UNIVERSITI TEKNOLOGI MARA

DETECTION OF MET GENE COPY NUMBER IN HEPG2 LIVER CANCER CELL LINE BY USING REAL-TIME POLYMERASE CHAIN REACTION (PCR)

NURUL SHAHIRA BT ROSLAN

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ABSTRACT

MET proto-oncogene encodes for MET receptor and the activation of this receptor by the binding of its ligand which is hepatocyte growth factor (HGF) causes signal transduction that's eventually lead to further signalling. The activation of MET receptor involves cell proliferation, cell migration, and cell invasion. Uncontrolled activation of MET may elicit unwanted effects such as tumorigenesis, invasion, and metastasis in solid tumor. MET gene copy number might one of the indicative to the pathogenesis of cancer and also it can help in the prognosis of certain cancers. Hepatocellular carcinoma cancer (HCC) is the most frequent diagnosed liver cancer. This study will discuss on the detection of MET gene copy number in HCC by using HEPG2 liver cancer cell line in comparison to normal cell. The type of PCR used in this study is real-time PCR and the method to analyze the data from the real-time PCR is relative quantification instead of absolute quantification. Relative quantification presented the result in fold change. The method to determine the expression ratio is delta delta Ct method. The result shows that the MET gene copy number is upregulated or increase in HEPG2 liver cancer cell line compared to normal cell. This is because the expression ratio of MET gene copy number in normal cell to HEPG2 increased by 6338.83 fold. Based on this result, we can conclude that in tumorous cell the MET gene copy number is higher compared to in normal cell. Thus, MET gene copy number is considered as being the pathogenesis of HCC.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Cancer has become prominent causes of death throughout the world. It affected all ages no matter how old are they. A study conducted by Jemal *et al.* (2011) shows the number of cancer cases is 12.7 million and accounted death is 7.6 million have occurred worldwide. Siegel *et al.* (2015) stated that cancer is one of the leading cause of death in United States and currently in second place behind heart diseases. Siegel *et al.* (2015) also mention that cancer might be able to surpass heart diseases in term of causing death. In Malaysia, it is estimated that the annual incidence of cancer is 30 000 while the prevalence is estimated to be approximately 90 000 (Lim, 2002). Lim (2002) also stated that with the increase of age, the incidence of cancer is expected to keep on increasing in near future. Based on the survey conducted, Lim (2002) mention that lung, nasopharynx, stomach, urinary bladder, rectum, non-Hodgkin's lymphoma, larynx, liver, colon, and esophagus were the top ten leading cancer among males while for females cervic, breast, ovary, lung, nasopharynx, esophagus, thyroid, colon, rectum, and non-Hodgkin's lymphoma.

This study is conducted to detect the MET gene copy number in HEPG2 liver cancer cell line, thus, focus more on liver cancer particularly hepatocellular carcinoma cancer (HCC). Liver cancer rank in second in term of causing death while in term of diagnosed cancer, it is in fifth place in males worldwide. However, in females, liver cancer is in sixth place which frequently causing death and seventh most commonly diagnosed cancer (Jemal *et al.*, 2011). Liver cancer affected men the