



Aloe Vera of Australia Products

Aloe's Effectiveness As An Anti-Inflammatory Agent

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Aloe has long been effective as an anti-inflammatory, so an investigation was undertaken to determine whether Aloctin A inhibits adjuvant arthritis in rats and carrageenin induced edema in rats. Aloctin A is a glycoprotein isolated by ammonium sulphate precipitation, pH dependant isolated and gel filtration from *Aloe arborescens* Miller.

Previous publications have demonstrated that Aloctin A inhibits the growth of methylcholanthrene-induced fibrosarcoma in vivo with the mechanism appearing to be host related. Since *Aloe arborescens* Miller has been used as an anti-inflammatory in folklore medicine its effect on adjuvant arthritis and carrageenin-induced edema was examined. The model used for adjuvant arthritis was developed by Newbould, and the carrageenin-induced edema used the method of Winters et al.^{1,2}

Adjuvant Arthritis Formation And Compound Treatment

Indomethacin, prednisolone carrageenin, liquid paraffin and heat killed *Mycobacterium butyricum* were used. The Aloctin A was prepared according to the method of Suzuki et al.³ The arthritic syndrome was induced in Sprague Dawley rats by an intradermal injection of 0.10 ml of liquid paraffin containing 0.6 mg of heat killed *Mycobacterium* into the interplantar surface of the right hind foot. The compounds to be tested were administered either orally or intraperitoneally each day for 15 days beginning one day prior to the injection of the phlogistic agent into the foot.

In the preliminary investigation, the oral administration of Aloctin A did not affect adjuvant arthritis at the doses tested in this experiment.



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Aloctin A was suspended in 0.9% sodium chloride, and was administered intraperitoneally through this investigation. The Indomethacin and prednisolone in an aqueous suspension were administered by gastric gavage. The control animals received adjuvant but no drug. The body weight and foot volumes were recorded at regular intervals.

Edema Formation And Compound Treatment

Edema was induced in the hind paw of the rats by a sub-cutaneous injection of 0.05 ml of 1% carrageenin solution in 0.9% sodium chloride. The Aloctin A suspended in 0.9% sodium chloride was administered intraperitoneally 30 minutes prior to the injection of the phlogistic agent. Indomethacin in aqueous suspension was administered by gastric gavage.

The volume measurements were made immediately prior to and at one, three, four, and five hours after injection of the phlogistic agent. The volume measurement was determined by the water displacement method. The effects of the compounds were expressed in terms of percent inhibition in the swelling volume of the control animal versus the treated animals.

The results in Table 1 clearly show that Aloctin A at all dose levels effectively suppressed the swelling of adjuvant arthritis, with the optimal dose level being 5 mg/kg/day. The activity of Aloctin A given intraperitoneally appeared to be higher than that of indomethacin given p.o., and was nearly equal to prednisolone given p.o. During the course of this experiment no side reactions of Aloctin A were noted.

Table 1

Effect of Aloctin A, Indomethacin and Prednisolone on arthritis induced in rats by mycobacterial adjuvant.

Compound	Daily Dose (mg/kg)	Route	B.W. Gain (g +/- S. E.)	Inhibition (%)		Inhibition (%)	
				Day 0-21 Injected Day 14	Hind Paw Day 21	Secondary Lesion Day 14	Lesion Day 21
Aloctin A	0.5	i.p.	15 +/- 12	14.4	9.3	28.4	17.4
	2.5	i.p.	35 +/- 9	39.3	27.0	23.9	30.3
	5.0	i.p.	45 +/- 8	57.2	56.6	43.3	72.3
	7.5	i.p.	5 +/- 1	49.4	29.5	39.3	-2.3
	10.0	i.p.	5 +/- 1	22.6	4.6	28.6	-5.3



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Indomethacin	2.0	p.o.	-10 +/- 7	38.1	23.9	12.1	-1.2
Prednisolone	2.0	p.o.	0 +/- 1	58.3	43.2	82.2	35.7
Control			10 +/- 9	0	0	0	0

Six rats per group were used.

Each value of Inhibition (%) is average of six rats per group.

Aloctin A showed marked inhibition of edema in the carrageenin foot paw swelling assay (Table 2). When Aloctin A was given intraperitoneally 30 minutes prior to the injection of the carrageenin, a marked inhibition of edema was observed three hours after the injection. The effect of Aloctin A showed a dose-response relationship up to 10 mg/kg.

Table 2

Effect of Aloctin A and Indomethacin on swelling of rat hind paw induced by carrageenin.

Compound	Dose (mg/kg)	Route	Inhibition (%) 1	Inhibition (%) 3	Inhibition (%) 4	Inhibition (%) 5 (hr)
Aloctin A	0.5	i.p.	10.2	32.3	36.0	26.4
	1.0	i.p.	10.8	66.5	64.2	55.8
	5.0	i.p.	12.5	50.8	55.6	59.2
	7.5	i.p.	4.8	89.2	88.0	94.6
	10.0	i.p.	2.2	92.8	93.4	95.3
Indomethacin	0.5	p.o.	-14.4	18.8	19.2	29.5
	1.0	p.o.	-28.5	32.6	41.5	40.8
	2.0	p.o.	12.5	59.5	63.4	59.0

Each value is mean of six rats per group.

The present experiments demonstrated that Aloctin A inhibits adjuvant arthritis and carrageenin-induced edema in rats. Aloctin A is a new type of anti-inflammatory. Anti-inflammatory drugs reported to date are classified as steroids, non-steroids, immunosuppressive drugs and antiphlogistic agents, whereas Aloctin A is a glycoprotein. Further studies are needed to construct a reasonable hypothesis for the mode of action of Aloctin A.



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References

¹ **Newbould BB:** Chemotherapy of arthritis induced in rats by mycobacterial adjuvant. *Brit. J. Pharmacol.* 21, 127-136.

² **Winter CA; Risley EA; Nues GW:** Carrageenin-induced edema in hind paw of the rat as an assay for anti-inflammatory drugs. *Proc. Soc. exp. Biol. Med.* 111, 544-547 (1982).

³ **Suzuki I; Saito H; Inouse S; Migita S; Takahashi T:** Purification & characterization of two lectins from *Aloe arborescens* Miller. *J. Biochem* 85, 163-171 (1979).