

UNIVERSITI TEKNOLOGI MARA

**CYTOTOXICITY OF NITRIC OXIDE IN TRIPLE
NEGATIVE BREAST CANCER CELL
(MDA-MB-231)**

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ABSTRACT

Breast cancer (BC) has three types and one of it is triple negative breast cancer (TNBC). MDA-MB-231 is one of the cell line in TNBC. There is no specific drug used to treat TNBC. Nitric oxide (\bullet NO) is used to treat hypertensive emergency and congestive heart failure. In this study, \bullet NO released by Sodium Nitroprusside (SNP) was studied. We hypothesized that \bullet NO was more cytotoxic in micromolar concentration in comparison to tamoxifen. Tamoxifen is a well-known drug to treat BC and one of the drugs used in the treatment of TNBC. The result showed that the exposure of MDA-MB-231 cells to a range of SNP concentrations was unable to cause cytotoxicity of MDA-MB-231 cells. A minimum cell death upon SNP treatment was observed at 25 μ M after 24 h of treatment. It can be concluded that SNP at low concentration can be more cytotoxic to MDA-MB-231 cells.

Keywords: breast cancer; MDA-MB-231; SNP

CHAPTER 1

INTRODUCTION

1.1 Background of study

Breast cancer (BC) is the most frequent diagnosed cancer in women which represent around 16% of all cancer in women. In 2013, it is estimated around 240,000 of new cases of invasive BC and estimated around 40,000 of BC deaths (National Cancer Institute, 2013). In Malaysia, BC represents around 18% of all cancers and 1 of 20 women has a chance to get BC (Dahlui *et al.*, 2011). BC is a malignant tumour and a heterogenous disease (Bertucci & Birnbaum, 2008). There are three types of BC which are Oestrogen Receptor Positive BC, Hormone Epidermal Growth Receptor (HER2) and Triple Negative BC (TNBC). TNBC is breast cancer that negative for oestrogen receptor, progesterone receptor and HER2 receptor (Bauer *et al.*, 2007)

There are several drugs that have been used to treat BC and one of the drugs is tamoxifen. Tamoxifen is a well-known drug to treat BC and it is cytostatic rather than cytotoxic (Osborne *et al.*, 1987). It is also known as targeted therapies which only target oestrogen receptor and therefore is not effective to treat TNBC (Morad *et al.*, 2012)

Since tamoxifen would not be effective to treat TNBC, so it is important to find another alternative. Nitric oxide ($\bullet\text{NO}$) is a reactive radical species and genotoxic. $\bullet\text{NO}$ also involves in tumour growth suppressions and carcinogenesis (Lala & Chakraborty,