UNIVERSITI TEKNOLOGI MARA

APOPTOTIC ACTIVITY OF TUALANG HONEY TOWARDS MCF-7 BREAST CANCER CELL LINE

NURWAHIDA AMALIN SUHAIBI

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ABSTRACT

Incidence of breast cancer in most Asian country has increased over the past two decades. In Malaysia, breast cancer is one of the most common cancers among Malaysian females. Development of breast cancer strongly related to increased in oxidative stress that caused by imbalanced between the free radicals production and antioxidant balance. Oxidative stress caused cellular damage and lead to chronic disease like cancer. Patients who have been diagnosed with breast cancer have several options of treatments. The major elements of modern breast cancer treatment are surgery, hormonal therapy, chemotherapy and radiotherapy. Despite of all the conventional therapy, alternative treatments are also available as an adjuvant treatment with the conventional treatments like by using honey. Honey possess antimicrobial, antiviral, anti-parasitory, anti-inflammatory, anti-oxidant, anti-mutagenic and anti-tumour activity. Phenolic constituents of the Tualang honey such as flavonoids are the main compound that attribute to the functional properties of honey as antioxidant, anti-inflammatory, antibacterial, antiviral and anticancer. The phenolic and flavonoid content of Tualang honey had been tested and the result was 37.9531 g GAE/L and 30.5828 g CE/L. The MCF-7 breast cancer cell line was treated with 2.5%, 5% and 10 % of Tualang honey for 48 hours. The result showed that, among these three concentrations, MCF-7 breast cancer cell line that was treated with 10% of Tualang honey concentration showed the whole morphologic features of apoptosis which were chromatin condensation, cell shrinkage and formation of apoptotic bodies. For MCF-7 breast cancer cell line that was treated with 2.5% of Tualang honey, the apoptotic changes that had been observed was chromatin condensation while for the one that been treated with 5% were chromatin condensation and blebbing of plasma membrane.

CHAPTER 1

Introduction

1.1 Background of Study

Annually, more than 1 million women were diagnosed with breast cancer worldwide [1]. Breast cancer has become major cause of cancer death among women in most developed countries [2]. Based on Malaysia Cancer Statistic 2006, the highest cancer incidence in female was breast cancer, which contributes 29.9% of ten most frequent cancers in females [3].

Breast cancer was originated from self renewing cell called breast cancer stem cell [4]. This cell was defined as $CD44^{+}CD24^{-}$ and have higher tumorigenic potential [5]. The gene expression of $CD44^{+}CD24^{-}$ revealed that breast cancers are associated with invasion, poor prognosis and also metastasis [6]. Breast cancer can be classified into three which is invasive ductal carcinomas, invasive lobular carcinoma and also a small portion of rare type of breast cancers [5].

Oxidative stress is one of the main causes of breast cancer [7]. Oxidative stress is a condition where the free radical production and anti oxidant level that been produced by the body are imbalance. Oxidative stress can cause cellular damage leading to development of several chronic diseases like cancer, atherosclerosis and also aging.