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

By

LEE THONG CHUAN

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

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March 2006

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Faculty: **Biotechnology and Biomolecular Sciences**

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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ACKNOWLEDGEMENTS

I would like to thank all those who have taken upon themselves, as a personal goal or as a matter of duty, to provide nourishment and guidance academically or otherwise, that ultimately has led to this thesis.

Associate Professor Dr. Tan Wen Siang who, through his own example, has inspired and directed me to achieve the highest level of science possible, and who has provided me with the tools for successful competition in science.

Professor Datin Dr. Khatijah Yusoff who, has inspired me to be creative and innovative, provided me with the critical and enlightening comments.

Associate Professor Dr. Sheila Nathan who, has given an excellent guidance and supervision, and provided me with a concrete and informational advises in this study.

Thank you for all of your kindness and patience during the duration of the work and thesis writing.

Vun Khai Yan, who has helped me in the nucleotide sequencing of partial F gene and mean death time.

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Dr. Kho Chiew Ling, who has been supportive and provided me advises in Newcastle disease virus and molecular biology techniques.

Dr. Majid Eshagi, a postdoctoral fellow, who has been a good friend and mentor in our group, and who has kindly trained me to be a skilled scientist.

Dr. Priadarishni Ramanujam, who has shared with me the knowledge of phage display.

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Dr. Abdul Rahman Omar, who has provides some of the viruses used in this study.

I would also like to thank to all members if the virology group for their sharing of scientific knowledge and for the productive working conditions, Lee Lian Kiat, Chia Suet Lin, Firoozeh Jahansari, Iswan Budi, Lalita Ambigai, Mokrish, Ong Swee Tin, Raha Raus, Shaherny Zaid, Siti Salwa Hasmoni, Mohamed Rajik, Tan Geok Hun, Tang Kah Fai, Tang Kie Hie, Taznim Begam, and Zulkefley Othman.

Personal thanks to Noor Suhana Adzahar, and my family.

I duly acknowledge the financial support, IRPA grant 01-02-04-003-BTK/ER/006 for supporting this study and the National Science Foundation (NSF) scholarship from the Ministry of Science, Technology and Innovation, Malaysia (MOSTI).

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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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