UNIVERSITI TEKNOLOGI MARA

OPTIMIZATION OF REAL-TIME PCR METHOD TO DETECT GENE DUPLICATION OF *CYP2D6*

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2012

ACKNOWLEDGEMENTS

Thanks to Allah SWT, with His willing giving me the opportunity to complete this Final Year Project entitled Optimization of Real-time PCR to Detect Gene Duplication of *CYP2D6*. The special thank goes to my helpful supervisor, Miss Fazleen Haslinda Binti Mohd Hatta for her supervision and support. Her guidance has truly helped the progression and smoothness of the study. The cooperation is much indeed appreciated.

I also would like to express my gratitude to Prof Mohd Zaki Salleh, Head of PROMISE, Assoc. Prof Dr. Teh Lay Kek and all lecturers for their interest, permission and encouragement. Furthermore, great deals of appreciation goes to the post graduate students, lab assistants and staffs of the Pharmacogenomics Centre (PROMISE). It is a pleasure to express my thanks for their cooperation, guidance and kindness that help me from time to time during the progression of this study.

Finally, my grateful thanks also go to my parent, siblings and friends for their understanding, moral support and lifelong love that bring me up and enabled me to complete this work.

TABLE OF CONTENTS

		Page
TITLE PAGE		
APPROVAL FORM		
ACKNOWLEDGEMENT		ii
TABLE OF CONTENTS		iii
LIST OF TABLES		vi
LIST OF FIGURES		viii
LIST OF PLATES		ix
LIST OF ABBREVIATIONS		x
ABSTRACT		xii
CHAPTER ONE (INTRODUCTION)		
1.1	Background of study	1
1.2	Statement of problem	3
1.3	Significance of study	4
1.4	Objective of study	5
1.5	Hypothesis	5
CHAPTER TWO (LITERATURE REVIEW)		
2.1	Introduction	6
2.2	General aspect	
	2.2.1 *CYP2D6*	6
	2.2.2 Copy number variation (CNV)	7

2.2.3 Gene duplication 8

2.3 *CYP2D6* gene duplication

2.3.1 Effect of gene duplication 9

2.4 *CYP2D6* and tamoxifen 10

2.5 Detection of *CYP2D6* gene duplication 11

2.6 Real-time polymerase chain reaction 11

2.6.1 SYBR green 12

2.6.2 Application of real-time PCR 13

2.6.3 Optimization of real-time PCR 13

2.6.4 Optimization of annealing temperature (Ta) 14

CHAPTER THREE (MATERIALS and METHOD)

3.1 Materials 15

3.2 Methodology

3.2.1 Sample Collection 19

3.2.2 Primer Design 19

3.2.3 Quantitation of DNA Extraction 19

3.2.4 Polymerase Chain Reaction (PCR) cycle and Master Mix Preparation

3.2.4.1 PCR for Temperature Gradient Establishment 20

3.2.4.2 PCR (Detection of *CYP2D6* Gene Duplication) 22

3.2.5 Agarose Gel Electrophoresis 24

ABSTRACT

Cytochrome P450 2D6 is a polypeptide of 497 amino acids which extensively involved in metabolism of wide range of drugs such tamoxifen, chlorpheniramine, codeine and many more. The gene encodes for this enzyme resides on chromosome 22q13.1 near two neighboring pseudogenes; *CYP2D7* and *CYP2D8*. In person carrying *CYP2D6* gene duplication, this enzyme will be expressed more thus increase the toxicity of pro-drugs and reduce the effectiveness of active drugs. The purpose of this study is to optimize the real-time PCR assay in detection of the gene duplication of *CYP2D6*. Real-time PCR was used due to its advantages over traditional PCR. The DNA samples extracted from blood and the primers that have already been prepared were used. Temperature gradient was established using traditional PCR in order to obtain the optimal annealing temperature to be used in real-time PCR assay. The Ct values of samples were compared. Detection of gene duplication of *CYP2D6* using traditional PCR was used to confirmed the presence of gene duplication of *CYP2D6* in real-time PCR assay. It can be concluded that the DNA sample consisting gene duplication of *CYP2D6* was successfully be detected using optimized real-time PCR assay. However, further study need to be done to obtain amplification reaction with greater efficiency and it should cover wider parameters of optimization. Once this method has been fully optimized, well-designed and developed, the detection of gene duplication of *CYP2D6* will be much easier. Patient response to the pharmacotherapy can be determined to improve the effectiveness as well as reducing the cost and duration of treatment.