

**THE EFFECTS OF ESTROGEN DEPRIVATION ON
HIPPOCAMPAL SYNAPTIC PLASTICITY AND
COGNITIVE FUNCTION IN OBESE-INSULIN
RESISTANT FEMALE RATS**



DUANGKAMOL MANTOR

**MASTER OF SCIENCE
IN PHYSIOLOGY**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved

**GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
DECEMBER 2017**

**THE EFFECTS OF ESTROGEN DEPRIVATION ON
HIPPOCAMPAL SYNAPTIC PLASTICITY AND
COGNITIVE FUNCTION IN OBESE-INSULIN
RESISTANT FEMALE RATS**



DUANGKAMOL MANTOR

**MASTER OF SCIENCE
IN PHYSIOLOGY**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved

**GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
DECEMBER 2017**

**THE EFFECTS OF ESTROGEN DEPRIVATION ON
HIPPOCAMPAL SYNAPTIC PLASTICITY AND
COGNITIVE FUNCTION IN OBESE-INSULIN
RESISTANT FEMALE RATS**

DUANGKAMOL MANTOR

**A THESIS SUBMITTED TO CHIANG MAI UNIVERSITY IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE
IN PHYSIOLOGY**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved

**GRADUATE SCHOOL, CHIANG MAI UNIVERSITY
DECEMBER 2017**

**THE EFFECTS OF ESTROGEN DEPRIVATION ON
HIPPOCAMPAL SYNAPTIC PLASTICITY AND
COGNITIVE FUNCTION IN OBESE-INSULIN
RESISTANT FEMALE RATS**

DUANGKAMOL MANTOR

THIS THESIS HAS BEEN APPROVED TO BE A PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE
IN PHYSIOLOGY

Examination Committee:

.....Chairman

(Prof. Dr. Nateetip Krishnamra)

.....Member

(Asst. Prof. Dr. Wasana Pratchayasakul)

.....Member

(Prof. Dr. Nipon Chattipakorn, M.D.)

.....Member

(Prof. Dr. Siriporn Chattipakorn)

.....Member

(Dr. Siripong Palee)

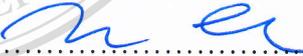
.....Member

(Dr. Nattayaporn Apaijai)

Advisory Committee:

.....Advisor

(Asst. Prof. Dr. Wasana Pratchayasakul)

.....Co-advisor

(Prof. Dr. Nipon Chattipakorn, M.D.)

.....Co-advisor

(Prof. Dr. Siriporn Chattipakorn)

.....Co-advisor

(Dr. Siripong Palee)

15 December 2017

Copyright © by Chiang Mai University

To

Dear parents



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved

ACKNOWLEDGEMENT

First of all, I would like to express my deepest gratitude to my advisor, Asst. Prof. Dr. Wasana Pratchayasakul, for all her meticulous guidance, continuous support and encouragement throughout the study. I also wish to express my sincerest thanks to my co-advisor, Prof. Dr. Siriporn Chattipakorn, Prof. Dr. Nipon Chattipakorn and Dr. Siripong Palee for sharing their precious time, attention, expert opinion and technical support. I would like to offer my heartfelt thanks to all of my teachers, who provided me from basic education until higher education.

I owe deep gratitude to Prof. Dr. Nateetip Krishnamra and Dr. Nattayaporn Apaijai, the examination committee, for useful suggestions and comments that help to improve my thesis. I am very thankful to all instructors and staffs in the Department of Physiology, Faculty of Medicine, Chiang Mai University who provided me a basic and advanced knowledge in physiology.

I owe special thanks to all staffs and members at the Cardiac Electrophysiology Research and Training center (CERT), Department of Physiology, Faculty of Medicine, Chiang Mai University, who seem to be my research family, for all their helpfulness that enables me to carry out my study.

Finally, I wish to express my deepest appreciation to my family for their infinite love, inspiration, generous standing and all of support throughout my life. Unforgettable, special thanks to all my friends for providing precious friendship, and entertainment during my study.

Duangkamol Mantor