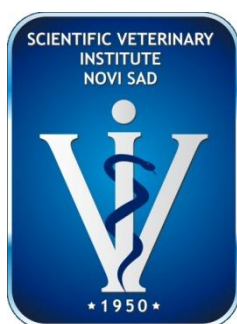


SCIENTIFIC VETERINARY INSTITUTE „NOVI SAD“
INSTITUTE OF VETERINARY MEDICINE OF SERBIA

„One Health – New Challenges“
**First International Symposium of
Veterinary Medicine
(ISVM2015)**



BOOK OF ABSTRACTS



**Hotel "Premier Aqua" - Vrdnik
May 21 – 23, 2015**

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LIVE ATTENUATED SWINE INFLUENZA VIRUSES AS VACCINE CANDIDATES

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Summary

Swine influenza (SI) is an acute, highly contagious, respiratory disease of swine caused by influenza A viruses. In addition, SI infections possess significant human public health concerns as they may serve as intermediate host for the generation of new pandemic viruses. Vaccination is still the primary method for the prevention and control of SI. Currently, commercially available vaccines against SI are a combination of inactivated swine influenza viruses (SIVs) with oil adjuvant. Their application induces mainly humoral immune response, which may not be protective against virus variation in the field. In contrast, application of live attenuated influenza vaccines (LAIV) mimics natural infection and induces strong, cell-mediated and humoral immunity. Furthermore, LAIV induces cross-protective immunity against different subtypes of influenza A viruses and are currently unavailable for SI. Using reverse genetics technology, we generated multiple different mutant SIVs that could be considered as a LAIV. Two SIV mutants were derived from A/Swine/Saskatchewan/18789/02 (H1N1) SIV and had modified cleavage site within hemagglutinin (HA) segment. Both SIV mutants were fully dependent on the presence of human neutrophil elastase for their growth in tissue culture, thus they were highly attenuated when administered to pigs due to the lack of exogenous elastase at the replication site. The second approach was focused on the generation of a new LAIV, an eight-segment SIV harboring two different SIV hemagglutinins (HAs), H1 and H3, in the genetic background of H1N1 SIV. This mutant SIV was generated by fusing the H3 HA ectodomain from A/Swine/Texas/4199-2/98 (H3N2) to the cytoplasmic tail, transmembrane domain, and stalk region of neuraminidase (NA) from A/Swine/Saskatchewan/18789/02 (H1N1) SIV. While this H1-H3 chimeric SIV, when propagated *in vitro* in the presence of exogenous neuraminidase, showed kinetics and growth properties similar to the parental wild-type virus, *in vivo* it was highly attenuated in pigs. Furthermore, application of these three genetically modified, live attenuated, swine influenza viruses as a live vaccines induced robust humoral (systemic and mucosal), cell-mediated and cross-reactive immune responses in pigs which conferred complete protection against infections with both H1 and H3 SIV subtypes in pigs.

Keywords: Live attenuated vaccine, swine influenza, reverse genetics