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Equine Viral Arteritis standard sera production paving the harmonization way to serological test inside Europe

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Equine viral arteritis (EVA), a disease with a worldwide distribution, is important in international trade and equine breeding industry. The causal agent of EVA is a positive single-stranded RNA virus belonging to the Equarterivirinae genus of the Arteriviridae family in the Nidovirales order. EVA is transmitted either by respiratory route or by the venereal route. Most of the infections are subclinical. Some studies showed that up to 70% of stallions might become persistently infected following EAV primary infection. According to studies about stallion shedders, EAV persists in their reproductive tract. The replication of the virus allows the virus to reach the semen of stallions considered today as the reservoir of the Equine Arteritis Virus (EAV). EVA can have significant economic consequences in the equine industry since rare severe EAV infections can be responsible for fulminating pneumonia, enteritis, or pneumo-enteritis in young foals, and the infection can lead to the abortion of pregnant mares or to the death of young foals. The most suitable diagnosis is a serological screening using a Virus Neutralization Test (VNT) as described in the chapter 3.6.10 of the World Organization Animal Health Terrestrial Manual. It aims to detect in a serum sample the presence of antibodies that have the ability to neutralize EAV. VNT is also the major serological assay used among the network of Veterinary Laboratory Diagnosticians (VLD) in the world. Indeed, detection of antibodies can be used:(I) to stand out EAV circulation in a population or in an individual animal, (II) to define the seroprevalence of equids in a county, (III) to show the efficiency of eradication policies, (IV) to confirm clinical cases and (V) to state about the immune response in individual animals or populations post-vaccination. In 2009, our lab as the European Union Reference Laboratory (EU-RL) for equine diseases other than African Horse Sickness, organized an InterLaboratory Proficiency Testing (IL-PT) for the EVA serological diagnosis. Results obtained by all the National Reference Laboratory (NRL) in EU for EVA that participated in this IL-PT allowed us to have a look on the qualitative and quantitative result harmonization in EU for EAV. According to the results obtained by the participants, qualitative results were satisfactory. However, quantitative results obtained by each participant's laboratories highlighted discrepancies. Indeed, only 90 results out of 154 (58.4%) were in the range of the expected titer specifications. Since 2013, the number of quantitative satisfactory results reached up to 74.2% (180 out of 242). To enhance the harmonization of quantitative results, the EU-RL for EAV decided to produce four EAV positive sera with different titers of EAV neutralizing antibody titers. The reproducibility, homogeneity, and short and long-term stabilities of these standard sera have been validated. In order to promote international exchanges, their use aims to harmonize the qualitative and quantitative results obtained according to the viral neutralization test, regardless of the laboratory that carried out the screening. Undeniably, harmonization of EAV neutralizing antibody titer is very important to ensure consistent results whatever the VLD that performed the serological detection.