

UNIVERSITI TEKNOLOGI MARA

**PROTEIN EXPRESSIONS OF PDK1,
XIAP, S6K1, MEK1/2 AND ERK1/2
WHICH FUNCTION IN GROWTH,
DIFFERENTIATION AND
SURVIVAL OF NON-VITRIFIED
AND VITRIFIED MURINE
PREIMPLANTATION EMBRYOS**

MOHD FAZIRUL BIN MUSTAFA

Thesis submitted in fulfilment
of the requirements for the degree of
Master of Science

Faculty of Medicine

May 2016

CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 14th January 2016 to conduct the final examination of Mohd Fazirul Bin Mustafa on his Master of Science thesis entitled “Protein expressions of PDK1, XIAP, S6K1, MEK1/2 and ERK1/2 which function in growth, differentiation and survival of non-vitrified and vitrified murine preimplantation embryos” in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiners recommends that the student be awarded the relevant degree. The panel of Examiners was as follows:

Azian Abdul Latiff, PhD
Professor
Faculty of Medicine
Universiti Teknologi MARA
(Chairman)

Khatiza Haida Ali
Professor
Faculty of Medicine
Universiti Teknologi MARA
(Internal Examiner)


Mahanem Mat Noor
Associate Professor
Faculty of Science and Technology
Universiti Kebangsaan Malaysia
(External Examiner)

SITI HALIJJAH SHARIFF, PhD
Associate Professor
Dean
Institute of Graduates Studies
Universiti Teknologi MARA
Date: 25th April, 2016

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student	:	Mohd Fazirul Bin Mustafa
Student I.D. No.	:	2010622756
Programme	:	Master of Science (MD780)
Faculty	:	Medicine
Thesis Title	:	Protein expressions of PDK1, XIAP, S6K1, MEK1/2 and ERK1/2 which function in growth, differentiation and survival of non-vitrified and vitrified murine preimplantation embryos
Signature of Student	:	
Date	:	May 2016

ABSTRACT

Embryo development is closely related to the proteins which are differentially expressed in each developmental stage. Proteins are crucial in regulating biological processes such as growth development, migration, proliferation, differentiation, and survivability of preimplantation embryos. Therefore, the objectives of this study are to analyse the expression of PDK1, XIAP, S6K1, MEK1/2 and ERK1/2 proteins at the 2-cell and blastocyst stages and investigate the effect of vitrification on the expression of these proteins. Murine oocytes were superovulated with 10 i.u PMSG, followed 48 hours later with 10 i.u hCG. Vitrification of the embryos at the blastocyst stage was carried out using ESF40 as a cryoprotectant. Proteins expression was observed by Western blot analysis. Experiments were carried out in triplicates. Results showed that five selected proteins; PDK1, XIAP, S6K1, MEK1/2 and ERK1/2 were predominantly expressed in embryo cytoplasm and exhibited notable involvement of PI3K and MAPK at the 2-cell stage. Vitrified blastocysts showed a decrease in the expression of ERK1/2, S6K1 and XIAP compared to non-vitrified blastocyst. This study showed that the expression of these proteins in embryos was developmental stage dependent. Each stage of development is responsible for specific biological processes in cell growth. Vitrification was shown to modulate the protein expression involved in embryonic developmental competence, associated with the activation of the apoptotic pathway through regulation of the expressions of PDK1, XIAP, S6K1, MEK1/2 and ERK1/2.

ACKNOWLEDGEMENT

I would like to thank my supervisor, Assoc. Prof Dr Nor Ashikin binti Mohamed Noor Khan for her tutelage and support in the duration of this study. I also would like to thank my co-supervisor Dr Sharaniza Ab Rahim and Assoc Prof Dr. Gabriele Froemming for their assistance. I thank my embryo group members, Mr Razif Dasiman, Ms Norhazlin Binti Mat Jusoh and Mrs Wan Hafizah Binti Mat Jusoh. I would like to thank the Institute of Medical Molecular Biotechnology (IMMB) and Laboratory Animal Care Unit (LACU) of Faculty of Medicine, Universiti Teknologi MARA (UiTM) for providing the support to conduct the experiments and complete my studies. I am also very grateful to my wife, Mrs Zaiharina Binti Mohamad Zamberi and our kids, Ms Zara Firzanah Binti Mohd Fazirul and Mr Zafran Firdaus Bin Mohd Fazirul for their strong sense of belief in me and their never ending support and encouragement and inspirational advice.