

**IDENTIFICATION OF PEPTIDES FROM A PHAGE DISPLAY LIBRARY  
FOR DIFFERENTIATING NEWCASTLE DISEASE VIRUS PATHOTYPES**

**By**

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**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,  
in Fulfilment of the Requirements for the Degree of Master of Science**

**March 2006**

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

## IDENTIFICATION OF PEPTIDES FROM A PHAGE DISPLAY LIBRARY FOR DIFFERENTIATING NEWCASTLE DISEASE VIRUS PATHOTYPES

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**March 2006**

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**Chairman: Associate Professor Tan Wen Siang, PhD**

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Newcastle disease virus (NDV) strains can be classified as virulent or avirulent based upon the severity of the disease. Biopanning experiments were performed using a disulfide constrained phage display heptapeptide library against three pathotypes of NDV strains: velogenic (highly virulent), mesogenic (moderately virulent) and lentogenic (avirulent). A phage clone bearing the peptide sequence SWGEYDM was isolated and shown to be able to differentiate virulent from avirulent NDV strains. This phage clone was employed as a capturing reagent in a dot-blot assay to detect virulent NDV strains in allantoic fluid of embryonated chicken eggs. The performance of the dot blot assay was compared with that of mean death time (MDT) in embryonated chicken eggs and the reverse transcription-polymerase chain reaction (RT-PCR) methods. The dot blot was shown to be specific for virulent NDV strains and able to differentiate between the virulent and avirulent NDV strains.

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Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia  
sebagai memenuhi keperluan untuk ijazah Master Sains

**PENGENALPASTIAN PEPTIDA DARI PERPUSTAKAAN PAMERAN FAJ  
UNTUK PEMBEZAAN PATOTAIP VIRUS PENYAKIT NEWCASTLE**

Oleh

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Strain virus penyakit Newcastle (NDV) boleh diklasifikasikan sebagai virulen dan avirulen berdasarkan tahap keterukan penyakit. Biopendulangan telah dijalankan dengan menggunakan perpustakaan peptida pameran faj yang terbatas secara disulfida terhadap tiga patotaip strain NDV: velogenik (amat virulen), mesogenik (sederhana virulen) dan lentogenik (avirulen). Klon faj yang membawa jujukan peptida SWGEYDM yang dipencilkan dari biopendulangan telah dibuktikan dapat membezakan strain NDV virulen daripada avirulen. Klon faj tersebut telah digunakan sebagai reagen penangkapan di dalam suatu asai pemblotan titik untuk mengesan strain NDV virulen di dalam cecair alantoik telur ayam berembrio. Prestasi pemblotan titik telah dibandingkan dengan min masa kematian (MDT) telur ayam berembrio dan transkripsi berbalik-tindak balas rantai polimerase (RT-PCR). Pemblotan titik ini telah dibuktikan spesifik terhadap NDV virulen dan dapat membezakan strain NDV virulen and avirulen.

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I certify that an Examination Committee has met on 29 March 2006 to conduct the final examination of Lee Thong Chuan on his Master of Science thesis entitled “Identification of Peptides from a Phage Display Library for Differentiating Newcastle Disease Virus Pathotypes” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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## DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

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