

**SPECIFIC INTERACTIONS BETWEEN NIPAH VIRUS NUCLEOCAPSID (N)
PROTEIN AND PHOSPHO-(P) PROTEIN USING THE YEAST TWO-HYBRID
SYSTEM**

By

TAZNIM BEGAM BINTI MOHD MOHIDIN

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

February 2006

Dedicated to my parents, sister and brother

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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Chairman: Professor Datin Khatijah Mohd Yusoff, PhD

Faculty : Biotechnology and Biomolecular Sciences

Nipah virus (NiV) which is a member of a new genus, *Henipavirus*, in the family *Paramyxoviridae*, encodes an unusually large phospho- (P) protein compared to other known paramyxoviruses. In this study, the region(s) involved in the interaction between this exceptionally large P protein with its nucleocapsid (N) protein was investigated *in vivo* using the yeast two-hybrid system. Deletion analysis was used to map the domain(s) of both the N and P proteins involved in N-P and P-N interactions. Mapping of the domains of N protein involved in its interaction with the P protein revealed that the C-terminal 30 amino acids (423-452 residues) are crucial for N-P interaction. However, mapping of the domains of P protein involved in the P-N association demonstrated that both the C-terminal 63 amino acids (470-532 residues) and the immediate N-terminal 62 amino acids (1-62 residues) simultaneously play a major role. Comparison of these findings with other studies indicates that paramyxoviruses are different in terms of

interaction domains(s) between these two essential viral proteins involved in genome replication.

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

TINDAK BALAS SPESIFIK DI ANTARA PROTEIN NUKLEOKAPSID (N) DAN PROTEIN FOSFO (P) NIPAH VIRUS MENGGUNAKAN SISTEM DWI-HIBRID YIS

Oleh

TAZNIM BEGAM BINTI MOHD MOHIDIN

Februari 2006

Pengerusi: Profesor Datin Khatijah Mohd Yusoff, PhD

Fakulti : Bioteknologi dan Sains Biomolekul

Nipah virus (NiV) yang merupakan ahli *Henipavirus* iaitu satu genus baru dalam famili *Paramyxoviridae*, mengkodkan suatu protein fosfo (P) yang besar jika dibandingkan dengan paramyxovirus lain yang diketahui. Dalam kajian ini, bahagian yang terlibat dalam tindak balas di antara protein P ini dengan protein nukleokapsid (N) telah dikaji secara *in vivo* dengan menggunakan sistem dwi-hibrid yis. Analisis pemotongan telah digunakan untuk memetakan domain yang terdapat pada kedua-dua protein N dan P yang terlibat dalam tindak balas N-P dan P-N. Pemetaan domain protein N yang terlibat dalam tindak balas dengan protein P menunjukkan bahawa 30 asid amino pada terminal-C (residu 423-452) adalah penting untuk tindak balas N-P. Walau bagaimanapun, pemetaan domain protein P yang terlibat dalam penggabungan P-N menunjukkan bahawa kedua-dua 63 asid amino pada terminal-C (residu 470-532) dan 62 asid amino pada terminal-N (residu 1-62) memainkan peranan yang sama penting. Perbandingan antara penemuan kajian ini dengan kajian-kajian yang lepas menunjukkan bahawa

paramyxovirus adalah berbeza dari segi bahagian-bahagian protein N dan protein P yang bertindak balas di antara satu sama lain dalam proses replikasi genom.

ACKNOWLEDGEMENT

Thankfulness and glories to Allah the Almighty for His blessings.

First and foremost, I would like to extend my greatest and deepest gratitude to my supervisor, Prof. Datin. Dr. Khatijah Mohd Yusoff for her valuable guidance and endless encouragement throughout the completion of this research. My warmest gratitude also goes to Assoc. Prof. Dr. Raha Abdul Rahim for her supervision, advice, and constructive suggestions.

I would also like to express my sincere appreciation to Miss Firoozeh Jahanshiri for her kind assistance, supervision, knowledge and review of my work during the period of this study. Her companionship and encouragement in making this research a successful one for me is greatly remembered.

I would like to take this opportunity to thank all members, postgraduates as well as the undergraduates of Virology Lab (134 and 143) for their kind assistance and for sharing their experiences and knowledge, directly or indirectly. My deepest thanks to Siti Salwa, Kah Fai, Andrew, Lalita, and Geok Hun for their invaluable help and encouragement as well as making my time in the laboratory an enjoyable and wonderful one. I thank Dr. Majid Eshagi, Zulkefley, Shaherny, Raha, Swee Tin, Thong Chuan, Suhana, Rafidah, Nazrien, Mokrish and Budy for their support.

My most sincere acknowledgement to Miss Surini who had been the greatest companion one could ever have. Her motivations as well as undying love, support and trust through thick and thin are greatly appreciated. Not forgetting my fellow coursemates from other laboratories especially Natarajan, Fazuriana, and Sim for their love and encouragement. I owe them a great deal.

Last but not least, I would like to recognize my parents, sister and brother for their unconditional sacrifices, love and undying support. Thank you for believing in me and for making me the person I am today.

Finally, I would like to thank the Ministry of Science, Technology and Innovation of Malaysia for providing me the National Science Fellowship.

I certify that an Examination Committee has met on 7th February 2006 to conduct the final examination of Taznim Begam binti Mohd Mohidin on her Master of Science thesis entitled “Specific Interactions Between Nipah Virus Nucleocapsid (N) Protein and Phospho-(P) Protein Using the Yeast Two-hybrid System” 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:

Janna Ong Abdullah @ Ong Weoi Choo, PhD

Lecturer
Faculty of Biotechnology and Biomolecular Sciences
Universiti Putra Malaysia
(Chairman)

Mariana Nor Shamsudin, PhD

Associate Professor
Faculty of Medicine and Health Science
Universiti Putra Malaysia
(Internal Examiner)

Shuhaimi Mustafa, PhD

Lecturer
Faculty of Biotechnology and Biomolecular Sciences
Universiti Putra Malaysia
(Internal Examiner)

Mohd. Nazalan Mohd. Najimudin, PhD

Associate Professor
Name of faculty/institute
Universiti Sains Malaysia
(External Examiner)

HASANAH MOHD. GHAZALI, PhD

Professor/Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date :

This thesis submitted to the Senate of Universiti Putra Malaysia has been accepted as fulfilment of the requirements for the degree of Master of Science. The members of the Supervisory Committee are as follows:

Khatijah Mohd Yusoff, PhD

Professor
Faculty of Biotechnology and Biomolecular Sciences
Universiti Putra Malaysia
(Chairman)

Raha Abdul Rahim, PhD

Associate Professor
Faculty of Biotechnology and Biomolecular Sciences
Universiti Putra Malaysia
(Member)

AINI IDERIS, PhD

Professor/Dean
School of Graduate Studies
Universiti Putra Malaysia

Date :

DECLARATION

I hereby declare that the thesis is based on my original work except for quotation 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.

TAZNIM BEGAM BINTI MOHD MOHIDIN

Date:

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