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5-FLUOROURACIL LOADED EGG ALBUMIN-CYCLODEXTRIN NANOPARTICLES FOR TARGETED DRUG DELIVERY IN BREAST CANCER TREATMENT

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ABSTRACT

Breast cancer is the cancer that majorly caused death among women worldwide. There are many studies and development associated with the breast cancer treatment yet, no one of them was fully successful to eradicate the cancer cell. The ineffective chemotherapeutic nowadays is mostly due to the less specific targeting of the anticancer drug to cancer cell and had caused many side effects. However, the study of nanoparticles as more targeted drug deliver is now been concerned. Therefore, we conducted a study on the characteristic of 5-fluorouracil loaded egg albumin-cyclodextrin nanoparticles as targeted delivery in breast cancer treatment. Four samples of nanoparticles had been prepare with optimization of the drug content which is 0mg, 2mg, 4mg and 6mg.these nanoparticles undergo three characterizations which were zetasizer, scanning electron microscope and transmission electron microscope. Based on the characterization data, the size of the nanoparticles were within 100nm to 400nm. The increments of the size of nanoparticles were relevant on the amount of drug content. As the amounts of the drug content were increased, the larger the size of the nanoparticles had formed. This study may encourage future study of the specificity and selectivity of nanoparticles to cancer cells.

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INTRODUCTION

1.1 BACKGROUND OF STUDY

Treatments of cancer have been evolving from non-specific therapy such as radiotherapy, chemotherapy and surgery, to a more targeted approach. The conventional anticancer drug therapy such as chemotherapy has a low specificity to tumour cells (Chicaíza-Becerra et al., 2014).Chemotherapy is rather ineffective and causes many adverse effects including nausea, vomiting, loss of hair, pain, skin discoloration, burning sensation and feeling cold (Perry, 2008). These adverse effects happen due to the non-specific targeting of anticancer drug which affects healthy dividing cells (Kessler et al., 2014). They may be the reason for the cancer patient to not adhere to cancer treatment and therefore decrease the survival rate of the patients. Consequently, a more targeted drug delivery such as nanoparticle technology may be beneficial as it has high selectivity and specificity towards tumour cells only. The nanoparticle is designed to encapsulate the hydrophobic anticancer drug in such a way that it can transport the drug to target cells. Taking advantage of the tumour morphology that has an irregular shape and gap between tumour cells, nanoparticles may have a higher penetration into cancer cells due to their smaller size.