L-TRYPTOPHAN AND INFLAMMATION

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Summary: L-Tryptophan inhibits carrageenin induced paw oedema but not the 5-HT induced one in rats and its inhibitory activity pattern is similar to that of dipeptide; L-phenylalanyl-L-phenylalanine and naturally ocurring anti-rheumatic peptide like substance.

Key words : L-Tryptophan carrageenin oedema 5-HT oedema

Clinically useful anti-rheumatic drugs; salicylates, phenylbutazone, indomethacin, prednisolone, chloroquine, gold salts, mefanamic and flufenamic acids, share a common action in displacing L-Tryptophan and several synthetic dipeptides notably L-phenylalanyl-L-phenylalanine, from their binding sites to human serum proteins (1, 8).

Human serum contains L-tryptophan in protein bound and free form and in patients with rheumatoid arthritis, these molecules are bound to an abnormally high extent, resulting in low free levels, which could be restored to normal by antirheumatic drugs theraphy (4). Remission in rheumatoid arthritis associated with pregnancy has been explained on the basis of raised free tryptophan levels caused by amino acid displacement by Oestrogens (1). A peptide like substance isolated from human serum (5), has been shown to inhibit carrageenin induced paw oedema in rats, but does not antagonise common mediators of the inflammation in *in vitro* models (3). A dipeptide; L-Phenylelanyl-L-Phenylalanine has been shown to inhibit carrageenin induced oedema but not dextran oedema (9). L-tryptophan has been reported to inhibit infiltration of leucocytes into area of local inflammation in rats (2). It was interesting to examine whether like dipeptide or naturally occurring peptide, the amino acid itself could also inhibit the odema induced by some common phologistic agents. In this study I report the anti-inflammatory activity of the amino acid against carrageenin induced paw oedema (10).

MATERIALS AND METHODS

Albino rats of either sex (110-150 *g*) were used. L-Tryptophan (BDH, USA) was suspended in 1% Carboxymethyl-cellulose (CMC), Sod. salicylate (used to test the sensitivity of the system) dissolved in water. The test compounds and control (1% CMC) were administered, i.p. 60 min before the injection of carrageenin (Viscarin, Marine Colloids). The volume of the paw was measured plethysmographically (7) immediately and 4 hr after the subplanter

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injection of 0.1 *ml* of 1% carrageenin in normal saline in right hind paw. The results were expressed as percentage inhibition of oedema and ED-50 calculated graphically. The amino acid was examined against 5-HT induced paw oedema according to the method of Parratt & West (6).

RESULTS AND DISCUSSION

The results (Table I) show that amino acid caused significant dose dependent inhibition of carrageenin induced oedema, ED-50, 270 *mg. kg*-1, but did not produce any significant inhibition

TABLE I: Anti-inflammatory effects on carrageenin paw oedema test.

Pretreatment	*Dose mg. kg.* -1, *i. p.*	*Net oedema ml.* ± S. E.	*Inhibition* %	*ED-50 mg. kg.*-1
Control	—(7)	0.71 ± 0.087	—	
Sod. salicylate	200 (4)	0.44 ± 0.057	38.03*	
L-tryptophan	50(7)	0.65 ± 0.081	9.23	
	100 (7)	0.50 ± 0.070	29.58*	
	200 (7)	0.42 ± 0.054	40.84*	270
	300 (7)	0.31 ± 0.040	56.34*	

*Statistically significant
( ) Number of animals

of 5-HT induced oedema even at 300 *mg. kg*-1 dose level, the highest dose trial during experimentation. The amino acid seems to produce an anti-inflammatory activity pattern which is very similar to that produced by dipeptide; L-phenylalanyl-L-phenylalanine and recently isolated peptide like substance.

In addition to the hypothesis that free form of L-tyrptophan mimics naturally occurring anti-rheumatic peptide, it may itself afford protection to susceptible tissues against inflammatory reaction through its anti-inflammatory activity reported in this communication.

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