Effect of phospholipids on histamine release

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Goth & Adams (1970) have shown that phosphatidyl serine has a selective effect on histamine release by dextran or ovomucoid from rat peritoneal cells. We have found that certain phospholipids interact with rat mast cells to produce an enhanced anaphylactic secretion of histamine. This potentiation was produced by acidic phospholipids, phosphatidyl serine (PS) and inositol (PI) which gave graded effects over the dose range 1–10 μg/ml. The neutral phospholipids, phosphatidyl ethanolamine and choline were inactive.

The degree of potentiation depended on the type of mast cell. It was greatest with rat isolated peritoneal cells (2–5 fold increase). Histamine release from mesentery and lung was less affected (about 1·6 and 1·3 fold increase respectively).

The anaphylactic release of histamine from peritoneal mast cells requires the presence of calcium ions. The optimal calcium concentration in the absence of added phospholipid was found to be about 1 mM. When PS was added (100 μg/ml) the release was potentiated but a further increase was obtained by raising the calcium concentration to 10 mM. The two acidic phospholipids which have been found to potentiate histamine release are known to bind calcium ions (Hauser & Dawson, 1967), whilst the neutral phospholipids neither potentiate histamine release nor bind calcium. An interaction of phospholipids with calcium may be involved in the anaphylactic secretion of histamine.

The enhancing effect of acidic phospholipids does not extend to histamine release by compound 48/80. On the contrary, release by this agent is inhibited by both PS and PI. In the presence of PS (100 μg/ml) the log-dose response curve for 48/80 shows a parallel shift of 0·3 log units. Similar inhibitory effects have been obtained in the three preparations studied: isolated peritoneal cells, chopped mesentery and chopped lung tissue. These findings point to important differences in the mode of action of antigen and 48/80.

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REFERENCES

GOTH, A. & ADAMS, H. R. (1970). Selective effect of phosphatidyl serine on macromolecular histamine release in the rat. *Fedn Proc.*, **29**, 2087.

HAUSER, H. & DAWSON, R. M. C. (1967). The binding of calcium at lipid water interfaces. *Eur. J. Biochem.* **1**, 61–69.

Resistance of rats to carrageenan and to adjuvant-induced arthritis

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Production of an inflammatory oedema in the rat paw by injected carrageenan has been widely adopted as an experimental model for the evaluation of potential anti-inflammatory drugs, particularly as their relative activities in this test correlate well with their anti-inflammatory activities in man. Recently, Willis (1969) and Di Rosa & Willoughby (1971) reported that this oedema is mediated by histamine and 5-hydroxytryptamine (5-HT) during the first hour, after which the increased vascular

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