UNIVERSITI TEKNOLOGI MARA

A BIOINFORMATICS APPROACH TO ANALYSE A FATTY ACID AND RETINOL BINDING PROTEIN SECRETED BY *ANCYLOSTOMA CANINUM*: AN APPROACH TOWARDS HOOKWORMS VACCINE DISCOVERY

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ABSTRACT

Bioinformatics was defined as an interdisciplinary field involving biology, computer science, mathematics, and statistics to analyze biological sequence data, genome content, and arrangement and to predict the function and structure of macromolecules. In this research, we are about to use the bioinformatics to analyze a fatty acid and retinol binding protein secreted by adult *Ancylostoma caninum*. *Ancylostoma caninum* is an intestinal hookworm of dogs, can cause debilitating effects on its canine host, particularly to puppies (Boag *et al.*, 2002). Hookworms are a leading cause of malnutrition and anemia, particularly in children, and high parasite burdens can lead to stunted growth and mental retardation (Crompton, 2000; Hotez, *et al.,* 2004). Recently, vaccine development has taken advantage of the genome sequence of pathogenic bacteria and parasites. With the advent of whole-genome sequencing and advances in bioinformatics, this approach can now mine the sequences for potential surface targets using various algorithms, characterize these gene targets and choose primers for cloning, all before one enters the laboratory. Fatty acid and retinol binding protein (FAR) secreted by the *Ancylostoma Caninum* might enhance the infective capabilities of the parasite by reducing the amount of retinol available for repair of tissue damage occurring during hookworm attachment. Thus by identify the FAR secreted by the *Ancylostoma caninum*, hopefully we can predict the site where the FAR binds.

Chapter 1

Introduction

1.1 Background of study

Bioinformatics was defined as an interdisciplinary field involving biology, computer science, mathematics, and statistics to analyze biological sequence data, genome content, and arrangement and to predict the function and structure of macromolecules. With the advent of genome era, bioinformatics now plays added roles in biological and medical research and accounts for and increasing number of publication each year (Luscome *et al.*, 2001). In this research, we are about to use the bioinformatics to analyze a fatty acid and retinol binding protein secreted by adult *Ancylostoma caninum*.

Ancylostoma caninum is an intestinal hookworm of dogs, can cause debilitating effects on its canine host, particularly to puppies (Boag *et al.*, 2002). Adult hookworms attach to the inner mucosal and sub mucosal layers of the mammalian small intestine where they digest and feed on host components. This attachment site comprises a few cubic