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Short communication

ANTIINFLAMMATORY ACTION OF LAPACHOL

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Introduction

Lapachol, 2-hydroxy-3-(3-methyl-2-butenyl)-1,4-naphtoquinone, isolated from some species of *Bigoniaceae*, was studied originally by Paternó (1882) and more recently by Gonçalves de Lima et al. (1956) in regard to its antibiotic/antineoplastic potential. Recently, according to the observations of one of us (C.A.C. Lopes), and antiinflammatory action in humans has been observed (unpublished results). The present paper attempts to document this action using widely accepted models of inflammation in animals.

Clinically, lapachol is presently being used in the treatment of adenocarcinoma and squamous carcinoma (Rao, 1974; Santana et al., 1980/81).

Materials and methods

Drug source

Pure lapachol was supplied by the phytochemistry sector of the Departamento de Antibióticos da Universidade Federal de Pernambuco as yellow coloured crystals.

Carrageenan-induced paw edema

This test was undertaken using the technique described by Winter et al. (1962) using Wistar stock rats of both sexes (130–150 g). The rats were taken off food the night before testing and divided into four groups of 6 animals each. On the next day, groups 1 and 2 received 100 and 500 mg/kg, orally, of a lapachol suspension in distilled water containing 0.1% Tween 80 and 0.5% ethanol. The reference group received, orally, 150 mg/kg of phenylbutazone in a suspension of 1% carboxymethylcellulose. The control group received, orally, drugless vehicle (Tween 80 + ethanol + H_2O). One

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hour after oral administration, 0.1 ml of an aqueous solution-suspension of 1% carrageenan was injected in the subplantar region of the right hind paw of all rats. The volume of both hind paws was registered before and 4 h after the injection of the carrageenan. The relative increase in volume of the paws of the groups was compared to that of the control group and the reference group using the Student's *t* test.

Carrageenan-induced abscess

The method described by Benitz and Hall (1963) consists of the induction of a subcutaneous abscess at the tail root in the mid-line of the back of the rats. Utilizing the same general scheme of grouping and dosage just described, animals were injected with 0.5 ml of a sterile suspension of 5% carrageenan in distilled water. Twenty four hours later an abscess was well developed and could be easily dissected out. In the test groups, lapachol was administered immediately before the injection of the carrageenan and 6 h later. Twenty four hours after the administration of the carrageenan, the abscess was dissected out and weighed. The wet weight of the abscess was then compared for the four groups using the Student's *t*-test.

Results and discussion

Lapachol demonstrated a significant anti-edematogenic action of 76 and 85% for 100 and 500 mg/kg, respectively, 4 h after the pedal injection of carrageenan (Table 1). This time after carrageenan pedal injection corresponds to the second phase of inflammation which is correlated with the appearance of prostaglandins and kinins (Van Arman and Bohidar, 1978).

Lapachol at a dosage of 150 mg/kg produced an inhibition of 57% in the weight of the carrageenan-induced abscess, whereas phenylbutazone at the same dose yielded an inhibition of 48% (Table 2).

Lapachol in this preliminary study produced a significant anti-inflammatory action in both of the experimental models in rats; therefore, these results support further investigations with this interesting compound.

TABLE 1

EFFECT OF LAPACHOL AND PHENYLBUTAZONE ON CARRAGEENAN-INDUCED EDEMA IN THE PAW OF RATS

Treatment	Oral dosage (mg/kg)	*N*	Increase of paw volume (ml)	Edema inhibition (%)
Control	–	6	2.12 ± 0.10	–
Lapachol	100	6	1.26 ± 0.09	76.1*
Lapachol	150	6	1.18 ± 0.08	85.3*
Phenylbutazone	150	6	1.21 ± 0.09	79.2*

Tabular figures represent the mean ± S.E.M. values.
Significance relative to control group: $*P < 0.01$.

TABLE 2

EFFECT OF LAPACHOL AND PHENYLBUTAZONE ON THE DEVELOPMENT OF CARRAGEENAN-INDUCED ABSCESS IN RATS

Treatment	Oral dosage (mg/kg)	*N*	Abscess wet weight (g)	Inhibition (%)
Control	–	6	2.03 ± 0.09	–
Lapachol	100	6	1.13 ± 0.07	38.1*
Lapachol	150	6	0.93 ± 0.03	57.2**
Phenylbutazone	150	6	1.06 ± 0.05	47.7**

Tabular figures represent the mean ± S.E.M. values.
Significance relative to control group: $*P < 0.01$, $**P < 0.001$.

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