

UNIVERSITI TEKNOLOGI MARA

**DESIGN AND SYNTHESIS OF Fe²⁺ CATECHOL APPENDENT
Zn²⁺ CYCLEN
COMPLEX**

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ABSTRACT

The significant of this study is to design and synthesis a chemical probe of glutathione (GSH). Originally, Fe^{2+} catechol appendent Zn^{2+} - cyclen complexes was proposed having a potential chemical structure for GSH. However, due to uncommercialised available of catechol, this study was conducted by using 2 Zn^{2+} - cyclen complexes instead of Fe^{2+} catechol. The hypothesis of this study is one linker compound that appended of 2 Zn^{2+} - cyclen complexes at certain distance, can detect one GSSG molecule. The methods of this study consist of 2 parts which is synthesis and analysis part. The first step in synthesis part was conversion of free cyclen from cyclen tetrahydrochloride salt. Then, three amine groups on the cyclen were protected using Boc-protecting group. The third step was, coupling of tri-Boc protected cyclen with di-bromomethyl phenyloxy propane and the forth step was Boc deprotecting of cyclen. The synthesis part of this study consists of five steps in total. However, due to time restriction, the last step in synthesis part cannot be done and analysis part cannot be proceed. Nevertheless, the designed probe can be synthesis and the data from analysis part may support the hypothesis made if this study continues.

CHAPTER 1

INTRODUCTION

1.1 Background.

Glutathione (GSH) is a natural existing compound that being produced by human body and plant. It was found widely distributed all over the body and present at almost all cell (Davies, 2012). The function of GSH in a body is as a cell protector by neutralize, make a conjugation or metabolize a substance that can do harm on the cell. Furthermore, the existence of GSH does support the normal immune system function of human (Davies, 2012).

There is a lot of evidence based on clinical study shows that the concentration of GSH in person having a health issue have depleted and low concentration of GSH compared to normal healthy individual. A study had reveal that, 45% GSH reduction do occur in infected influenza virus patient compared to their normal GSH concentration, 10% to 42% of GSH concentration reduction occur in the muscle of patient that undergo abdominal operation within 2 days after operation (Masella & Mazza, 2009).