suppress chemoreceptor activity in a slip dissected from the nerve (Figure 2). At high frequencies of stimulation, up to 10–100/sec for 1–5 sec, the suppression outlasted the period of stimulation by up to 2 sec. In Figure 2, B the stimulus artefact marks the period of stimulation; the discharge is not totally suppressed during stimulation but the prolonged depressant effect is shown here and also on the graph of Figure 2, E. In both of the graphs, showing the effect of different stimulus frequencies, the scatter of the frequency plot appears to be reduced during stimulation though this point has yet to be rigorously tested.

A shift of the oxygen response curve of chemoreceptor afferents such as we have found after interruption of the centrifugal pathway is to be predicted on the basis of NEIL and O'REGAN'S[3] result if there is effective tonic activity in these fibres. In addition a more marked effect may be expected at low oxygen tensions if the efferent pathway were more active under this condition. BISCOE and SAMPSON[2] have shown that activity in the centrifugal sinus nerve pathway increases as the arterial oxygen tension is lowered. If their centrifugal pathway is indeed efferent to the carotid body then these results are commensurate. The failure to demonstrate the shift in the oxygen response curve of chemoreceptors in some cases is to be expected in anaesthetized animals since the amount of the shift depends on the resting activity, which will vary with the level of anaesthesia.

The prolonged depression by stimulation suggests persistence of a chemical transmitter effect whilst if there is a reduction in scatter of the frequency signal this will alter the information transmitted.

Presumably if the interpretation given by BISCOE and STEHBENS and BISCOE, LALL and SAMPSON[4] of their results is correct, namely that nerve endings on Type I cells are efferent, then this efferent system will be acting through the Type I cell to set the receptor sensitivity and alter the oxygen response. How this could come about is open to speculation but the means may involve release of catecholeamines from the Type I cells[5] perhaps influencing the oxygen gradients through the tissue and thus across the receptor, whatever that may be[6].

Résumé. Potentiels d'action enrégistrés dans les fibres nerveuses des chémorécepteurs de la carotide du Chat. La fréquence des potentiels augmente en réponse à toutes les tensions d'oxygène quand le nerf sinusal est réséqué. La stimulation de l'extrémité périphérique provoque une diminution prolongée de l'activité chémoréceptrice.

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Small Intestinal Absorption of Simple Sugars and Water in the Cat

The cat would be unique among mammals if its absorption of D-glucose and D-xylose were identical as reported[1]. In other species D-glucose is rapidly absorbed by active processes whereas D-xylose is much more slowly absorbed by similar processes[2]. Paradoxically, D-galactose and 3-methyl-D-glucose which appear to share the same affinity for the active sugar transport mechanism as D-glucose, are absorbed at expected rapid rates in the cat[1,3]. These reports suggest that simple sugar transport in the cat intestine has unusual features, the definition of which might yield fundamental information about basic mechanisms. Unfortunately, there were methodological limitations in previous studies. The present study was designed to better define sugar absorption in the cat by using several sugars over a wide concentration range in both jejunum and ileum.

Materials and methods. Adult male cats of 4 kg average weight were deprived of food but not water for 16 h before experiments. After anesthesia with i.p. Dial with urethane (CIBA, Summit, N.J.), the intestine was exposed and two 20 cm segments (jejunum distal to the ligament of Treitz and ileum proximal to the ileocecal valve) were measured and cannulated at both ends. Solutions of D-glucose, D-galactose or D-xylose in Krebs' bicarbonate buffer[4] in concentrations of 1, 10, 20 or 40 mM/l were circulated through the segments at 5 ml/min from a 40 ml reservoir by a perfusion pump for 1 h. A non-absorbable indicator, polyethylene glycol (PEG), was added to each solution (2 g/l)[5]. Sugars were analyzed chemically[6,7] and PEG content spectrophotometrically[8]. Absorption in this model is the measured disappearance of a substance per hour from the intestinal lumen.

Calculations were as follows: (1) PEG ratio $=$ $\frac{\text{PEG initial, mg/ml}}{\text{PEG final, mg/ml}}$ (2) Water absorption, ml/h/g wet tissue weight = (1-PEG ratio)(40 ml)/wet weight in g. (3) Sugar (or sodium) absorption, mM/h/g wet tissue weight = [sugar, initial, mM/l] – [sugar, final, mM/l] (PEG ratio) 40 ml/wet weight in g. Standard t_0 – tests and analysis of variance were used for comparison of group means[9]. Means were considered significantly different when p was 0.05 or less.

Results. Absorption data for sugar and water are shown in the Table. The figures represent means and standard deviations for groups of 6 cats studied at each sugar concentration in both segments.

Statistical comparisons showed that the absorption of each sugar at all concentrations was greater in jejunum

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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