UNIVERSITI TEKNOLOGI MARA

COMBINATION THERAPY OF *Curcuma xanthorrhiza*-ETHANOLIC EXTRACT AND CISPLATIN ON BREAST CANCER CELL LINE, MDA-MB-231

MOHAMMAD AZAM BIN RASIDI

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ABSTRACT

Breast cancer is the most common cancer in the world; it is estimated that 1.6 million of breast cancer cases with 560 thousand death. In Malaysia, it is found that 3738 new cases were reported in 2003. Cisplatin is one of the drug that being used in chemotherapy. Cisplatin belongs to platinum-based chemotherapy with mechanism of action- it acts as DNA cross-linking agent, topoisomerase inhibitors and microtubules stabilizers which interrupting the ability of cancers to divide. *Curcuma xanthorrhiza* is also known as temulawak is believed to have anti-cancer properties. Several research shown that it have the anti- cancer properties such as it has protective property towards of hepatocytes, inducing DNA fragmentation in hepatoma cells and prevention of lung metastasis.

Aim of this final year project is to assess the interaction of CX-ethanolic extract and cisplatin combination therapy on breast cancer cell line, MDA-MB-231. The interaction can be divided into three- antagonism, synergistic and additive.

Breast cancer cell line, MDA-MB-231 were cultured in mixture of DMEM, fetal bovine serum and 1% streptomycin penicillin in the condition of 37 °c and 5% CO_2. The cell then treated with various concentration of cisplatin and CX-ethanolic extract. In order to evaluate cell viability, MTT assay was being used in this study.

The results showed that cisplatin have the IC_{50} of 225.39μmol/ml while CX-ethanolic extract have IC_{50} of 833.84μg/ml. CX-ethanolic extract do have the anti-cancer properties towards breast cancer cell line, MDA-MB-231. However, when the

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Cancer is a type of disease that shows the progressive growth of cells. There are several hallmarks of cancer including proliferative signaling, able to evade growth suppressor, evade apoptosis or resisting cell death, enabling replicative immortality, induce angiogenesis, activate invasion and metastasis and genome instability (Hanahan & Weinberg, 2011). These hallmarks of cancer are important in pathophysiology of the cancer to identify the pharmacological classes of drugs that can be used to treat or control the growth of cancer cells.

Breast cancer is the most common cancer in the world; it is estimated that 1.6 million of breast cancer cases with 560 thousand death. In Malaysia, it is found that 3738 new cases were reported in 2003. This statistics make incidence rate of 46.2 per 100,000 women (Cheng Har Yip, Aishah, Taib, & Mohamed, 2006). Oestrogen plays an important role in breast cancer development. Oestrogen can become endogenous carcinogen via catechol estrogen quinones which then react with DNA to form specific depurinating estrogen-DNA adducts (Gaikwad et al., 2008). This abnormalities leads to development of the breast cancer.

Cisplatin is one of the drug that being used in chemotherapy. Cisplatin belongs to platinum-based medication which same group as docetaxel. The mechanism of action of cisplatin is that it acts on DNA cross-linking agent, topoisomerase inhibitors and microtubules stabilizers which interrupting the ability of cancers to divide (Flores-pérez