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REGULATION OF CHROMIUM (III) AND NICKEL (II) OF RNA VIRUS REPLICATION

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The transition elements: chromium and nickel are essential micronutrients for human, animals and plants. Micronutrients in human and animal organisms play crucial role in prevention and treatment of various diseases. They also play an important role in the optimization of physical and mental functions. Inside the cells, chromium (III) may interact with microfilaments, mitochondria, lysosomes and nucleus. Cr (III) compounds can bind directly to DNA *in vitro*, forming Cr-DNA adducts and DNA-DNA crosslinks. Nickel can induce genotoxic effects, such as DNA strand breaks, sister chromatid exchanges and DNA-protein crosslinks. Moreover, nickel can generate ROS production, which interacts with nucleic acids or proteins. The aim of this study was to examine the effect of treating of chromium (III) and nickel (II) and their combinations on Bovine Viral Diarrhoea Virus (BVDV) replication. The BVDV has been a good model virus for investigating HCV, which is a member of genus *Hepacivirus*, which belongs to the same family. The antiviral efficacies of chromium (III) and nickel (II) on BVDV were evaluated using Real Time PCR method. Moreover, the cytotoxicity of these microelements was examined using the MTT reduction assay. The IC₅₀ (50% inhibitory concentration) for the chromium chloride was 1400 µM for BT cells. The IC₅₀ for the nickel chloride was more than 1200 µM for BT cells. The concentration-dependent antiviral activity of chromium chloride and nickel chloride against BVDV was observed. In cultures simultaneously treated with 1) 200 µM of CrCl₃ and 1000 µM of NiCl₂, 2) 1000 µM of CrCl₃ and 200 µM of NiCl₂, a decrease in number of RNA copies was observed compared with control cells and cells incubated with chromium(III) and iron(III) used separately. The synergistic antiviral effects were observed for chromium (III) and nickel (III) against BVDV.

Biography

Professor Andrzej K. Siwicki, VMD, Ph.D., DSc is a head of Department Microbiology and Clinical Immunology, Faculty of Veterinary Medicine, University of Warmia and Mazury and Department of Pathology and Immunology IFI in Olsztyn, Poland. He is author of over 500 original papers in reputed journals and about 200 scientific communications (index-h 32, index of citation: 4502). His fields of interest are modulation of defence mechanisms and protection against diseases by natural and synthetic products in animals, influence of pollutants on the cell-mediated immunity and restoration of immunity after suppression induced by xenobiotics. Developed a new possibility in the comparative immunotoxicology for control of effect of xenobiotics and pharmaceutical products on the defence mechanisms and protection against diseases. He attended scientific missions in USA, Japan, France and Israel, was a co-ordinator of USDA and FAO projects and he is professor conferring of 14 PhDs and 4 DSc.v.

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