

# ALOE VERA

the health benefits

Aloe vera is a succulent prickly plant of the Lily Family which grows in warm, frost-free climates and which has been known for centuries as a potent medicinal plant according to various cultures around the world.

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## 1 Introduction

Aloe vera is a succulent prickly plant of the Lily Family which grows in warm, frost-free climates and which has been known for centuries as a potent medicinal plant according to the “folk medicines” of cultures around the world. Any nearly pure Aloe vera liquid product, whether called Gel, Juice or Whole Leaf Extract, comprises the fluid obtained by breaking up the structure of the Aloe leaf and separating off the solid residues to leave a more or less clear solution. These liquid products are mainly taken by mouth. They are the preferred form of Aloe vera to be taken internally for their health-giving effects or for medical problems. These products can be wonderfully efficacious in a large number of conditions, some of them very serious medical conditions, as will be detailed here. Aloe vera is also used extensively in the form of creams to be applied to the surface for treating bites, stings, cuts and abrasions as well as many kinds of strains and sprains affecting muscles and joints

research is of high quality, which underlines the considerable status that Aloe has attained as a herb with well proven medical attributes. At the same time one should call into question any claims for Aloe vera (or any other substance) for which there may be a lack of enough medical evidence. A certain amount of uncritical marketing hype is still out there. This Newsletter examines all the major known physiological actions of Aloe vera and seeks to tease out, from the mass of research and clinical literature, to what extent the alleged benefits are reliable, and which are as yet unproven. The overall picture that emerges is of a very versatile herb with truly spectacular and wide ranging medical effects. Many different systems of the body are influenced, many symptoms are countered, and many named medical conditions are alleviated. Aloe vera deserves the reputation it has gained and the key to exploiting its benefits is to have an assured source of the genuine, undiluted product, free from unnecessary “extenders” and bulking agents.



**Aloe Vera deserves the reputation it has gained, the key to its benefits lies in the undiluted pure product, free from unnecessary agents.**



**Aloe Vera is a herb with well proven medical attributes.**

that can be accessed from the surface. These surface products, called “topical” products, can also be wonderfully efficacious when used for these specific purposes. This makes them especially applicable to many forms of First Aid and to Sports Injuries. Care should be taken with both types of product to ensure the highest possible content of genuine Aloe material. Aloe vera is also included into other types of formulation, such as cosmetics, toothpaste, shampoos etc. Application in these forms to the skin, scalp or gums may be of benefit, though clear evidence of this is often lacking for the particular products and the content of Aloe in them is often extremely low. This highlights the importance of the honesty and openness of the formulator (or the lack of it) and the intent to provide an effective level of real Aloe in the product concerned. Among these products, cosmetics such as face creams have the best claims to efficacy because Aloe has been shown to penetrate well into skin, to stimulate the immune system beneath the skin, and to facilitate the actions of other accompanying agents.

Scientific and medical research teams have investigated Aloe in many countries but especially in the United States and Japan. Much of this

## 2 The Elixir Reputation of Aloe

The complaints that Aloe has been shown to address, with varying degrees of scientific backing include:

Acne, dermatitis, abrasions, boils, carbuncles, cuts, hair loss, headaches, high blood pressure, indigestion, nausea, peptic ulcers, duodenal ulcers, colic, ulcerative colitis, gum sores, other mouth disease, pruritis, burns, AIDS, atherosclerosis and coronary heart disease cancers, diabetes, allergies, colds, parasites - e.g. protozoan infections, viral infections, infections generally, constipation, dandruff, oedema, chronic fatigue syndrome, genital herpes, gingivitis, haemorrhoids, herpes simplex and zoster, inflammation, insomnia, insect bites including bee stings, jelly-fish stings, menstrual cramps and period irregularity, radiation burns, rashes, oesophagitis, sprains, seborrhoea, sunburn, tendonitis, leg ulcers, ulcerations generally, vaginitis, varicose veins, arthritis, gout, rheumatism, Candida infection, other fungal infections, psoriasis, warts.

## 3 What Aloe vera is not

Aloe vera juices, gels and extracts are not to be confused with “Drug Aloes”, which is a laxative material derived from the sap of the outer layer

of the Aloe leaf. "Drug Aloes" are a prescription medicine, i.e. they cannot be bought over the counter in the UK. The gels, juices or whole leaf extracts referred to above are freely available for purchase by the public as herbal drinks or powders. They are not permitted to contain significant levels of these laxative materials ("aloin" and related compounds), and therefore they do not have, or should not have, laxative action.

Anyone who says they have heard that Aloe can upset the digestive system is probably thinking of the effect of Drug Aloes and has failed to understand the clear distinction that should be drawn between the two forms. Probably one will never need to use Drug Aloes, which is really only useful as a purgative. There are better laxatives available than Drug Aloes and they have nothing whatever to do with the main uses of Aloe vera juice and gel today. One should never allow any reference to it to confuse one's understanding of the proper use of Aloe vera juice or gel. The uses

categories as follows.

**Anti-inflammatory**  
**Immune stimulatory**  
**Pro-healing**  
**Pro-gastrointestinal**  
**Antidiabetic**  
**Anti-arthritic**  
**Arterial**

The mechanisms of the immune stimulant effect and the pro-healing effect are fairly well understood. Whilst the anti-inflammatory effect is understood in principle, the contributions of the different components have yet to be worked out.

## 5 Immune System Stimulation

A prime action of Aloe is to increase the activity and effectiveness of the immune system. Much is written these days about the importance of having one's immune system in good health. A sufficient level of activity amongst the immune cells is a basic requirement.

Aloe Vera is included in cosmetics, toothpaste and shampoos, application to the skin, scalp and teeth in these forms may be beneficial.



Aloe Vera is a succulent plant of the lily family which grows in warm frost free climates.



of Aloe vera juice or gel are all connected with producing a harmless stimulation of body systems to produce improved functioning, relief of pain and swelling and faster healing. There have been many cases of muddled thinking over this in the media, often by writers who should know better. There are one or two exceptions to the above. One is in the use of Aloe for diabetes. Here there are strong indications of the effectiveness of at least some components of the Drug Aloes. When these have been used they are administered carefully to ensure that the dose given will not produce a purgative effect. It is still true, though, that individuals should probably not use Drug Aloes as a self-prescribed medicine. In the future, however, it seems possible that formulated anti-diabetic medicines may emerge in which Aloe vera juice or extract is admixed with carefully selected individual components of Drug Aloes that will maximise the anti-diabetic action. We also know that "Drug Aloes" contains anti-inflammatory and anti-bacterial components that cannot be utilized without separation from the purgative components.

## 4 How does Aloe vera Work?

The physiological and medicinal effects of Aloe are best understood by dividing them into

In a short review J.C. Pittman (1992) cited that "Acemannan has direct effects on the immune system, activating and stimulating macrophages, monocytes, antibodies and T-cells." This is a wide and multifaceted claim. Acemannan is a trade name that has been applied to one part of the especially potent mannose-rich polysaccharide fraction from Aloe. "Glucomannan" is the generic name for the complete polysaccharide fraction. Acemannan comprises the highest molecular weight fraction of the glucomannan. T-cells are one of the major classes of lymphocytes. Pittman also says that Acemannan "has been shown in laboratory studies to act as a bridge between foreign proteins (such as virus particles) and macrophages, facilitating phagocytosis." Phagocytosis is the process in which immune cells engulf foreign and infective particles, including infective micro organisms, and then digesting them. Therefore one cannot be surprised that Aloe vera is widely noted, within the research literature, as being protective against infections. There are many studies showing that resistance to infection is enhanced by Aloe either in humans or in animals, whether the infective agent is a bacterium, virus or fungus. In other cases the immunostimulant effect manifests through increasing the power of the organism to either

resist carcinogenic change or to halt or diminish the progression of established tumours.

### 5.1 Evidence for and Mechanism of the Immune Stimulant Effect of Aloe

The evidence available in the research literature is of four kinds.

- 1) Work showing that Aloe protects humans or animals from infections by bacteria, viruses or fungi (anti-infective action)
- 2) Work showing that Aloe protects humans or animals from carcinogenesis, or from established tumours (anti-cancer action).
- 3) Work showing that the behaviour and activities of isolated cells from the immune system of humans or animals are influenced by Aloe in a way that would be expected to increase their effectiveness against either infections or tumours (immune cellular actions). These effects can include stimulation of phagocytosis (engulfing of bacteria or other particles by immune cells) or the

septic effect. Plaskett (1997a) has reviewed the effects of Aloe upon infections. Fujita et al (1978) reported upon the anti-microbial & anti-fungal properties of Aloe.

### 5.3 Viral Infections

Aloe augments the body's resistance to viral infections. The available reports relate to work with diseases of cats and to human infection with AIDS. In most of this work the material used is referred to as "Acemannan". Sheets et al (1991) demonstrated that Aloe could protect cats to a very useful degree against Feline Leukaemia Virus (FeLV). This virus is connected with lymphoproliferative diseases in cats, such as leukaemia and lymphosarcoma. In other words, they are neoplasms of the lymphatic system. They may also produce immunodeficiency disease and aplastic anaemia in cats. It is estimated that 40% of cats developing the disease die within 4 weeks of infection and 70% die within eight weeks. However, in the experiment, involving 44 cats,



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Aloe augments the body's resistance to viral infections.

- production of substances toxic to bacteria such as hydrogen peroxide or nitric oxide.
- 4) Work showing that Aloe reacts with or inhibits or destroys viruses or cancer cells outside the body (anti-viral action or anti-cancer action).

Some details of this research are given below. This literature is quite extensive, however, so it is only possible to cite examples of some of the best-known research papers.

### 5.2 Bacterial and Fungal Infections

Northway, in 1975, used a commercial extract of Aloe vera Gel in his veterinary practice to treat a number of external conditions in a total of 67 animals. Part of his conclusion was that there was excellent response in the case of fungal infections and also "in the treatment of mixed bacterial infections". Cera et al (1980) put Aloe Gel onto burns and found that the organism that most often infects burn tissues, *Pseudomonas aeruginosa*, was inhibited. Solar et al. (1979) found that Aloe markedly increased the resistance of mice to *Klebsiella pneumonia*. In this last instance the benefits were apparently obtained through the effects on host physiology (by inference, the immune system), rather than an antibiotic or anti-

83% of those that were not clearly terminal at the start lived. Follow-up 39 weeks after the beginning of the study showed that owners of the surviving cats reported them as being "healthy and happy" pets with a normal state of activity. The conclusion of the authors was that "The significant improvement in viability as well as the overall health of the treated cats suggests that Acemannan is an effective treatment of FeLV infection". Yates et al (1992), did a similar study with Feline Immunodeficiency Virus. Like the study by Sheets et al, this showed improved survival rates from the use of Acemannan.

The work of Pulse & Uhlig, 1990, has shown that Aloe, together with the nutrients cited in the study, can be effective in improving the general health and immune status of AIDS patients. The trial lasted for 180 days and the 29 patients were assessed by medical examination and laboratory studies at 30, 60, 90 and 180 days after the start of the programme. They were also assessed by a Modified Walter Reed Clinical Evaluation. This showed that, according to that evaluation, all 29 patients improved by 90 days and 27 of them made further improvement by 180 days. The mean value decreased by two units from a starting value of 5.39, a considerable improvement. They were

also assessed by the Karnofsky Quality of Life Assessment, in which the scores rose in 90 days from a mean of 78.97% at the start to 92.41% at the end (these results show improvement as they rise). It is noteworthy that by 180 days, not only had the mean values improved but 100% of the patients individually, had shown improvements. Clearly, it is not possible to separate out the effects due to the Aloe from the effects of the essential fatty acids and other nutrients employed in the study. However, Practitioners will be quick to note that the use of Aloe along with nutritional supplementation is exactly what should be recommended, since Aloe itself is not primarily taken for its nutrient content and its use, logically, should never exclude or diminish the simultaneous use of nutritional supplements. There is also a fair amount of testimonial evidence in favour of the use of Aloe vera in AIDS, especially that offered by Ritter (1993), Ritter & Ritter (1998). These direct findings on infections are backed up

## 5.4 Immune Effects of Aloe upon Tissues and Isolated Cells

Work on immune stimulation through increasing phagocytosis has been presented by Shida et al (1985) and Yagi (1987). Karaca et al (1993) demonstrated increased nitric oxide production by chicken macrophages treated with Aloe. Stimulation of interferon production by macrophages was observed by Borecky et al (1967) and by Lackovic et al (1970). Chinnah (1990) studied the antiviral, adjuvant and immunomodulatory effects of Acemannan in chicken cells in tissue culture. Strickland et al (1994) showed that Aloe gel extract could reduce the immune suppression effects that UV irradiation causes in mouse skin. McDaniel & McAnalley (1992) concluded in a review that macrophages are stimulated by Acemannan to produce the cytokines, interleukin-1 and 6, tumour necrosis factor and interferon. As a result B cells, T cells and plasma cells are stimulated and there

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by some in vitro work (i.e. work on surviving tissue cells outside of the body in tissue culture) by Kahlon et al, (1991). White blood cells (mononuclear cells and T4 lymphocytes) were used in the experiment as "targets" for the virus attack. Exposure to the glucomannan of Aloe showed that it offered a degree of protection to the blood cells from attack. The replication of the virus was slowed down and there was a decrease in the infectivity of the viral progeny. The same thing was observed with Newcastle disease virus and the Herpes simplex virus. Kemp et al (1990) also found that Acemannan does have some direct antiviral properties and demonstrated this in the case of HIV, Newcastle disease virus and influenza.

Some more recent studies have focussed upon the effect of Aloe upon the immune system within skin, in particular, the ability of Aloe to inhibit the negative effect on skin immune power from exposure to UV light (Strickland et al 2004).

By contrast, most of the reports of direct anti-bacterial effects from Aloe probably stem from the presence of some of the Drug Aloes in the preparation and are not a property attributable to either Aloe vera gel or de-aloinized whole leaf extract of Aloe.

is both an antiviral and anti-tumour effects as a result. All this shows that immune cells react in ways that reflect the stimulatory effects of Aloe upon the whole immune system.

## 5.5 Anti-Cancer Effects Exerted via the Immune System

These have been demonstrated most convincingly using isolated Acemannan. Plaskett (1996c) has reviewed the research literature relating to the anti-cancer effects of Aloe. Early reports on the use of species of Aloe to treat animals bearing tumours showed that the tumours were inhibited. Papers appeared by Soeda (1969), Yagi et al (1977), Suzuki (1979), Imanishi et al (1981), Yoshimoto et al (1987) and Imanishi (1993). Much of this work was carried out by treating animals that were carrying tumours with Aloe and demonstrating that the tumours were inhibited. Alternatively, it was done by looking at the activation of the animals T-lymphocytes (cells of the type which would have the job of tackling the tumour cells). A direct inhibitory effect of Aloe on human tumour cells was shown by Winters et al (1981). Most of the above work was done with animals and the most successful work was done using one fraction of the glucomannan Acemannan, given by injection.

There has also been extensive and successful work on use of Acemannan in cancer in living animals in the 1990's (Kent 1993), King et al (1991a), King et al (1991b), King et al (1995).

No one should simply drink Aloe Gel or Extract and expect to recover from cancer as a result. That would be simplistic and almost certain to result in disappointment. There is insufficient evidence to justify this level of confidence. All one can say consuming high-specification Aloe products may synergize with the effects from a very thorough-going nutritional programme.

## 6 Anti-Inflammatory Effect

The anti-inflammatory action of Aloe in acute inflammation is one of the best-known actions. Aloe inhibits the complex tissue events that accompany inflammation. The result is that the pain, soreness, redness and swelling associated with tissue damage diminish and pass off much

measuring (assaying) it or upon investigating the mechanism by which it works. Payne (1970) worked using Aloe in periodontal surgery. The more rigorous scientific studies have been done in controlled experiments in which inflammation is first created in a biological system using an irritant and then noting the effects of Aloe treatment.

Davis et al (1984) and Davis et al (1987) measured the topical anti-inflammatory activity of Aloe vera by the relief of ear swelling caused by an irritant. Davis et al (1989a) administered processed Aloe vera topically, showing that it inhibits inflammation. Davis et al (1989b) and Davis et al (1992) used artificially created pouches of skin containing a specific irritant such as croton oil or carrageenan (inflamed synovial pouch method). Others have treated mouse skin to produce minor trauma and then treated the skin, or the animal, with Aloe. There are numerous reports in this literature of various degrees of relief of inflammation by Aloe, which is usually substantial



**Aloe, together with the nutrients cited in the study, can be effective in improving the general health and immune status of AIDS patients.**



**Aloe reacts with or inhibits or destroys viruses or cancer cells outside the body.**

more rapidly than would otherwise be the case. This effect is clearly responsible for all the early benefits from applying Aloe Gel or Whole Leaf Extract, or various preparations and ointments and creams of Aloe, to wounds, including operation wounds, cuts and abrasions of all kinds. This effect must also be responsible too for the early benefits in sports injuries, such as sprains and muscular injuries, frostbite, burns and radiation burns, in the tissue-damage applications associated with dentistry and ear, nose and throat surgery, as well as its earliest effects upon arthritis and some infections. Many of the actions of Aloe on other conditions that embody inflammation must also be due at least in part to the anti-inflammatory effect. This would include insect bites or stings and jellyfish stings. Much skin disease is associated with inflammation as a symptom. Clearly, Aloe often brings benefits from anti-inflammatory action, even though the skin trouble itself probably has a different primary cause. Hence the anti-inflammatory action is one of the main benefits of Aloe. It is one of those actions that have favourable knock-on consequences. The most dramatic benefits of anti-inflammation are seen in acute conditions.

Since the anti-inflammatory action is plain for all to see, most studies have focussed either upon

and mainly without any negative effects. This work is well set out by Davis (1997).

There have by now been so many publications confirming anti-inflammatory activity that the existence of the effect is in no doubt. We also know of a range of different anti-inflammatory substances in Aloe. The extent to which each contributes to the overall anti-inflammatory effect of Aloe gel or juice is not clear, however. It seems that the compounds responsible for this effect are mostly small molecules because, when the higher molecular weight components of Aloe are precipitated out with alcohol (ethanol) some 78% of the anti-inflammatory activity remains in the supernatant liquid. The polysaccharide fractions of Aloe are found mainly in the precipitate. Hence this simple chemical process achieves a high degree of separation of the immunostimulant from the anti-inflammatory components.

The substances in Aloe with anti-inflammatory properties include the natural steroids lupeol, beta-sitosterol and campesterol (Davis et al, 1994b, Davis et al, 1997), the enzyme, bradykininase, which is an enzyme breaking down the stimulatory peptide, bradykinin (Fujita et al 1976, Yagi et al 1982, Yagi et al 1986), natural salicylates that bear a relationship to aspirin and

probably some other unidentified substances that act as anti-prostaglandins (Raine et al 1980, Penneys, 1982, Hegger & Robinson 1983). Anti-prostaglandins are substances that inhibit the actions of or the production of the prostaglandin hormones. Aloe may also inhibit the production of leukotrienes. These are hormone-like substances that attract macrophages to inflammation sites. Davis (1997) also refers to a contribution to the anti-inflammatory action by the phosphorylated sugar, mannose-6-phosphate, though it is not always clear whether he is referring to the free sugar derivative itself or to its combined form within the high molecular weight Aloe polysaccharide, glucomannan. Davis (1997) also considers that some anti-inflammatory activity is associated with the presence of the plant growth substance gibberellin. Plaskett (1996a) and Plaskett (1996b) also reviewed the biochemical mechanisms of relief of inflammation by Aloe. Apart from direct effects upon inflammation, 't Hart et al (1990) studied the effect of the separated low molecular weight fraction of Aloe solids upon free radical production by neutrophils (a class of leucocytes that are active at sites of inflammation). The Aloe material inhibited the production of free radicals and the damage resulting from their release.

is tested at set intervals after the injury. However, it is clear that, whilst one can see only the surface, the healing action of Aloe, just like the anti-inflammatory effect, is capable of acting through the whole body, in the deep organs as well as the superficial tissues. It works by stimulating the surviving cells to multiply rapidly to replace damaged cells. The mechanism by which the repair is accelerated is through the stimulation of fibroblasts. These are the cells that produce the protein fibres that form part of granulation tissue, providing strength to the wound repair.

The combination of anti-inflammatory and pro-healing effects makes Aloe vera outstandingly suitable for many First Aid applications.

Early papers on the topic are those of Barnes (1947), Goff & Levenstein (1964) and Rubel (1983). From 1987 onwards, Professor Davis and co-workers have worked extensively in this area (Davis et al 1988, Skokan, S.J., & Davis, R.H., 1993, Davis et al 1994a & b), Davis et al 1989a). Hegggers et al extended that work (Hegggers et al 1993, Hegggers et al, 1994). This work of the later 1980's and early 1990's has fully confirmed the activity of Aloe vera in accelerating the healing of wounds, shown that it is entirely reproducible and

Exposure to the glucomannan of Aloe showed that it offered a degree of protection to the blood cells from attack.



Immune cells react in ways that reflect the stimulatory effects of Aloe upon the whole immune system.



Today the use of Aloe for anti-inflammatory purposes is widespread and widely reported. Recent work on use of Aloe for radiation burns and for radiological protection are exemplified respectively by Su et al (2004), Heggie et al (2002) and Wang et al (2004). Other investigations also continue into the anti-inflammatory actions of Aloe, e.g. Landmead et al (2004), in which Aloe vera was shown to be an effective anti-inflammatory in human colorectal mucosa.

## 7 Tissue Healing Effects

A third major action of Aloe is increasing the healing powers of tissues that have been damaged. This is most obvious at the surface, where one can easily watch the acceleration of wound healing. This has long been studied by creating wounds by observing the rate of healing with and without Aloe as a wound dressing. This action has been fully authenticated by scientific studies in which the strength of the wound repair

reliable and shown that the effect of Aloe vera on wound healing is very marked. Up to 50% or more healing may occur with the use of Aloe than without.

Prof. Davis has been very concerned with the quest to find the mechanisms of action of Aloe vera in producing both the anti-inflammatory and healing effects, and this has produced some most interesting findings and theories eloquently set out in his book (Davis 1997). The active glucomannan polysaccharide of Aloe is able to attach itself to stimulatory sites on the surface of the fibroblast cells.

Meanwhile, these studies prepared the way for the clinical exploitation of the known properties of Aloe in wound healing and as a result Aloe-containing wound dressings have been marketed based upon the separated polysaccharides of Aloe, e.g. Carrasyn hydrogel wound dressing. This very practically orientated approach led to

another productive outpouring of research literature that included both technical development and theoretical studies (Alvarez et al 1992, Jensen & Seeley 1995, McDade et al (1994), Mulder et al 1994, Seeley et al 1994a & b). The appearance on the market of specific Aloe-derived products aimed at acceleration of wound healing has helped to mature the Aloe Industry and the market for its products in a favourable way. It has also been responsible for an increase in the understanding of the manner in which wound healing is accelerated and for this healing effect being demonstrated over and over many times under good laboratory conditions.

The nutritional requirements for optimising wound healing have been reviewed recently by MacKay & Miller (2003). Recent interest has also centred upon determining whether Aloe can assist healing in the case of chronic wounds (Gallagher & Gray 2003) and also the mechanism of the wound-healing effect. For example Choi et al (2001) isolated a particular glycoprotein fraction that exerted the wound-healing effect.

## 8 Gastro-Intestinal Effect


A fourth major action of Aloe tones up the principal functions of the digestive system.

being effective in these cases by the public and by Alternative Practitioners. Indeed, gastrointestinal conditions may well be the commonest reason for the consumer to use Aloe. We have published evidence for use in some gastrointestinal conditions but not others. The widespread claims for Aloe's wider use for this class of condition suggests an urgent need for further research.


### 8.1 Evidence for and Mechanisms of the Gastro-Intestinal Effect

Evidence has been published that Aloe treatment inhibits excessive stomach secretion ("acid stomach"). Millions of people are affected by that and suffer much discomfort from it and a lack of "wellness". They usually resort to antacid remedies, but in doing so often expose themselves to the potentially toxic aluminium that these may contain. Alternatively drugs like cimetidine (it goes by several trade names) may be employed and these are by no means without unwanted side effects. The evidence indicates that Aloe can often relieve this condition without using unnatural synthetic drugs or toxic minerals.

Peptic ulcer often develops from "acid stomach" is and is a very common medical problem. Huge digestive discomfort and pain usually result, with



**Aloe inhibits the complex tissue events that accompany inflammation. The result is that the pain, soreness, redness and swelling associated with tissue damage diminish and pass off much more rapidly than would otherwise be the case.**



Experiments have shown that after using Aloe the output of digestive enzymes and the bacterial population of the intestines is improved. There is then less putrefaction of food in the intestines and gastric and control of intestinal acidity / alkalinity is improved. These represent potent factors contributing to good trouble-free digestive function. There is very good scientific evidence supporting the use of Aloe vera against peptic or duodenal ulcer. The immune system and the anti-inflammatory effects are almost bound to contribute to the digestive effects because the immune system is active within the gastrointestinal system and because many gastrointestinal symptoms are caused by inflammation. The nature of Aloe vera's actions lead one to expect that Aloe may be able to assist in other named gastro-intestinal conditions such as Crohn's disease, ulcerative colitis, diverticulitis and irritable bowel syndrome. Efficacy in these named conditions is mostly lacking strict scientific proof at present, but Aloe vera is very widely held as

danger of even fatal consequences from perforated intestine or haemorrhage. Japanese and American researchers worked on this. The Blitz et al (1963) state that, working only with patients diagnosed clinically as having peptic ulcer, 100% "recovered completely" by the end of a year of the trial and that a full year after the trial their recovery was fully maintained. The report says, "Clinically, Aloe vera gel has dissipated all symptoms" and "Aloe vera gel provided complete recovery". Of course, ulcers need healing and hence it seems that the immune, anti-inflammatory and pro-healing actions may all combine to produce this important benefit. The Japanese work in this area using Aloe sp. is represented by Yamamoto (1970), Hirata & Suga (1977), Hirata & Suga (1978).

Aloe's healing and immune powers also apply to conditions of the lower digestive organs. Aloe is reported as giving generally better small intestinal function and contributing to relief from constipation. There is a research interest in using Aloe to treat

even ulcerative colitis. The latter is a very serious condition that should always be treated under medical supervision, but research done in Texas does show that special concentrates from Aloe can afford relief and improvement. This tells us that Aloe possesses remarkable power to normalize the function and health of the whole digestive system throughout its length. Alternative medicine practitioners have long used Aloe vera juice for the treatment of irritable bowel syndrome (IBS) and most are extremely enthusiastic about the results. Good results in small intestinal conditions were also reports by Chikalo & Bolovyeva, quoted by Reynolds (1966), Grindlay & Reynolds (1986).

Many users of Aloe having one or more of the medical conditions listed previously may have recovered. However, for those of us who may suffer non-specific digestive discomfort, either at the top end or the bottom end of the system, the very best evidence for improvement of function through use of Aloe comes from well-known nutritionist Bland (1985). He gave Aloe vera juice to volunteers who were not necessarily suffering digestive problems. Nonetheless, he showed that the blood levels of a substance called "indican" were much reduced by taking Aloe vera. Indican is absorbed into the blood when digestive function is sufficiently compromised to allow undigested protein to pass down into the lower gut to be broken down there by bacteria. This is not something we should want to happen. Indican and its relatives are toxins, but indican is also an indicator of just what is happening to our insides.

indicated from Reich et al (1994) and Aloe, along with other herbs, was shown to benefit constipation, by Odes & Madar (1991). Recent research is now suggesting that the positive effect upon ulcerative colitis is becoming more soundly based (Health News 2004, Langmead et al 2004, Korkina et al 2003).

Aloe is very widely accepted, indeed, as a gastrointestinal remedy. One can whole-heartedly recommend Aloe, therefore, as a general conditioning tonic for the digestion and frequently also as a remedy for established digestive ills. Note, however, that this is not true of the so-called "Drug Aloes" that are purgative. Aloe preparations used to aid gastrointestinal purposes should be rigorously freed from these compounds unless the treatment is being controlled by qualified people.

## 9 Anti-Diabetic Effect

It has been clearly established that Aloe vera counters the excessively high blood glucose levels that are characteristic of adult diabetes (non-insulin-dependent diabetes or Type II diabetes). In many cases Aloe brings the blood glucose down within the normal range. This is based upon several studies.

Type II diabetes represents a progressive, age-related loss of the function of the beta cells of the Islets of Langerhans of the pancreas, which normally produce insulin. This process is accelerated in subjects with a genetic susceptibility and in those who are overweight.

**Today the use of Aloe for anti-inflammatory purposes is widespread and widely reported.**

Protein should not pass to the lower intestine but should be digested and absorbed much further up. Our intestinal bacteria should not be of the type to produce indican because those are the bacteria of putrefaction. Dr. Bland's work showed that Aloe improved control over gastrointestinal acidity and alkalinity. The physical consistency of the stools was also much better.

Hence, Bland showed that Aloe exerts a beneficial effect of upon digestive health . It engenders conditions that benefit intestinal function. It is to be expected that this would help keep at bay the onset of such conditions as colitis, diverticulitis, ulcerative colitis, Crohn's disease and irritable bowel syndrome. Benefit in ulcerative colitis is

However, there is also strong evidence that the phenomenon of insulin resistance plays an important part in the condition. Insulin resistance is a relative lack of responsiveness to insulin by body cells in insulin's target organs. Insulin resistance is common in the obese but it also occurs in non-obese diabetic subjects.

### 9.1 How the Action of Aloe Impinges upon Hyperglycaemia in Type II Diabetes

Research from Saudi Arabia, Ghannam et al (1986), reports effects of Aloe on human diabetics. They state, "The dried sap of the Aloe plant is one of several traditional remedies used for diabetes in the Arabian peninsular." The study concerned five patients only, who all had non-insulin-dependent diabetes (NIDD) i.e. Type II. Two of these patients yielded two separate sets of experimental data, making seven records in all. Although the sample of patients is so small, the results obtained were most impressive. The fasting serum glucose levels were reduced from a mean of 273mg/dl before treatment to a mean of 151mg/dl after treatment. The insulin levels of these patients were unchanged. Interestingly, as has been stated, insulin levels in the blood of patients with NIDD commonly do not exhibit absolute insulin deficiency and it appears that their problem has much to do with a relative insensitivity of the body tissues towards being influenced insulin. The inference here is that treatment with Aloe in some manner not yet understood, improves the responsiveness of the body tissues towards insulin. This makes the insulin that is already circulating in the blood, more effective. In four out of the seven records, the patient's serum glucose fell to normal (80-100mg/dl) or just above that range, while in three other cases, although serum glucose was dramatically reduced, the level continued to hover at or just slightly above the renal threshold for glucose excretion, of 180mg/dl. This means that

Ghannam et al (1986) also studied the effect of Aloe treatment upon diabetic mice and reported an improvement (hypoglycaemic effect) of approximately 43% in their plasma glucose levels after 7 days of treatment.

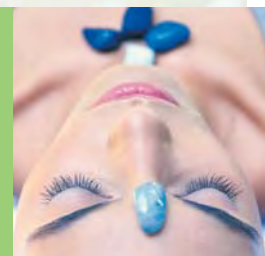
Agarwal (1985) published a major paper on the prevention of atheromatous heart disease. There were 5000 patients in the study, aged 35 to 65 years, with follow-up over five years. Over 60% of these also had diabetes. Of these diabetic patients 94% experienced improvements in their blood sugar levels during the trial. This trial was also of interest because the Aloe material used was fresh Aloe gel (100g / day, given along with 20g / day Husk of Isabgol), and no sap-derived materials were used.

Ghannam et al found that Aloe exerts its hypoglycaemic effect by reducing the body's production of blood glucose from breaking down protein ("gluconeogenesis"). The positive action of myrrh in diabetes (an alternative antidiabetic plant product) was achieved by increasing the tissue oxidation of glucose. The obvious inference from this is that Aloe, in a form that contains both main fractions, and myrrh, should be especially effective in combination for the treatment of diabetes.

Other relevant research, some from the middle East, presents effects of Aloe in diabetic animals, for example, that of Al-Awadi (1985) and Farida et al. (1987) of Kuwait. They concluded that both Aloe, and myrrh, were significantly hypoglycaemic.



**It works by stimulating the surviving cells to multiply rapidly to replace damaged cells. The mechanism by which the repair is accelerated is through the stimulation of fibroblasts.**



**A third major action of Aloe is increasing the healing powers of tissues that have been damaged.**

small amounts of glucose were still being excreted. This paper is enormously encouraging towards the idea that Aloe is an effective remedy against Type II Diabetes. The extent of the reduction in the blood sugar levels of these patients is significant. Indeed, with the blood sugar reduced to 151mg/dl, the level has been reduced below the renal threshold. In that sense, these patients, after treatment, were not really diabetic at all, even though they still had a degree of hyperglycaemia. However, there is some question about the nature of the Aloe material used by these authors, leaving us unsure what components of the Aloe were responsible for the benefits.

Blood sugar was reduced in diabetic mice, in one set of experiments by 6% and in another by 26%. By comparing the 1987 study with their results from previous studies, also concluded "different parts of the Aloe plant may lower blood glucose by different mechanisms". Therefore, an optimum Aloe product for the treatment of diabetes might need to contain, in addition to the material of the Aloe gel or whole leaf extract, some components from the aloin (sap) fraction. Possibly then, for an Aloe product to be entirely optimised for the broadest possible spectrum of biomedical activities, the exudate fraction, or some parts of it, may, indeed, be needed, but with the right precautions.

Further work by Ajabnoor (1990) used the sap compounds of Aloe (Drug Aloes), confirming a powerful hypoglycaemic effect in diabetic mice, producing a lowered blood sugar by up to 53%. The conclusion was reached that Aloe exerted its effect through stimulation of insulin secretion and that it was more effective in this respect than the hypoglycaemic drug tolbutamide.

The above work shows Aloe vera to be an impressively potent medicine in the treatment of Type II Diabetes. Its wider use in the alternative field of medicine could well bring positive benefits. The medical orthodoxy should be involved if possible in extending the research. More modern work is still being carried out, such as that by Okyar et al (2001), on the effect Aloe leaves on blood glucose levels in rats and confirmatory evidence is still being generated. Plaskett (1996d) reviewed the relationship between Aloe and diabetes.

there is no other like Aloe vera. The roots of this certainty are the multiple different physiological effects of Aloe recounted in this Newsletter. Most herbs have only a limited range of effects. These effects may make the herb sought-after and valuable in medicine. But because in most cases the effects of the herb are limited and not multifarious, the herb will need to be either used in a simple symptom-related way as a folk medicine or over-the-counter medicine or prescribed by expert herbalists who understand exactly what it can do. Also, there are herbs with toxic side effects. Such herbs warrant the closest professional scrutiny of the patient's medical situation before they are used. Aloe vera gel or juice does not have these limits. It is very free from side effects and disadvantages. There are times when practitioners should oversee its use, especially when Aloe forms part of an overall nutritional/herbal/ naturopathic prescription. Nonetheless, great amounts of Aloe are in use

Recent interest has also centred upon determining whether Aloe can assist healing in the case of chronic wounds.



A fourth major action of Aloe tones up the principal functions of the digestive system.



## 10 Anti-Arthritic Effect

Hanley et al (1982), Davis et al (1984) and Davis (1997) state, "Aloe vera inhibits inflammation and adjuvant-induced arthritis". Almost every natural health practitioner who uses Aloe at all extensively has come across cases of human arthritis that have responded spectacularly to the treatment. Whether this demonstrates the inhibition of chronic inflammation in the joints or whether there is a more fundamental action involved has not been established. Indeed, there is a real need for human clinical trials on this topic.

## 11 Arterial Effects

Agarwal (1985) is the main source of data on this topic. Such a large study involving levels of recovery from arterial disease and, apparently, prevention of many expected deaths, has to be taken very seriously. Quite obviously more research is needed. Some other researches also touch upon the effect of Aloe upon arteries at the tissue level. One example is Lee et al (1998), who showed a stimulatory effect upon the pulmonary artery tissue of calves.

## 12 Powerful Herbal Medicine

This author considers that there is no other herb like Aloe. Among the multiple species of Aloe

around the world on a self-prescribed basis and we see little if any disadvantage or difficulty arising. On the other hand the benefits appear to be great.

Aloe is perhaps unique in the way in which its multifaceted actions interact and support each other. The combination of anti-inflammatory and healing actions is especially fortunate because it allows a wide range of conditions to benefit that call for both relief from swelling and pain and also the healing of wounds or tissue damage. That combination is powerful medicine. The stimulation of immune system actions is one generic effect. However, immune stimulation is expressed in a number of different ways within the complexity of the immune system, with its different cell types and its different chemical messengers responding in different ways. The resulting improvements in immune function are of many kinds and benefit many organs. Moreover, the immune system is deeply involved in the body's reactions to injury in ways that clear the way for the subsequent repair. Thus, it seems that all three of the most major actions of Aloe focus together on a myriad of conditions that all require anti-inflammation, healing and an active immune system. Synergy becomes the order of the day. This would appear

to be the essence behind Prof. Davis' "Conductor/ Orchestra Concept of Aloe vera" (Davis 1997).

The essential actions at cell level that together comprise the "gastrointestinal" effects of Aloe have not been clearly identified. It seems likely, however, that much of this effect may be mediated through the anti-inflammatory, pro-healing and immune system effects. Here too, synergy between the different separate actions is almost certainly important. If there are, say 100 conditions that Aloe vera helps, then these seem likely to be traceable in the end to some 6 to 8 basic effects that combine together and synergize in complex ways.

Finally, because the actions of Aloe are so numerous, and because some of them support systems that are basic to the well being of the body, one might expect to find that regular Aloe users would live more illness-free lives than non-

There is now available a set of objective laboratory tests that can distinguish Aloe from extender substances by nuclear magnetic resonance and also the actual DNA of Aloe vera can be detected when present and distinguished from that of all other plants. These methods have been explored and verified in detail by the International Aloe Science Council in the USA and similarly examined and adopted in the UK by the Health Food Manufacturers Association (HFMA).

These tests and the enforcement of the results is not yet a matter of UK Law, but it clearly well behaves buyers of Aloe to look for products that are well verified by one of these bodies and sold by responsible retailers who understand the product. This simple precaution will tend to protect users from exploitation by the sellers of inferior or possibly fraudulent products. It should help to ensure that Aloe vera, at the 'point of sale', still possess the properties for which it is so highly valued.

**Aloe's healing and immune powers also apply to conditions of the lower digestive organs. Aloe is reported as giving generally better small intestinal function and contributing to relief from constipation.**



**Aloe exerts a beneficial effect upon digestive health.**

users and might perhaps live longer. This has not yet been demonstrated in humans but the reader's attention is drawn to the work of Ikeno et al (2002), pinpointing a more illness-free life for rats that are given Aloe on a regular basis.

### **13 Making sure that your Aloe is Genuine and is Strong Enough**

Any user of Aloe should bear in mind the recent history of Aloe, which is that whilst it has marvellous credentials as a curative herbal remedy, it has been much abused by the unscrupulous acts of certain suppliers. They have diluted the extracts with water and extended it dishonestly by the addition of inactive maltodextrin, dextrose or glycerol. It has also been subject to other forms of abuse which were not dishonest, but involved processing the plant in ways which failed, to various degrees, to preserve its biological activity. There are, or have been, operators who market only a distillate from Aloe. From what is known of the active ingredients of Aloe, there is little reason to expect that any significant amount of these will be present in such distillates. Plaskett (1997b) has reviewed the relationship between the activity of Aloe vera and the conditions of harvesting and processing.

**For more detailed newsletters on Aloe Vera, please call Nutrigold on 01884 251777.**

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