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DIFFERENTIAL CYTOTOXICITY OF ETHYL ACETATE EXTRACT OF MALAYSIAN MARINE ENDOPHYTIC FUNGUS (MBL) AGAINST HUMAN BREAST CANCER CELL LINES

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ABSTRACT

The global cancer burden is increasing. Breast cancer, in particular, accounts for more than 500,000 deaths worldwide. Current anticancer therapy, unfortunately, is often compromised by side effects and development of drug resistance. This has led to active drug discovery from natural sources like endophytes. Capitalising on the abundance of Malaysian marine endophytic fungi, the present study aimed to assess cytotoxic profiles of ethyl acetate extract of endophytic fungus MBL that originated from *Avicennia* sp. against two breast cancer cell lines, MDA468 and MCF7. The fungal culture MBL was first examined using gross observation and environmental scanning electron microscope (ESEM). The cultures were then extracted with ethyl acetate and concentrated using rotary evaporator. The resultant extract (0.01 – 100 μg/mL) was screened for its cytotoxicity against MDA468 and MCF7. SRB assay was then performed after 72 h treatment. Data generated was used to determine the IC_{50} (concentration required to inhibit 50 % cell population). The present findings found MBL to produce modest cytotoxic activity against MDA468 and MCF7 with IC_{50} at 33.5 μg/mL and 40.8 μg/mL, respectively. Its IC_{50} values were beyond the NCI cut off concentration ($IC_{50} < 20$ μg/mL) for a crude extract to be considered as cytotoxic. Besides, it was found to be at least 5.5-fold less potent than paclitaxel and tamoxifen, the positive controls. The present findings warrant further investigation in other types of cancer cell lines in the future.

CHAPTER 1

INTRODUCTION

1.1 Background of study

The global cancer burden is increasing. In 2012, there were 8.2 million cancer-related deaths and 14 million new cancer cases (National Cancer Institute, 2015). The number of new cancer cases is expected to rise to 22 million within the next two decades (National Cancer Institute, 2015). Breast cancer, in particular, accounted for more than 500,000 deaths worldwide (WHO, 2015). In Malaysia, breast cancer is the most common form of cancer affecting women (Abdul Wahid, 2012). In 2012, the age-standardised rate (ASR) of breast cancer in Malaysia was 38.7 per 100,000 (Yip et al., 2014).

Chemotherapy is the mainstay treatment for management of advanced breast cancer. Generally, this treatment uses cytotoxic drugs that kill fast-growing cells to stop the spread of cancer cells (Conway-Turner et al., 1998). The main problem with cytotoxic agents, however, is that they cannot distinguish between actively dividing normal cells and fast-growing cancer cells (Conway-Turner et al., 1998). As a result, the effectiveness of these agents is often limited by their side effects which may range from unpleasant to serious problems like alopecia, nausea, vomiting, bone marrow deterioration and heart damage (Aslam et al., 2014). Some patients may also