CHAPTER I

INTRODUCTION

An insult to the body, whether by physical or chemical damage, produces both local effects at and around the site of the insult and general responses involving the whole body, i.e. undamaged as well as damaged tissue. There are two important aspects in the general responses to a thermal injury. First, the lack of homeostatic control and second, the interaction between the wound and the host from both the circulatory and metabolic points of view. In an attempt to describe the pathophysiology of the burn it is thus advisable to look upon the burn wound as a specialized "organ" with its own blood supply and unique metabolic characteristics. The wound "communicates" with the host, and influences a variety of systemic, circulatory and metabolic changes.

Local responses after burn injury include the inflammatory processes infection, antigen challenge with overproduction of chemical mediators, activation of leukocytes and endothelial cells and an alteration in circulating cytokines. These may all contribute to systemic effects.

The local changes in the burn tissue are not only characterized by the type and extent of the insult but , of course, also influenced by local and general therapy. The concentration of seriously burned patients at burn centers where the necessary multidisciplinary care can be provided has improved survival. This care includes development of fluid resuscitation regimens, effective management of inhalation injury, nutritional support, control of infection, early burn wound excision and both synthetic and collagen-based effective skin substitutes. In addition, numerous specific

therapeutic agents are being evaluated for effectiveness in preventing, modurating or reversing the systemic effects of injury, burn wound infection and sepsis. The most interesting of these are inhibitors of the metabolites of arachidonic acid (Arturson , 1990) and monoclonal antibodies against specific cytokines or cell receptors (Barlow ,1994). Due to the interactions between the complex inflammatory mediator systems and the overlapping actions of the cytokines, success of monotherapy is, however, unlikely.

Recently, cytokines have been considered to be important participants in the postburn pathophysiological process (Youn et al., 1992; Drost et al., 1993; De Bandt et al.,1994) and in the pathophysiology of sepsis and septic shock (Montegut et al., 1995). It has been recognized that at the site of tissue injury or infection, local production of proinflammatory cytokines will activate host non-specific immunity. The first-wave cytokines such as interleukin-1 (IL-1) and tumor necrosis factor-α (TNF-α) were produced mainly by the tissue macrophages (Tracey et al., 1986; Beutler et al.,1987). In addition to inducing changes in adhesion molecule expression on endothelial cells, IL-1 or TNF can potently stimulate the cyclooxygenase activity in stromal cells as well as the production of the second-wave cytokines such as IL-6 and cytokines of the chemokine family such as IL-8 which are generally chemotactic for neutrophils (Richards et al., 1995). The release of a cascade of secondary cytokines and humoral factors may lead to local and systemic sequelae.

Aloe, a popular houseplant, has a long history as a multipurpose folk remedy. Commonly known as Aloe vera, the plant can be separated into two basic products: gel and latex. Aloe vera gel is the leaf pulp or mucilage, a thin clear jelly-like substance obtained from the parenchymal tissue that makes up the inner portion of the leaves (Tyler, 1993). The gel contains carbohydrate

polymers, such as glucomannans or pectic acid, plus various other organic and inorganic compounds. Aloe latex, commonly referred to as "aloe juice," is a bitter yellow exudate from the pericyclic tubules just beneath the outer skin of the leaves.

Aloe gel has been used for topical treatment of wounds, minor burn, and skin irritations. Besides, a lot of scientific evidence for therapeutic properties of Aloe vera on the burn wound has demonstrated that the various constituents in Aloe vera may be responsible for different pharmacological actions including antiinflammation , antimicrobials, wound healing promotion and, possibly, immunomodulation.

Up to now, aloe vera has been recognized as a good herbal medicine for analgesia, anticancer, antiviral, mutagen, antiulcer, cough suppressant hyperglycemia, antifungal, antiarthritis, antiparasite, antifertility, cathartic, cosmetics, fat production and decongestion (Farnsworth et al., 1992).

Many studies have revealed that Aloe vera has both antithromboxane and antiprostaglandin activities. Several vehicle components and Aloe vera were found to be complex lipid which could inhibit the oxidation of arachidonic acid, reflecting inhibition of lipoxygenase and/or prostaglandin synthesis activity or, possibly, sequestration of arachidonic acid.

As previously mentioned, it was obvious that Aloe vera contain various kinds of active components. It could be used to treat inflammation and wound healing. However, the antiinflammatory mechanism underlying the therapeutic effects of Aloe vera is largely unknown.

Therefore, we design the experiment in order to study the effect of Aloe vera on microcirculation by using intravital fluorescent microscopic study and on cytokine production.