牛流行熱 G 蛋白次單位疫苗之研發

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摘要

牛流行熱是由牛流行熱病毒引起，經庫蠓等吸血節肢動物媒介造成感染。台灣首發病例於 1967 年，之後每三至六年爆發一次，造成酪農業嚴重損失。目前台灣牛流行熱疫苗為組織細胞培養之不活化病毒疫苗，但此製程所獲得的病毒力價卻不高，造成疫苗的成本耗費過大。前人研究顯示牛流行熱病毒封套醣蛋白 G 蛋白具強免疫原性且會引發中和抗體，並證實以桿狀病毒系統表現之 G 蛋白保有其抗原性。本研究之目的為透過桿狀病毒系統開發牛流行熱次單位疫苗，希望能夠提供一有效且經濟之疫苗。本實驗是以 2007 年台灣牛流行熱病毒野外分離株之核酸為模版，增幅 G 蛋白基因片段，應用桿狀病毒表現系統大量表現重組 G 蛋白。目前已表現全長及截去膜附著區位 (Transmembrane domain) 之 G 蛋白；其中全長 G 蛋白具有膜融合功能，與前人研究相符。應用多源抗體以西方墨點法及間接免疫螢光染色法，分析二種重組 G 蛋白之表現構型，結果顯示全長 G 蛋白具有較佳抗原性。未來將以小鼠模式評估重組 G 蛋白免疫原性，篩選標的蛋白以作為牛隻疫苗免疫試驗之基礎。

Development of a Bovine Ephemeral Fever G protein Subunit Vaccine

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Abstract

Bovine ephemeral fever (BEF) caused by bovine ephemeral fever virus (BEFV) is an arthropod-borne disease. In Taiwan, the first outbreak of BEF was in 1967, and since then it occurred every three to six years. The febrile disease causes seriously economic damage in dairy and grazing industries through reduced milk production and raising cull rate. Currently available killed vaccines produced by cell culture could not gain high virus titers that caused vaccines cost expensive. According to former studies, the glycoprotein G (G protein) of BEFV possessed excellent immunogenicity and elicited neutralizing antibodies against BEFV. Furthermore, the recombinant G protein produced by baculovirus expression vector system (BEVS) retained its original antigenicity. Aim of our study is to produce efficacious and cost effective BEFV G protein subunit vaccine by baculovirus system. The nucleic acid fragment of G protein was amplified from a field isolated BEFV strain in Taiwan in 2007, and a large scale of recombinant G protein will be produced by means of baculovirus expression system. G proteins in the form of full length and transmembrane domain deleted both have been expressed. The G protein of full length exhibited fusogenic activities as the review study reported, and it reacted to polyclonal antiserum more well in western blots analysis and immunofluorescence assay than the other one. In the future study, the immunogenicity of recombinant G proteins will be characterized in mouse model and the most potential one will be selected for vaccination studies in cattle.