牛流行熱疫苗研發之動物實驗

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摘要

牛流行熱是由桿狀病毒所引起之急性發熱性疾病，藉由節肢動物媒介而感染，在台灣平均每 3-6 年爆發流行一次，為加強本病之預防，過去以日本分讓之牛流行熱活毒疫苗病毒株 YHL 株用來製作活毒疫苗，並完成相關動物試驗以確定其安全性與效力。迴毒試驗的結果顯示 YHL 活毒疫苗連續在牛隻繼代五次，並未造成病毒的毒力回復而引起牛隻發病或任何不良反應；若以 YHL 活毒疫苗搭配本所生產之不活化疫苗免疫後之血清中和抗體來評估效力，免疫後抗體最高可達 256 倍，然而免疫後牛隻是否能耐過病毒攻擊無法得知，因過去幾年進行多次攻毒皆未能成功使牛隻發病，如以發病牛分離之病毒接種於糠蚊及白腹叢蚊體內增殖，再將蚊蟲研磨液施打於牛隻，以及直接將發病牛血液經靜脈注射至牛隻體內，均無法誘發臨床症狀及病毒血症，血液分析亦未出現白血球減少現象，因此目前仍僅能以中和抗體力價作為效力評估的指標。牛流行熱不活化疫苗佐劑改良方面，依據小鼠試驗的結果挑選其中效果最佳的兩種新型佐劑進行牛隻實驗，與本所磷酸鋁膠佐劑疫苗相比，兩種新型佐劑疫苗誘發中和抗體的效果更佳且持續時間更長，未來將納入更多佐劑進行試驗，以取代現有磷酸鋁膠佐劑，冀能開發效果更好的不活化疫苗。

Animal Trials for Bovine Ephemeral Fever Vaccine

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Abstract

Bovine ephemeral fever (BEF) is an arthropod-borne viral disease caused by Rhabdovirus. There have been outbreaks every 3-6 years in Taiwan. For the purpose of improving the BEF vaccination program, we have been developing a live vaccine with YHL virus strain isolated from Japan, and several animal trials have been conducted to confirm the safety and efficacy of this live vaccine. In the reversion to virulence test, five serial passage of the virus have been performed in calves, and no systemic infection or any adverse effect has been observed. In addition, the calves could develop a rapid serum neutralizing (SN) antibody response against BEF virus after receiving YHL live vaccine plus subsequent inactivated vaccine booster. The antibody titers reached to 1:256. However, whether this BEF vaccine could provide enough protection against wild type virus attack still remains unknown because attempts to establish the cattle challenge model have been failed in the past few years. Not any clinical signs, viremia or leucopenia appeared during the experimental period in all testing calves either inoculated intravenously the grinding fluids of Culicoides and mosquitoes containing BEF viruses or directly inoculated the blood collected from sick cattle. The efficacy of the live vaccine could only be evaluated by the SN antibody titers. As to adjuvant improvement of BEF inactivated vaccine, two selected adjuvants were mixed with inactivated BEF virus respectively and inoculated to calves. The results indicated that the SN titers induced by these two adjuvants were higher and lasted longer compared with the AHRI commercial aluminum gel vaccine. In conclusion, more adjuvants will be tested in the future to improve both safety and efficacy of the BEF vaccine.