UNIVERSITI TEKNOLOGI MARA

DEVELOPMENT OF A PCR METHOD TO DETECT POLYMORPHISM OF ANGIOTENSIN CONVERTING ENZYME

NURUL FAZLEEN BINTI ABDUL MALIK

Dissertation submitted in partial fulfillment of the requirement for the degree of Bachelor of Pharmacy (Hons)

Faculty of Pharmacy

2013

ACKNOWLEDGEMENT

In the name of Allah, the most Beneficent, the most Merciful, Salam to our prophet Muhammad S.A.W. First and foremost, I would like to express my gratefulness to Allah S.W.T that with grace, this study was completed on time. I take this opportunity to express my profound gratitude and earnest appreciation to my supervisor Prof Dr. Teh Lay Kek, for her interest, valuable ideas, and advices as well as for encouraging supervision during the course of this work.

Special thanks are dedicated to the staff of Pharmacogenomics Centre (PROMISE), postgraduate students and my entire lab mate for their cooperation and kindness to guide and teach me in all aspect during the course of works.

Last but not least, I convey my thanks to my parents and siblings for their understanding and supports in almost everything I have done. In addition, I also want to express a deep sense of gratitude to Faculty of Pharmacy, UiTM and any person or organisation, direct, or indirectly contributed to this research.

TABLE OF CONTENTS

ABSTRACT

Angiotensin converting enzyme (ACE) is an enzyme responsible for the conversion of angiotensin I to angiotensin II and degradation of bradykinin. Polymorphism of ACE means that there is variation in the nucleotide sequence of ACE gene due to insertion (I) or deletion (D). There are several types of polymorphism of ACE, in which it may give different responses whether by enhancing or reducing the efficiency of ACE inhibitor. The aim of this study is to develop a PCR method to detect polymorphism of ACE gene. The primer were designed according to the gene and followed by reconstitution of primer working stock. DNA sensitivity was performed in order to detect the lowest concentration of DNA template that can be used for PCR method. Besides that, different DNA of patient was used in order to detect polymorphism of ACE by using this PCR method. Based on the result of this study, it can be concluded that I/D polymorphism of ACE gene was not successfully amplified by using the PCR. It is suggested that for next studies to used Restriction Fragment Length Polymorphism (RFLP) method for more accurate results.

CHAPTER 1

INTRODUCTION

1.0 Background of study

Angiotensin converting enzyme (ACE) is an important component of the renin-angiotensin aldosterone system (RAAS). ACE is an enzyme that is widely distributed on the surface of endothelial and epithelial cells (Tabatabaei *et al.*, 2006). ACE is responsible for the conversion of angiotensin I to angiotensin II (potent vasoconstrictor) and degrade bradykinin (potent vasodilator) (Seckin *et al.*, 2006). A gene polymorphism is an allele with a certain variation within a population (Ozen *et al.*, 1999). Polymorphism of ACE is due to the insertion (I) or deletion (D) in the nucleotide sequence of ACE's gene (Seckin *et al.*, 2006). ACE inhibitors are commonly used to decrease the blood pressure in hypertensive patient and to reduce the work load of the heart in patients with cardiac failure (Offermanns & Rosenthal, 2008). The ACE inhibitors are drug that inhibit the ACE activity. ACE inhibitor administration will helps to protect the heart from arrhythmias and improve the local blood flow and the metabolic state of the heart (Offermanns & Rosenthal, 2008).