TABLE 1. *The effects of DHE and those after pretreatment with various antagonists on the vascular bed of cat calf muscle. (−): dilatation. Except where indicated all preparations are innervated*

Drugs	Dose mg/kg I.V.	n	Resistance response (% change) Mean ± S.E.	Capacitance response (ml./100 g tissues) Mean ± S.E.
DHE vehicle	—	13	0·46 ± 1·24	—
DHE (denervated muscle)	0·015	5	6·40 ± 3·27	0·37 ± 0·04
DHE	0·015	6	−5·21 ± 2·62	0·29 ± 0·10
DHE	0·045	8	−10·75 ± 2·54	0·42 ± 0·06
Phenoxybenzamine + DHE	2·5 + 0·015	5	−17·00 ± 2·13	0·06 ± 0·12
Atropine + DHE	2·0 + 0·015	5	6·00 ± 2·63	0·28 ± 0·01
Eserine + DHE	0·100 (I.P.) + 0·015	6	−11·17 ± 5·52	0·29 ± 0·06
Chlorpheniramine + DHE	0·100 + 0·015	3	−4·32 ± 4·96	0·31 ± 0·03
Propranolol + DHE	1·0 + 0·015	3	−3·00 ± 2·65	0·33 ± 0·24
Acetylsalicylic acid + DHE	200·0 + 0·15	3	−12·67 ± 5·20	0·25 ± 0·14

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The actions of histamine on blood flow and capillary filtration coefficient (C.F.C.) in the cat small intestine

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In 1963, Folkow, Lundgren & Wallentin reported a method for the determination of the functional exchange vessel area in the small intestine of the cat. This plethysmographic method measures the rate of exudation of fluid from the vasculature into the perivascular space that occurs in response to an imposed increment in venous pressure. The rate of the transudation that occurs is dependent upon the tone in the precapillary sphincters, which governs the number of functioning exchange vessels. Capillary filtration coefficient (C.F.C.) is measured as millilitres of fluid (transuded/min)/mm of mercury rise in the venous pressure/100 g of tissue under investigation. The method used in the present study was based on that of Folkow *et al.* (1963).

Nineteen unselected cats weighing between 2·5 and 5·5 kg were anaesthetized with chloralose (70 mg/kg, I.V.) after induction with halothane. Continuous artificial ventilation was employed, using room air supplemented with oxygen to bring the oxygen content of the inspired mixture to approximately 40%. The volume of blood within the external circuit was compensated for with a solution of low molecular weight dextran in 0·9% saline (Rheomacrodex, Pharmacia), and drugs were dissolved in and washed in with 0·9% saline. Histamine acid phosphate administered intravenously in doses of 0·01 to 10·0 (μg/kg)/min regularly produced a fall in C.F.C., indicative of a constriction of precapillary sphincters. The total blood flow increased, usually by about 5–10% over control values. A similar fall in C.F.C. was observed following the infusion of a

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single selected dose of 10 (μg/kg)/min into the descending aorta superior to the origin of the superior mesenteric artery. These effects were not modified by hexamethonium bromide (1·0–5·0 mg/kg, I.V.).

Larger doses of histamine (up to 40 (μg/kg)/min, I.V.) irregularly produced rises in C.F.C., indicative of a dilatation of the precapillary sphincters, and similar rises could be produced regularly with the lower doses of histamine (0·01–10·0 (μg/kg)/min) after the administration of the α-adrenoceptor blocker phentolamine mesylate (1·0 mg/kg, I.V.) or after aminoguanidine bicarbonate (10 mg/kg, I.V.), a drug which inhibits histaminase activity and hence enhances the effects of exogenous histamine (Ghosh & Schild, 1958).

Mepyramine maleate (1·0 mg/kg, I.V.) blocked both the increases and the decreases in C.F.C. that resulted from histamine.

Histamine has been implicated in the release of catecholamines from the chick intestine *in vitro* (Everett & Mann, 1967), and, in doses comparable to those used in the present study, from the suprarenal glands of cats and dogs (Staszewska-Barczak & Vane, 1965), and it seems possible that the present results might be related to this phenomenon.

Schayer (1962) produced evidence to suggest that locally produced histamine has a role as an 'intrinsic regulator' of the microcirculation. The results of the present investigation show that exogenous histamine has profound and partially unexpected effects on the intestinal microcirculation, but do not in themselves suggest a physiological role of histamine in this tissue. Compound 48/80 (100 μg/kg, I.V.), which releases histamine from mast cells, causes a biphasic response of a large transient increase in C.F.C. followed by a sustained fall.

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Biochemical and cellular changes in the Arthus reaction

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New Zealand White rabbits were immunized with alum-precipitated ovalbumin (1 mg S.C. and 0·5 mg I.V.) and 4 weeks later were challenged with intradermal injections of 1 mg ovalbumin into the lower hind limb to induce an Arthus reaction. Changes were studied in the Arthus site and in the afferent lymph draining the site before it entered the popliteal node.

Erythema and oedema were established at the Arthus site 2–4 h after challenge although the intensity of erythema continued to increase up to 24 h. During this time there was a gradually increasing infiltration of leucocytes, mainly consisting of polymorphonuclear cells with some eosinophils and monocytic cells.

At the Arthus site there was a significant increase in protein concentration from 2 h onwards. There was also an increase in the activities of lactic dehydrogenase (LDH), β-glucuronidase (β-gluc), cathepsin D and glutamic oxalacetic transaminase (GOT). These increases were significant at 4 h and again between 12 and 36 h after challenge. However, there was no consistent increase in the activities of acid phosphatase or glutamic pyruvic transaminase.