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Effect of radiation in stratosphere on viability and physiological properties of influenza virus

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The stratospheric balloons are suitable for observation of long-term exposure of various samples to stratospheric environment. UV radiation, originating from sunlight, act as the main virucidal component in the environment. The main aim of this study was to reveal the effect of UVC irradiation on allantoic fluid containing the influenza virus A. Primarily, the stratospheric probe was designed and constructed. The board connected with Julo-X (flight computer) included 7 power outputs for heating elements, 10 temperature sensors, high voltage source for powering the photomultiplier tube and SD card storage for all of data. Further, we used lyophilised allantoic fluid containing the influenza virus A, which was sealed into a cuvette and subjected to radiation in the height of 40 km above sea level in the stratospheric probe. Subsequently, virus was applied into the chicken embryos to determine the ability to infect cells. The effect of irradiation on the integrity of the influenza virus RNA was examined using agarose gel electrophoresis, Experion RNA chip and electrochemical methods. Electrochemical methods and 2D electrophoresis were also used for comparison of the viral protein damage. Based on the results, we found that some electrochemical active peptide and protein moieties were found to be changes markedly by the effect of irradiation. This was most visible by measuring of Cat2 peak height found at -1.2 V. Moreover, the changes revealed by electrophoresis were also found significant.

Biography

Rene Kizek is a Professor and Head of Laboratory of Metallomics and Nanotechnology, Mendel University in Brno and Vice-Head of Research Group Leader of Submicron Systems and Nanodevices in Central European Institute of Technology. His research is mainly focused on effects of metal ions in organisms and their roles in various pathological processes mainly tumour diseases. Further, his team is aimed at developing new types of nanomaterials and testing these materials for nanomedical and nanomedicine purposes. He is an author of more than three hundred ISI indexed papers with more than 7000 citations and H-index 45.

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