UNIVESITI TEKNOLOGI MARA

CYTOTOXICITY OF PACLITAXEL LOADED AND SURFACE COATED N-VINYLCAPROLACTAM NANOPARTICLES ON OESTROGEN NEGATIVE BREAST CANCER CELLS (MDA231)

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DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREEE OF BACHELOR OF PHARMACY

FACULTY OF PHARMACY

2013

ACKNOWLEDGEMENTS

First of all I want to very grateful to Almighty Allah S.W.T in giving me strength and patience to complete this thesis project as partial fulfillment of the subject research II (PHC567). This project cannot be complete without many helps of people. I want to thanks to all that support and help me especially to my supervisor, Dr Steven Lim Siong Meng that help to revised and give many suggestions to the completion of the thesis. Also thanks to my co-supervisor Associated Professor Dr. Kalavathy Ramasamy and Dr. Rakesh that also offered support and guidance on writing the thesis.

I also would like to dedicate this thanks to all Collaborative Drug Discovery Research (CDDR) teams that help a lot in sharing knowledge and give advice about cell cultures especially Mr Mohd Zaki and Mr Fareez.

Special thanks to directly involve in completion of thesis project, Miss Noor Farina binti Nazli, Miss Najihah Mohd Termizi, Siti Norabona, Siti Munerah Adnan and Maizatul Shafiqah who had offered guidance and co-operation.

I would like to also give my appreciation and thanks to all my family members for their moral supports and motivation. Also not to forget my housemates and friends that whether directly or indirectly involved prior completion of the thesis.

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ABSTRACT

Cancer refers to diseases that are characterized by uncontrolled division of cells within the body. Amongst the 200 types of cancers which have been identified, breast cancer is the most common cancer in women worldwide. Over the past decades, paclitaxel represent one of the most important anticancer agents in chemotherapy. Cancer resistance and the lack of selectivity in its action have become major problem to the therapeutic effect of paclitaxel. Thus, novel formulation of drugs is important to improve the selectivity of the drugs action againsts cancer cells. Paclitaxel exerts many side effects too. This study was aimed to improve the cytotoxic effect of conventional paclitaxel. For this purpose, this study also compared the cytotoxic effect of paclitaxel with newly formulated paclitaxel-n-vinylcaprolactam. The newly formulated paclitaxel-n-vinylcaprolactam has unique characteristics of thermosensitive and lower critical solution temperature. The antitumour effects of both paclitaxel and paclitaxel-n-vinylcaprolactam were measured by plating MDA 231 onto 96 wells plates and maintained in RPMI 1640 (media). The treatment was done after weighing and dissolving compound in DMSO. After that, SRB assay was carried out to measure the viability of cells in each well plate. For the SRB method, cancer cells were fixed with trichloroacetic acid reagents and stained with SRB dye. The Magellan software was used to read the intensity if dye in each well and dose response curve was plotted in order to determine each IC_{50} value (concentration value that inhibit 50% of cell growth). Result was analyzed by comparing potency of both formulations. The IC_{50} of paclitaxel was about 6 times more than paclitaxel-n-vinylcaprolactam. The paclitaxel alone is more potent compared to paclitaxel-n-vinylcaprolactam. Further studies should be conducted to improve the cytotoxic effect of this newly formulated drug.

CHAPTER 1

INTRODUCTION

Cancer refers to diseases that are characterized by uncontrolled division of cells within certain part of the body. Amongst the 200 types of cancers which have been identified, breast cancer is the most common cancer in women worldwide. There were an estimated 12.7 million cancer cases around the world in 2008, of these 6.6 million cases were in men and 6.0 million in women. This number is expected to increase to 21 million by 2030 (Worldwide Cancer Research Fund International, 2008).

Over the past decades, taxanes represent one of the most important prototypic classes of anticancer approved in oncology (Stephen et al., 2012). Taxanes which include paclitaxel (PTX), act as microtubule stabilizers that result in antitumor action against cancer cells. PTX is a natural plant derivative extracted from the bark of western *Taxus brevifolia* and it is very effective in treating a broad range of solid tumours, including ovarian, non-small cell lung and breast cancers (Yao et al., 2011).