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### **Rapid multiplex detection of Ebola and influenza using nanotechnological approaches based on magnetic particles and quantum dot probes**

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Nanotechnological approaches provide a cheap, advanced, easy and rapid alternative to conventional molecular techniques. The aim of this study was to apply new nanotechnological approach in detection of two virus models (Influenza and Ebola). PbS quantum dots (QDs) were prepared by reacting Pb(OAc)<sub>2</sub>•3H<sub>2</sub>O, mercaptosuccinic acid and sodium sulfide in stirred solution. CuS QDs were prepared similarly only Cu(OAc)<sub>2</sub>•H<sub>2</sub>O was used instead of Pb<sup>2+</sup> salt. Influenza and Ebola peptides (those bearing cysteines on their C-terminus) were labelled using QDs (HA1 with PbS, EBO with CuS, respectively). The labelling was carried out as a simple mixing of peptides (100 µg/mL) and QDs (50 µg/mL) in ratio 1:1 (v/v) followed by filtration. Prior to a bio-conjugation, paramagnetic particles (PMPs) were washed using 1 mL of PBS to remove impurities. For bio-conjugation, peptides (final concentration 100 µg/mL) were mixed with PMPs (0.5 mg/mL). After incubation (37°C, 1250 rpm, 30 min) in thermomixer the bio-conjugate with bound peptides was immobilized using external magnetic field, three times washed with PBS and blocked using 100 µL of 0.1% milk followed by incubation (37°C, 1250 rpm, 30 min). In conclusion, simple nanotechnological approaches, as we suggested, are very promising and can provide a competitive alternative to conventional molecular methods for detection of the presence of viruses.

#### **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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