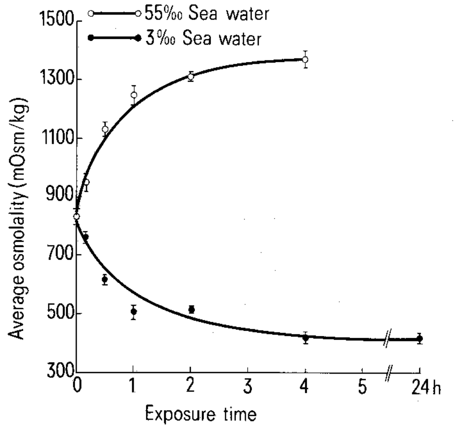
1 h, 2 h, and 4 h in both solutions, and also for 24 h in the 3‰ sea water. The animals died after 6–8 h exposure to 55‰ sea water and this was not due to the use of 'Instant Ocean' salts since *G. oceanicus* survives for many days in less saline solutions of this preparation. After the appropriate exposure period, the animals were gently dried with Kimwipes and hemolymph was removed from between the head and first peraeonal segment with a 5-µl pipette. 10 µl of hemolymph, from animals determined to be in stage C of the molt cycle[5], was diluted in 340 µl of distilled water. The osmolality of the diluted hemolymph was then measured on a Fiske OM osmometer.

Results and discussion. The average hemolymph osmolality of *G. oceanicus* exposed to 32‰ sea water was 833 mOsm/kg which is in close agreement with the previously obtained value (0.88 M/kg or 880 mOsm/kg) for *G. oceanicus* and *Marinogammarus finmarchius*[4], both marine species. After 24-h exposure to 3‰ sea water, the animals continued to maintain hemolymph osmolality at 420 mOsm/kg (figure). It is not surprising that *G. oceanicus* can regulate hemolymph osmolality in such low salinity sea water since they can be found in salinities as low as 2.5‰ sea water[6].



Change in average hemolymph osmolality of *G. oceanicus* with time, after exposure to 3‰ and 55‰ sea water. Time O hemolymph osmolality was measured in animals taken from 32‰ sea water and used as controls. The brackets represent data variability (±SEM).

Previously, it was found that the hemolymph concentration of *G. oceanicus* reached a new steady-state about 12 h after transfer from 35‰ sea water[4]. In our experiments, only 4 h were required to reach the new steady-state value. These differences are probably due to experimental procedure.

The symmetry of the curve in the figure and leveling off of hemolymph osmolality with time at a value (1370 mOsm/kg) less than that of 55‰ sea water (1700 mOsm/kg) suggest an ability to regulate in hypersaline waters. The inability to survive prolonged exposure may reflect a limit to its regulatory ability or a failure of some other physiological mechanism (e.g. ion balance). *M. finmarchius* did not regulate its hemolymph osmolality in hypersaline conditions[4].

Extremely hyposaline conditions in the intertidal zone may be encountered at low tide during a rain storm or in freshwater runoff whereas extremely hypersaline conditions in the intertidal zone may occur in tide pools because of evaporation due to long periods of bright sunlight. The ability to regulate in both environments is clearly advantageous. The poor ability of *G. oceanicus* to regulate in hypersaline conditions is sufficient to allow the animal time to escape or tolerate these conditions for the short time interval that hypersalinity exists (2–4 h) before the incoming tide restores normal salinities. Animals may be exposed to freshwater runoff or rainfall for periods much longer than this and they thus require a strong ability to regulate hemolymph osmolality in low salinity water.

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A correlation of responses of the resistance and capacitance vessels of the intestine and kidney to changes of impulse in postganglionic nerves under pressor reflexes

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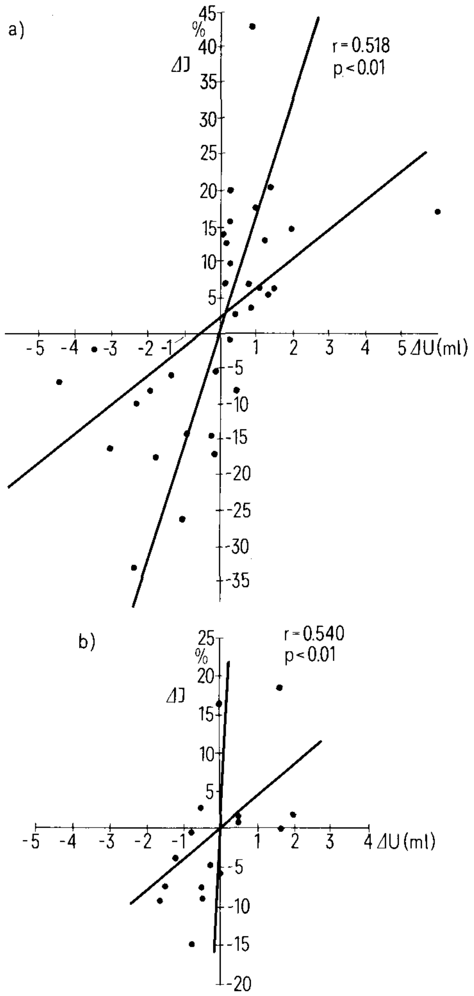
Summary. The responses of resistance vessels of the intestine and kidney were induced by high amplitude impulses (over 15 µV), while those of capacitance vessels in these organs were induced by low amplitude impulses (15 µV and lower) of postganglionic sympathetic fibres.

Our previous paper[1] has shown the relationship between changes of the high amplitude efferent impulses in the splenic nerve and the responses of the resistance vessels of the spleen, and between the low amplitude impulses and the responses of capacitance vessels in this organ. The aim of the present work is to study these relationships in the small intestine and kidney.

Method. Experiments were performed in 32 cats anaesthetized with urethane and α-chloralose (1 g/kg and 20 mg/kg). Responses of the resistance and capacitance vessels of the small intestine and kidney were studied by the method described previously[1]. Responses of the resistance vessels were estimated according to changes of the total peripheral resistance, those of the capacitance vessels, according to changes of blood content in the organ under constant blood volume perfusion. Action potentials in central ends of small branches of the corresponding sympathetic nerves were recorded simultaneously with the vasomotor responses. Reflexogenic reactions were induced by clamping both common carotid arteries for 30–40 sec. Ganglioblocking agent hexonium was given i.v. (2 mg/kg). Heparin was used to prevent blood coagulation. Experimental data were processed on digital computer 'Minsk-32' by correlation and regression analysis.

Results. The clamping of carotid arteries evoked a constriction of the resistance vessels of small intestine and kidney. The capacitance vessels demonstrated both constriction (74.4% of cases in the intestine and 47.6% in kidney) and dilatation (23.0% and 42.9% respectively). In the other cases, there were no responses of capacitance vessels in the organs under investigation.



Correlation of changes of the capacitance vessels of the intestine (a), kidney (b) and the efferent low amplitude impulse rate in the corresponding nerves in pressor sinocarotid reflex after injection of hexonium (2 mg/kg). Abscissa: the vascular blood content changes in ml (△U ml); ordinate: mean impulsation rate in % to control (△J%).

In response to the clamping of the carotid arteries, the efferent impulse rate in the nerves studied within the first sec after clamping increased at the expense of high amplitude impulses. The increase of impulse rate began earlier than the rise of resistance and possibly played the role of a trigger mechanism for the resistance vessel responses.

After an i.v. injection of hexonium (2 mg/kg) in experiments on the small intestine and kidney, as well as on the spleen[1], no reflex responses of the resistance vessels were observed. The sympathetic impulsation was significantly weaker mainly due to reduction of high amplitude potentials (15 μV and higher). The low amplitude impulses (lower than 15 μV) and the reflex responses of the capacitance vessels after hexonium were preserved. The efferent low amplitude impulses in the sympathetic nerve, against the background of the hexonium effect, responded to the clamping of carotid arteries by different changes being in most cases correlated with the capacitance vessel responses. In 52.4% of cases, the vascular blood content of the small intestine was decreased (constriction of the capacitance vessels), impulse rate in the intestinal nerve being increased. In 31% of cases, the vascular blood content of this organ was increased and the impulse rate in the intestinal nerve became slower. Constrictory response of the renal capacitance vessels was observed in 25% simultaneously with the impulse rate increase. In 50% of cases, renal capacitance vessels were dilated on the background of decreased impulse rate.

Mathematical processing of the data obtained has shown correlation between changes of the low amplitude impulse rate in intestinal and renal nerves and the capacitance vessel responses in the intestine and kidney (figure), similar to the results obtained in experiments on the spleen[1]. The data presented confirm the results obtained earlier[1] and are in agreement with the opinion of other authors[2-4] admitting the existence of differentiated sympathetic impulses to pre- and postcapillary portions of the vascular bed. The data obtained suggest that postganglionic sympathetic fibres are not similar both in physiological characteristics and in the functional destination. One of them, conducting high amplitude impulses, seems to be responsible mainly for responses of the resistance vessels, while the others - with low amplitude impulsation - control responses of the capacitance vessels.

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Unequal distribution of calcium and magnesium of snail neuron

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Summary. Ca and Mg contents of snail neuron differ depending on the cell type. Ca and Mg near the cell membrane are not equally distributed in the isolated neuron. Ca is almost twice as dense in the axonhillock region than in the cell body. The Mg distribution pattern is the reverse of that of Ca.

The role of divalent cations, particularly of calcium and magnesium other than as charge carriers, in processes such as regulation of enzymatic activities, secretion of humoral transmitters and initiation of muscle contraction has become of increasing interest. Little is known, however, about the distribution pattern of calcium and magnesium in different types of neurons and in single nerve cells in relation to the cell structure. It is desirable to obtain