DNA molecules with recombinant nano-technologies for specific therapy of autoimmune diseases.

Recent Publications

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