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Fisiologia. — *Chloride transport in rabbit jejunum and ileum.* Nota di AMALIA BIANCHI, BARBARA GIORDANA e FRANCESCA REPETTO, presentata (*) dal Corrisp. V. CAPRARO.

RIASSUNTO. — Sulla base dei risultati ottenuti determinando contemporaneamente i coefficienti termici del flusso entrante ed uscente del cloro ione attraverso la barriera intestinale *in vitro* (digiuno ed ileo di coniglio), si conclude per un processo di assorbimento metabolico-dipendente di questo anione.

The problem of intestinal chloride transport has been widely studied both in Heterotherms and Homeotherms.

While the absorption and secretion of the anion have been clearly demonstrated in many Heterotherms [1, 2, 3], the experimental results obtained on the absorption of chloride in Mammal's small intestine are more uncertain [4, 5, 6, 7].

In order to provide further contribution to this problem, the chloride transport across the isolated rabbit jejunum and ileum has been reconsidered from a new point of view.

A high thermal coefficient (Q_{10}) of a transport process by itself cannot be considered in absolute to demonstrate a direct relationship between transport and metabolism, nevertheless the comparison of the thermal coefficients of the two unidirectional fluxes of a single molecule seems to throw more light on the nature of the transport.

For example, sodium transport across the intestinal barrier in the absence of an electrochemical gradient, shows a Q_{10} value for the outflux consistent with a passive permeation both in jejunum and ileum (1.38 and 1.40 respectively) while for the influx the Q_{10} is significantly higher (1.99 and 1.74).

These results clearly suggest that sodium ion influx follows a pathway at least in part different from the outflux and confirm the well established partial dependence of the Na influx from the metabolism.

On the basis of these results, it can be supposed that the comparison of the thermal coefficients for the unidirectional chloride fluxes also can clarify the nature of the anion transport.

The experiments were carried out with ordinary rabbits fed a standard diet and weighing approximately 2–3 kg killed by a blow on the neck. A 15–20 cm segment of jejunum was quickly excised 90 cm from pylorus, and an analogous segment of distal ileum was cut 20 cm from ileocecal valve. The tissue, rinsed clean of luminal contents, was put into 37° C Krebs–Hen-

(*) Nella seduta del 10 febbraio 1973.

seleit solution. The composition of the perfusion fluid was: NaCl 118.45 mM, $NaHCO_3$ 25 mM, KCl 4.75 mM, $CaCl_2$ 2.53 mM, KH_2PO_4 1.19 mM, $MgSO_4$ 1.19 mM, glucose 12.9 mM, pH 7.4. The fluid was aerated with 95 % O_2–5 % CO_2.

The experiments were performed in winter and spring and the required temperatures were obtained in an air thermostat. Fluid evaporation was reduced to minimum by large moistened surfaces. The jejunal and ileal segments were cut along the mesenteric border and put between two lucite half-chambers of the same volume (7 ml); the apparent surface of the exposed intestinal mucosa was 2 cm^2. The spontaneous transepithelial potential was continuously shortcircuited by an electronic device (8).

At the beginning of each experiment the mucosal or serosal medium was labelled with ^{36}Cl (about 1 μC/ml) and unlabelled Krebs–Henseleit was used in the opposite side.

Small samples were taken at 15 min intervals from the initially unlabelled side.

A 40 min equilibration period, necessary to obtain steady fluxes, was followed by five 15 min periods, in order to measure the unidirectional flux values.

Since preliminary experiments had shown that the optimal temperature in these *in vitro* preparations is 34° C, the Q_{10} value has been calculated between 24° and 34° C.

The Cl in-and outfluxes were contemporaneously measured at 24° and 34° C in either jejunal or ileal adjacent tracts.

In the Table chloride in-and outflux values at the two temperatures and the thermal coefficients for jejunum and ileum are reported.

TABLE

Cl *in-and outfluxes* ($\Phi m - s$ *and* $\Phi s - m$) *in jejunum and ileum.*

	Cl			
	JEJUNUM		ILEUM	
	$\Phi m - s$ (μEq. cm^{-2} h^{-1}) mean±S.E.M.	$\Phi s - m$	$\Phi m - s$ (μEq. cm^{-2} h^{-1}) mean±S.E.M.	$\Phi s - m$
24° C	3.09±0.23 (10)	3.22±0.31 (10)	3.20±0.18 (11)	3.20±0.22 (11)
34° C	5.31±0.45 (10)	4.13±0.38 (10)	5.62±0.38 (11)	4.56±0.31 (11)
Q_{10}	(*) 1.73±0.09	(*) 1.33±0.09	(*) 1.79±0.13	(*) 1.45±0.09

Number of experiments in parentheses.

(*) Mean of thermal coefficients calculated from each pair of experiments.

The Q_{10} found for outflux is a very low one, so that the conclusion can be drawn that in rabbit small intestine there is no active secretion of the anion. Conversely, the Q_{10} for the Cl influx is significantly higher. Therefore the influx and the outflux pathways are partially different and the influx seems to be, almost partially, a metabolically dependent process.

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