An investigation of the association between herpesviruses and respiratory disease in racehorses in Western Australia

This thesis is presented for the degree of Doctor of Philosophy at Murdoch University

by

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I declare that this thesis is my own account of my research and contains work which has not previously been submitted for a degree at any tertiary education institution

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Abstract

Respiratory disease is an important cause of wastage in the Australian horse racing industry and viruses are frequently suspected as aetiological agents of respiratory disease or poor performance by clinicians and trainers but confirmation is seldom attempted. This thesis deals with the potential role of equine herpesvirus types 1, 2, 4 and 5 in upper respiratory disease and poor performance in horses in Western Australia.

The methodology selected for the identification of equine herpesviruses in tissues of horses was polymerase chain reaction (PCR) and therefore individual PCR assays were developed for the detection of each herpesvirus, and then a nested multiplex PCR was developed to detect all four viruses. There was good correlation between the multiplex PCR for the detection of EHV and the detection of virus by isolation in cell culture, although a combination of the 2 techniques provided greater sensitivity than either technique alone. The multiplex PCR described appeared equally sensitive as specific PCR assays using a single set of primers for each individual virus but reduced labour and reagent costs.

As latency is a well recognised phenomenon in the equine herpesviruses and the horse is subjected to a number of stresses which might induce reactivation of latent infections, it was hypothesised that there would be a background level of replication of the equine herpesviruses in clinically normal horses. Nasal swabs and peripheral blood leukocytes (PBL) were obtained from 282 clinical normal horses and examined for EHV. The results clearly demonstrated the widespread occurrence of EHV in the clinically healthy horses. The rate of detection of different types of EHV varied, as did the prevalence in young and adult horses. The most common EHV detected was EHV5: in 83.2% of 131 of horses <2 years of age; in 40% of horses >2 years of age.

A prospective clinical study was conducted whereby respiratory tract samples and PBL from adult horses with respiratory disease and/or poor performance were

examined for equine herpesviruses; the aim was to determine a possible association between equine herpesvirus infection and respiratory disease and/or poor performance. The relative incidence of factors identified in the history, signalment, physical and laboratory evaluation of horses in the study population was compared between horses from which EHV was identified in respiratory samples and horses negative for equine herpesvirus. The results indicated that equine herpesviruses were important causes of respiratory disease in the study population, and that haematological and cytological data were a poor indicator of such equine herpesvirus infection.

The occurrence of equine herpesvirus in nasal swabs and PBL of weaned or unweaned foals from Thoroughbred breeding establishments was determined and provided data on the occurrence of EHV in association with respiratory disease. EHV5 was detected in nasal swabs and/or PBL at a high prevalence rate in healthy foals and yearling horses but its occurrence was not associated with clinical signs of respiratory disease. In contrast, EHV2 was detected more commonly in nasal swabs and/or PBL from foals with respiratory disease than in similar samples from healthy horses. Experimental infection of 8 horses with EHV2 was attempted and induced clinical signs of respiratory disease, but less severe than observed in the epidemiological studies. The results suggested that EHV2 is associated with mild upper respiratory tract infection in young horses.

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