

AIM: Anti-Inflammatory activity of drugs using carrageenan induced PAW-edema model

REFERENCE:

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INTRODUCTION:

The carrageenan-induced paw edema model is based on the **ability of carrageenan to produce acute inflammation** when injected into the sub plantar region of a rat or mouse paw.

Carrageenan (a sulfated polysaccharide obtained from red algae) acts as a **phlogistic agent**, causing localized inflammation.

This leads to **paw swelling (edema)** due to:

- a) Increased vascular permeability
- b) Release of inflammatory mediators

PRINCIPLE:

Inflammation is tissue-reaction to infection, injury, irritation, or foreign substance. It is part of host defense mechanism but when it becomes uncontrolled it is hopeless condition. Aging is also considered to be an inflammatory response.

There are several tissue factors or mechanism that are known to be involved in the inflammatory reactions such as release of histamine, bradykinin, and prostaglandins.

The development of non-steroidal anti-inflammatory agents in recent years has contributed a lot in not only overcoming the human suffering such as arthritis but also has helped in understanding the tissue mechanism of inflammation.

The inflammatory reaction is readily produced in rats in the form of oedema with the help of irritants. Substances such as carrageenan, formalin, histamine, mustard, 5-hydroxytryptamine when injected in dorsum of the foot of rats they produce acute paw oedema within a few minutes of the injection.

Carrageenan is sulphated polysaccharide obtained from sea weed and by causing the release of histamine, 5-HT, bradykinin and prostaglandins it produces inflammation and oedema.

REQUIREMENTS:

Animal: Rats (150-200g)

Drugs: Carrageenan (Prepare 1% w/v solution and inject 0.1 ml underneath the plantar region).
Indomethacin (Dose 20 mg/kg, s.c., prepare a stock solution)

PROCEDURE:

- 1) Weigh the animals and number them
- 2) Make a mark on both the hind paws (right and left) just beyond tibio-tarsal junction, so that every time paw is dipped in the mercury column up to the fixed mark to ensure constant paw volume.
- 3) Note the initial paw volume (both right and left) of each rat by mercury displacement method.
- 4) Divide the animals into two groups each comprising of at least four rats. To one group inject saline and to the second group inject indomethacin subcutaneously.
- 5) After 30 min inject 0.1 ml of 1% (w/v) carrageenan in the plantar region of the left paw of control as well as indomethacin-treated group. The right paw will serve as reference non-inflamed paw for comparison.
- 6) Note the paw volume of both legs of control and indomethacin-treated rats at 0 min (initial) and 120 min after carrageenan challenge.
- 7) Calculate the percent difference in the right and left paw volumes of each animal of control and indomethacin-treated group. Compare the mean percent change in paw volume in control and drug-treated animals and express as percent oedema inhibition by the drug.

OBSERVATION TABLE:

Sr. No	Body Weight (g)	Treatment	Paw volume (ml) as measured by mercury displacement at			
			0 min		120min	
			R	L	R	L
1	150g	Control				
2	200g	Control				
3	150g	Control				
4	150g	Control				
Mean						
1	150g	Indomethacin				
2	200g	Indomethacin				
3	150g	Indomethacin				
4	150g	Indomethacin				
Mean						

INFERENCE:

Sr. No	Body Weight (g)	Treatment	Paw volume (ml) as measured by mercury displacement at			
			0 min		120min	
			R	L	R	L
1	150g	Control	0.42	0.42	0.42	0.87
2	200g	Control	0.50	0.50	0.50	0.98
3	150g	Control	0.45	0.45	0.45	0.92
4	150g	Control	0.48	0.48	0.48	0.95
Mean			0.46	0.46	0.46	0.93
1	150g	Indomethacin	0.35	0.35	0.35	0.55
2	200g	Indomethacin	0.38	0.38	0.38	0.59
3	150g	Indomethacin	0.27	0.27	0.27	0.56
4	150g	Indomethacin	0.31	0.31	0.31	0.52
Mean			0.32	0.32	0.32	0.55

**CONCLUSION:**

The study demonstrates that the test drug has significant anti-inflammatory activity in the carrageenan-induced paw edema model.

RESULT:

- a) The control group showed a progressive increase in paw edema after carrageenan (control) injection, confirming induction of inflammation.
- b) The drug group induced Indomethacin significantly reduced paw swelling at 0min and 122min of time interval respectively.