

**CHROMOSOME ABERRATIONS AND DNA DAMAGE IN  
PETROL PUMP WORKERS IN CHIANG MAI**

The seal of Chiang Mai University is a large, faint watermark in the background. It is circular and contains the Thai text 'มหาวิทยาลัยเชียงใหม่' at the top and 'CHIANG MAI UNIVERSITY 1964' at the bottom. In the center is an elephant with its trunk raised, holding a flame. The author's name 'AIDA BOONSERM' is printed in bold black text over the elephant's trunk.

**AIDA BOONSERM**

**MASTER OF SCIENCE  
IN ANATOMY**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright © by Chiang Mai University

All rights reserved  
**GRADUATE SCHOOL  
CHIANG MAI UNIVERSITY**

**MARCH 2006**

**ISBN 974-9890-17-5**

**CHROMOSOME ABERRATIONS AND DNA DAMAGE IN  
PETROL PUMP WORKERS IN CHIANG MAI**

**AIDA BOONSERM**

**A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN  
PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF  
MASTER OF SCIENCE  
IN ANATOMY**

**ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่**

**Copyright © by Chiang Mai University**

**All rights reserved**

**GRADUATE SCHOOL**

**CHIANG MAI UNIVERSITY**

**MARCH 2006**

**ISBN 974-9890-17-5**

**CHROMOSOME ABERRATIONS AND DNA DAMAGE IN  
PETROL PUMP WORKERS IN CHIANG MAI**

**AIDA BOONSERM**

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

**EXAMINING COMMITTEE**

*Umnat Mevatee*

.....  
Assoc. Prof. Dr. Umnat Mevatee

CHAIRPERSON

*W. Ruangyuttikarn*

.....  
Assoc. Prof. Dr. Werawan Ruangyuttikarn

MEMBER

*Y. Smitasiri*

.....  
Assoc. Prof. Yuthana Smitasiri

MEMBER

14 March 2006

© Copyright by Chiang Mai University

## ACKNOWLEDGMENT

My thesis could have been a success with the cooperation of the following institutions and persons. I would like to express my sincere gratitude and appreciation to Assoc. Prof. Dr. Umnat Mevatee, my thesis advisor, for his assistance, guidance, and suggestions throughout my research. Without his support and valuable recommendations this thesis would not have been successful.

I am extremely grateful to my examining committee, Assoc. Prof. Dr. Werawan Ruangyuttikarn and Assoc. Prof. Yuthana Smitasiri for kindly providing comments and valuable suggestions.

I also appreciated receiving the knowledge and guidance from the staffs in the Department of Anatomy, Faculty of Medicine, Chiang Mai University. I wish to thank Mrs. Chaniporn Puaninta for her guidance and providing me methodology of the comet assay. I would like also to express to all members of the Human Genetics Laboratory for their assistance during this study. Special thanks go to Miss Nonglak Boonma, Miss Siriporn Nunta, Miss Khemphith Vongphachanh, and Mr. Sarun Kunwittaya for assisting me in the collection of blood samples.

I would like to extend my gracious thanks to Mr. Virachai Polsiri, Application Specialist of Rushmore for his kindness guidance and teaching on comet measurement using Meta System Model “Comet Imager”.

A very special thanks for all volunteers petrol pump workers from various gasoline stations in Chiang Mai and students from Faculty of Medicine, Chiang Mai University for enrolled and supported to this project.

Finally, I would like to express my deepest appreciation to my dear parents and members of my family for their love, encouragement and support throughout my life and thanks to my nice friends and Mr. Lerson Moohammadaree for their encouragement. Without all these people above, this thesis would not be accomplished.

Aida Boonserm