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Advax-adjuvanted killed Japanese encephalitis virus (JEV) vaccine is safe in pregnant mares and in foals and induces robust immunological memory

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In 2011, following severe flooding in Eastern Australia, an unprecedented epidemic of equine encephalitis occurred in South-Eastern Australia, caused by Murray Valley encephalitis virus (MVEV) and a new variant strain of Kunjin virus, a subtype of West Nile virus (WNV_{KUN}). This prompted us to assess whether a delta inulin-adjuvanted, inactivated cell culture-derived Japanese encephalitis virus (JEV) vaccine (JE-ADVAX_{TM}) could be used in horses, including pregnant mares and foals, to not only induce immunity to JEV, but also elicit cross-protective antibodies against MVEV and WNV_{KUN}. Foals, 74-152 days old, received two injections of JE-ADVAX_{TM}. The vaccine was safe and well-tolerated and induced a strong JEV-neutralizing antibody response in all foals. MVEV and WNV_{KUN} antibody cross-reactivity was seen in 33% and 42% of the immunized foals, respectively. JE-ADVAX_{TM} was also safe and well-tolerated in pregnant mares and induced high JEV-neutralizing titers. The neutralizing activity was passively transferred to their foals via colostrum. Foals that acquired passive immunity to JEV via maternal antibodies then were immunized with JE-ADVAX_{TM} at 36-83 days of age, showed evidence of maternal antibody interference with low peak antibody titers post-immunization when compared to immunized foals of JEV-naïve dams. Nevertheless, when given a single JE-ADVAX_{TM} booster immunization as yearlings, these animals developed a rapid and robust JEV-neutralizing antibody response, indicating that they were successfully primed to JEV when immunized as foals, despite the presence of maternal antibodies. Overall, JE-ADVAX_{TM} appears safe and well-tolerated in pregnant mares and young foals and induces protective levels of JEV neutralizing antibodies with partial cross-neutralization of MVEV and WNV_{KUN}.

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