

**STUDY ON LEAST CONSERVATION OF CITRIC ACID CYCLE IN
MITOCHONDRIAL METABOLISM IN WHOLE ORGANELLE
SCALE IN TERMS OF ELECTRICAL ENGINEERING PROCESSES**



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In the name of Allah The Most Gracious and Merciful
With The Salawat and Salam to Prophet Muhammad SAW

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ABSTRACT

The main purpose by doing this project is to help the biologist and medical team, therefore most of the content in this report from the biology and bio-chemistry point of view. A new scope of knowledge area and another application of engineering process has been discovered while completing this project.

Recently the molecular modeling is started to grow in Malaysia. It is still new in engineering practice. Molecular modeling provides a powerful new tool for studying the structure of molecular level and relating the relating molecular structure to microscopic and macroscopic properties of materials. The development of powerful new computers makes it possible to carry out realistic simulation of intra-molecular and inter-molecular interactions on large atom ensembles [2].

The concepts of molecular modeling starts with fundamental knowledge towards biology cell then investigate the process involved inside the cell in terms of biochemical equation. Thereof, the mathematical equation can be determined and simulation process began. The simulation process is using E-Cell software. The results will be analyzed and compared with the electrical engineering process in order to seek the similarities between them.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The use of the computational methods towards solving problems in biology is known as bioinformatics [1]. Bioinformatics is a new and rapidly evolving discipline that has emerged from the fields of experimental molecular biology and biochemistry, also from the artificial intelligent (AI), database, pattern recognition, and algorithms disciplines of computer science. Fundamentally, bioinformatics professional must capable of communicating effectively in the language of both computer science and biology.

Bioinformatics is a quick introduction to elements of biology such as cells, molecules, genes, functional genomics, and micro-arrays. Cell is the smallest living units. It may live independently or maybe a part of multi-cellular organism[2]. Living cells has the ability to grow in an appropriate environment and to undergo cell division. Development of single cells into complex organisms is an area of study called developmental biology.

The cell provides a space with the tools function in specialized activity such as metabolism. The metabolic pathways are the chemical processes that generate energy to the body in a balanced condition[3]. The primary objective of these processes is to product citric acid, which in turn, is to produce adenosine triphosphate (ATP). The main focus of this work is o the processes involved in the citric acid.