สำนักงานวิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

CHAPTER I

INTRODUCTION

1.1 Background and rationale

In the present age, people are more concerned about their health and related problems. Healthy people want to stay healthy or even improve their health while sick people want better health and quality of life. However, many factors can cause disease: infectious agents, heredity, environmental conditions, malnutrition and stress. Infectious diseases cause death of millions of people each year. Occurrence of diseases may be prevented by the augmentation of host defenses against diseases and other environmental influences that leads to illness. This comprises the body's mechanisms to safeguard it from external factors, especially microorganisms and foreign materials, internal aberrations such as degenerative changes or tumors, and harmful environmental influences such as toxins, radiation or extreme temperatures.

Immunological responses serve mainly three functions including defense involved in resistance to infection by microorganisms, removal of components, and surveillance in identification and destruction of mutant cells. Interactions among immune cells and those of immune cells with other tissue cells are highly complex and not yet completely understood. However, a functionally active immune system with a normal range of immune cells can protect the host from the threat of deleterious agents under normal conditions. In immunosuppressive conditions such as HIV infected or side effect of chemotherapy of cancer. These problems require an agent to help and increase immune responses.

Traditional medicine has a long history. It is the sum total of the knowledge, skills and practices based on the theories, belief and experiences indigenous to different

cultures, whether explicable or not, used in the maintenance of health, as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses. There is an increasing interest in pharmacological agents that are capable of modifying the immune response with few or no side effects. Clinical and laboratory pharmacologists should find much interest in the increasing use of herbal medicines. Many herbal preparations alter immune functions and have had an amazing array of immunostimulatory effects attributed to them. In both *in vivo* and *in vitro* studies, herbal medicines are reported their effects such as cytokine secretion, histamine release, immunoglobulin secretion and class switching, cellular coreceptor expression, lymphocyte proliferation, and cytotoxic activity (Andrea *et al.*, 2000: 1–13; Zvetkova *et al.*, 2001: 2143-2150; Chompoonuch Boonarkart, 2003; Manosroi *et al.*, 2003:155-160; Auttachoat *et al.*, 2004: 1367-1379).

Thai traditional medicine is one of the most valuable heritages handed down from Thai ancestors and is still widely used in taking care of health in daily life especially among the rural Thais. For the past decade, the government and private organizations have worked in collaboration to restore the values and popularity of Thai traditional medicine. In many examinations, the herbal Thai or its components are compared to a commonly used to curing illness. Some herbal remedies are believed to have immune enhancing properties.

In investigation of the Thai tradition plant, *Aeginetia indica*, a parasitic plant that grows on bamboo, had been shown that significantly enhance T cell function. It induced anti-CD3 antibody-mediated T cell proliferation assay, the mixed leukocyte response (MLR) and the cytotoxic T lymphocyte (CTL) response. In addition, exposure to *A. indica* water extract decreased both the percentage and absolute number of regulatory $CD4^{+}CD25^{+}$ T cells in the spleen, which was consistent with a significant increase in interferon-γ (IFN-γ) production from Con A-stimulated splenocytes (Auttachoat *et al.*, 2004: 1367-1379).

Thai folklore extract of *Clausena excavata* Burm. f. has been used as folk medicines for the treatment of cancer and several disorders in the east of Thailand and were investigated on mouse immune system. The aqueous extract exhibited the maximum effect on both respiratory burst response and lysosomal enzyme activity more than the acetone extract. This Thai folklore extract was indicated that it stimulated phagocytic activation and increased splenocyte proliferation (Manosroi *et al.*, 2003:155-160).

Twenty extracts from Thai herbal plants, all claimed to be immune enhancers was screened for their activities on human human peripheral blood mononuclear cells (PBMCs). Among these, water extract from *Scaphium scaphigerum* fruits was demonstrated to stimulate human PBMCs by MTT assay, likes a mitogenic agent; phytohemagglutinin (PHA). *S. scaphigerum* is mainly distributed at Chantaburi province. Its fruits have been used not only as traditional medicine for treatment of conjunctivitis and cough but also for producing refreshing beverage. There had not been any scientific evidence about the effect of this plant on the immune system until the result of my preliminary study was come out. So this study aimed to *in vitro* evaluate the immunostimulatory effects of the water extract from *S. scaphigerum* fruits on both nonspecific and specific immune responses. The result from this study may initially provides some useful scientific information about this plant in immunological aspects, which may be useful for use of this plant in traditional medicine as well as refreshing beverage.

1.2 Objective

To study *in vitro* immunostimulatory effect of *Scaphium scaphigerum* fruit extract on both nonspecific and specific immune responses.

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1.3 Hypothesis

The *Scaphium scaphigerum* fruit extract can stimulate nonspecific and specific immunities.

1.4 Study design and processes

1. *Scaphium scaphigerum* fruit extract (The water extract was prepared from Thailand Institute of Scientific and Technological research)
2. Preparation of human peripheral blood mononuclear cells (PBMCs)
3. Determination of stimulatory of specific immune response
    - Mitogenic activity assay
        - MTT assay
        - Tritiated thymidine incorporation assay
    - T cell activation assay
        - CD69 expression detection
4. Determination of stimulatory of nonspecific immune response
    - Phagocytosis by macrophage activation
    - Nitric oxide production
5. Data analysis

1.5 Anticipated benefits from the study

- To initial investigate the pharmacological activities of *S. scaphigerum* fruit extract on immune system.

- To provide initial scientific data about the effect of *S. scaphigerum* fruit extract on immune system, which may be benefit for its use both as traditional medicine and refreshing beverage.