Sugar	Concentration (mM/l)	Jejunum Sugar (μM/h/g)	Water (ml/h/g)	Ileum Sugar (μM/h/g)	Water (ml/h/g)
D-Glucose	1	3.2 ± 1.6	0.2 ± 0.1	1.5 ± 0.7	0.2 ± 0.0
	10	21.1 ± 3.3	0.4 ± 0.1	11.2 ± 4.0	0.5 ± 0.0
	20	29.0 ± 7.2	0.5 ± 0.1	14.5 ± 3.7	0.4 ± 0.0
	40	37.0 ± 8.6	0.2 ± 0.2	20.2 ± 11.0	0.2 ± 0.0
D-GALACTOSE	1	3.0 ± 0.6	0.1 ± 0.0	1.2 ± 0.7	0.2 ± 0.1
	10	20.0 ± 4.9	0.3 ± 0.1	11.7 ± 6.4	0.3 ± 0.2
	20	23.3 ± 7.0	0.2 ± 0.1	15.9 ± 5.3	0.2 ± 0.1
	40	40.0 ± 10.5	0.2 ± 0.1	21.9 ± 10.1	0.1 ± 0.0
D-Xylose	1	1.1 ± 0.6	0.2 ± 0.2	0.5 ± 0.5	0.3 ± 0.2
	10	12.2 ± 4.8	0.4 ± 0.1	5.6 ± 2.5	0.3 ± 0.1
	20	15.5 ± 6.7	0.2 ± 0.1	8.3 ± 3.3	0.3 ± 0.2
	40	19.5 ± 4.8	0.2 ± 0.0	7.0 ± 4.1	0.2 ± 0.1

Absorption of sugar and water by the cat (mean ± standard deviation)

than ileum. Glucose and galactose absorption were identical in each segment and were significantly greater than that of xylose at each concentration in both segments. Water absorption did not differ with different segments or sugars.

Discussion. The data demonstrate that small intestinal absorption of several actively transported sugars in the cat follows patterns established in other mammals[2]. Thus, D-glucose and D-galactose showed equivalent absorption rates, which were significantly greater than that of D-xylose. Sugar absorption rates were greater in jejunum than ileum. This suggests that sugar transport mechanisms in cat small intestine are not unique but are similar to those in other mammalian species.

These results differ from those reported previously[1], which were obtained in only one intestinal segment at a single sugar concentration. The limited experimental conditions may have permitted a random result rather than a general demonstration of cat intestinal physiology.

Water absorption was similar from different sugar solutions and intestinal segments despite differences in sugar absorption. Water absorption is said to be passive, following that of actively transported substances, especially sodium[10]. Since the initial sodium concentration in all solutions was high, 145 mEq/l, it is probable that sodium absorption was not significantly different from the different solutions. Thus water absorption, following that of sodium, did not significantly increase either[11].

Résumé. A égale concentration, les taux d'absorption du D-glucose et du D-galactose dans le jéjunum et l'iléum du chat sont identiques. Ils dépassent nettement ceux du D-xylose. En cela, l'absorption du sucre simple dans l'intestin grêle du chat est semblable à celle qui s'observe chez les autres mammifères.

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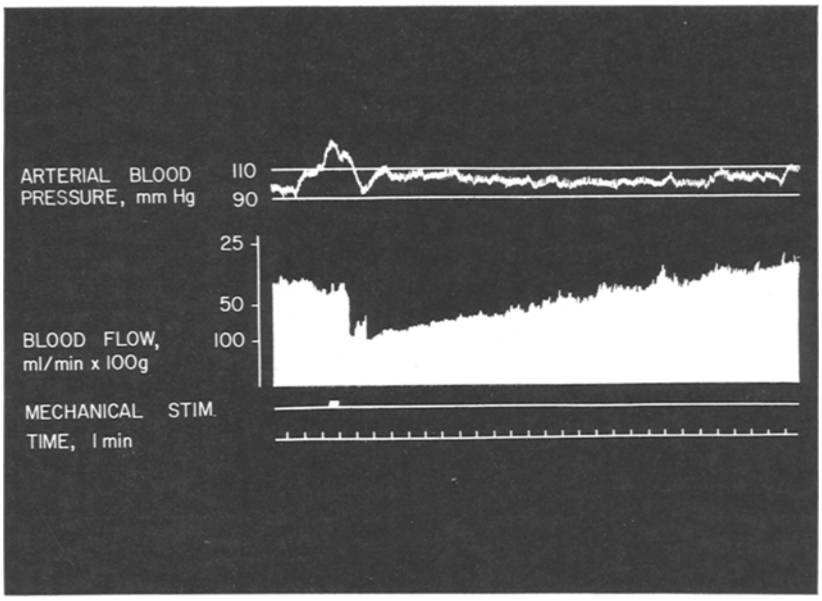
Intestinal Vasodilatation after Mechanical Stimulation of the Jejunal Mucosa

Intake of food results in a moderate increase of intestinal blood flow as has been demonstrated in both man and animal[1]. This blood flow increase is regarded as one component in the physiological response pattern evoked during digestion, and has therefore been characterized as a functional hyperemia. However, the underlying mechanisms for it has not been elucidated.

In this preliminary report experiments are described in which an intestinal vasodilatation is induced by local mechanical stimulation of the jejunal mucosa. It is proposed that this mechanism may be one factor of importance in explaining the functional hyperemia in the small intestine.

Methods. The experiments were performed on cats deprived of food for at least 24 h and anaesthetized with chloralose (50–70 mg/kg). Venous outflow from a segment of the jejunum weighing 20–35 g was recorded by an optical drop recorder unit operating an ordinate writer. Arterial blood pressure was measured from the left femoral artery by a mercury manometer. Mechanical



Cat 4.2 kg. The effect of mechanical stimulation (signal) of the jejunal mucosa on blood pressure and total jejunal blood flow. The heights of the ordinates are inversely proportional to the magnitude of blood flow.

stimulation of the mucosa was usually performed by a polyvinylchloride (PVC) plastic tube (outer diameter 5 mm) which was inserted into the lumen of the jejunal segment at the proximal end. The tube was then slowly pushed, while rotating it, to the distal end of the segment and then withdrawn in the same manner. In total, the PVC tube was in contact with the mucosa for about 30 sec during each stimulation period. In some experiments, mechanical stimulation of the jejunal mucosa was accomplished by means of a fast flushing of 50 ml saline at body temperature through the jejunal lumen.

Results. Mechanical stimulation of the jejunal mucosa with a PVC tube induced an increase of total jejunal blood flow amounting to 30–100% above control (see Figure). The flow response was evident 20–30 sec after the end of the mechanical stimulation. No effects on systemic blood pressure were observed. The return of blood flow towards control level was slow and occurred in 5–15 min after the stimulation (Figure). This vasodilator response was not altered by sectioning of the splanchnic nerves, by bilateral vagotomi, after administration of atropine (1 mg/kg) or klorisondamon (Ecolid®, CIBA; 2 mg/kg), a ganglionic blocking agent. After rapidly flushing the jejunal segment with saline, jejunal blood flow increased 15–50% and the response was in all aspects similar to that seen after mucosal stimulation with the PVC tube.

Discussion. The mechanism responsible for the intestinal vasodilatation during digestive work is so far unknown. It can, however, be ruled out that extrinsic nervous influence plays any role since earlier investigations have failed to demonstrate the existence of any vasodilator fibres to the small intestine[2]. From a theoretical point of view, it also appears more plausible that the functional hyperemia of the gut is controlled by local rather than remote factors.

In the present study it was demonstrated that mechanical stimulation of the jejunal mucosa induces a vasodilatation, apparently through some local mechanism since complete denervation of the gut did not alter the mechanical response. It was, further, shown that the vasodilatation was not abolished either by atropine, in doses blocking the vagal control of the heart, or by a ganglionic blocking agent. It seems reasonable to assume that the induced vasodilatation mainly occurs in the mucosa. Experiments to elucidate this particular point are in progress. The proper physiological stimulus for this dilator response and its relevance for jejunal vasodilatation during digestive work remains, however, to be determined[3].

Zusammenfassung. Mechanische Reizung der Dünndarmmukosa bewirkt eine Zunahme in der gesamten Durchblutung des Dünndarms bei der Katze. Diese vermehrte Durchblutung wird nicht beeinflusst durch Denervierung und/oder Ganglienblockade.

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