brain can retain ^{14}C labelled nutrients to a greater extent than the rest of the brain[7]. The following experiment was designed to determine whether this retention capacity is a consequence of differential incorporation of D-glucose-^{14}C within a lipid subfraction of the medial hypothalamus. If that is the case, it would be conceivable that feeding behavior is controlled by a local adipokinetic mechanism within the brain.

Ten Sprague Dawley albino rats (mean weight $\pm$ SD: 273 $\pm$ 40 g) having free access to food and water were used. Half the animals were of each sex, but since no reliable differences were observed between the 2 groups, all data were pooled. All animals were stomach tubed with 20 μC of uniformly labelled D-glucose-^{14}C in 5 ml of 50% w/v unlabelled D-glucose; 6.5 h later, all animals were anesthetized with Nembutal; brains were removed and frozen. VMH and lateral hypothalamic (LHA) samples were dissected and weighed to 0.1 mg[7]. Individual samples were homogenized and separated by conventional extraction procedures into trichloroacetic acid (30%) soluble, chloroform-methanol (2:1 by volume) soluble, and residue fractions. The extracts were evaporated to dryness and dissolved in 0.3 ml of Soluene®. After addition of 3 ml of scintillation cocktail (4 g PPO and 0.2 g POPOP per liter of toluene), each sample was counted for 50 min.

In all fractions, VMH radioactivity was higher than LHA activity (Table) ($t > 3.90$, $df = 9$, $p < 0.01$, in all 3 cases, correlated t-test). Furthermore, the relative increase in the activity of the VMH lipid fraction, in comparison to the corresponding LHA extract, was reliably higher than the corresponding increases in either the acid soluble or residue fractions ($t > 2.61$, $df = 9$, $p < 0.05$, in both cases).

Although translation of this distribution differential into a behavioral cause is not yet possible, the distinct metabolism of the VMH suggests one unique mechanism whereby the regulation of energy intake may be accomplished: Namely, local VMH metabolism may parallel a critical peripheral process, possibly adipose tissue metabolism, and thereby keep account of lipogenic and lipolytic nutrient transactions within the body. Such a process could be mediated by the insulin sensitive cells which have been demonstrated to reside in the medial hypothalamus[8].

Zusammenfassung. Nach peroraler Verabreichung von ^{14}C-Glukose konnte in den Lipiden des ventromedialen Hypothalamus mehr Radioaktivität nachgewiesen werden als im lateralen Hypothalamus. Dies könnte ein Hinweis für eine Steuerung der Nahrungsaufnahme über den Lipidmetabolismus des medialen Hypothalamus sein.

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DPM ($\pm$ SEM)/10 mg tissue in TCA, chloroform-methanol and residue fractions of ventromedial and lateral hypothalamic brain samples and % differences

Fraction	VMH	LHA	$\frac{\text{VMH-LHA}}{\text{LHA}} \times 100\%$
Trichloroacetic acid	498 ($\pm$ 60)	402 ($\pm$ 34)	24.2% ($\pm$ 5.8)
Chloroform-methanol	317 ($\pm$ 23)	214 ($\pm$ 12)	48.3% ($\pm$ 8.3)
Residue	143 ($\pm$ 8)	115 ($\pm$ 6)	25.9% ($\pm$ 6.7)

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The Effect of Intracellular Potassium Ions on Active Sodium Efflux in Frog Sartorius Muscle

The ion sensitivity of sodium efflux from striated muscle has been the subject of several investigations[1-4]. The activation of sodium outward transport by external potassium ions is abolished by strophantidin[4,5].

While the effects of external Na^+- and K^+-ion concentrations on the glycoside-sensitive Na^+-extrusion have been studied in some detail[6], little is known so far about the effect of internal K^+-ions on active sodium efflux from muscle.

Material and methods. Using pairs of sartorius muscles from the frog *Rana temporaria*, parallel measurements of Na-efflux without and with strophantidin were made and the difference between the respective values was taken to give the data for active Na^+-efflux. The experimental methods were similar to those described by previous authors[4-6]. Muscles were loaded with potassium chloride by immersing them for 6 h in high potassium-Ringer[7,8], containing ^{22}Na. Thereafter the muscle was initially equilibrated for 20 min in non-radioactive solution at the experimental temperature of 20 °C. Measurements of the sodium efflux were then carried out over a period of 45 min at the external K^+ concentrations [K_0], given in the Figure, in presence or in absence of 10^{-5} strophantidin. The time course of the changes in internal potassium [K_i], was obtained from muscles loaded with [^{42}K]-potassium chloride, the ^{22}Na being absent in this case. The [K_i] of these muscles equilibrated with the ^{42}K-solution of known specific activity was computed from the radioactivity remaining in the muscle. In addition the electrolytes were measured at the end of the experiment from perchloric acid extracts with she aid of a Beckman DU

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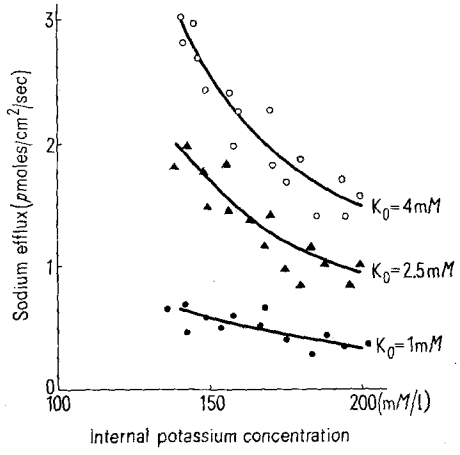
Spectrophotometer with flame attachment. The values for $[K_i]$ have been corrected for K^+-ions in the interspace.

Results. The data given in the Figure show that increasing the concentration of intracellular K^+-ions from 140 m*M* (characteristic for frog sartorius in physiological Ringer[3]) to up to 200 m*M* markedly inhibits active sodium extrusion. Independent of the external potassium level, the Na^+-efflux is reduced to about half the original rate. The reciprocal plot of the Na^+-efflux rate against $[K_0]$ at different internal potassium levels indicates that the internal potassium acts competitively. At the $[K_i]$ of 140 m*M*, the maximal rate of Na^+-efflux obtained from the LINEWEAVER-BURK diagram is 25 pmoles/cm² per sec.



Inhibition of active sodium efflux by internal potassium at different levels of external potassium ions. Paired muscles have been immersed in Ringer's solution[3,8], the potassium concentration being varied between 1–4 m*M* as indicated. The immersion solution for one of the twin muscles contained 10^{-5}*M* strophantidin; 20 min equilibration time was followed by a 45 min period, during which the sodium efflux rates with and without strophantidin were measured. The values given in the Figure represent the differences of the average values plotted against the average internal potassium levels. The solid curves are the least-square fit to the individual experiments indicated by the respective symbols.

Discussion. At the normal internal potassium level of 140 m*M*, where a direct comparison with the work of SJODIN[6] becomes possible, the observed kinetics of active sodium extrusion are rather similar. Increasing the intracellular potassium level results in a marked inhibition of the Na^+-efflux. As a possible mechanism, it is suggested that the intracellular K^+-ions may induce a conformation of the Na-K-ATPase which has only a low affinity for ATP[9]. On the basis of the evaluated Hill coefficient, it seems likely that 2 K^+-ions participate in this inhibitory reaction.

In view of the controversy existing in the literature as regards the intrafibrillar activities of Na^+ and K^+ in frog muscle[10] (though high concentrations close to the internal membrane surface would suffice), no attempt has been made to fit the data to a quantitative kinetic model. The possible regulatory role of the internal potassium may be to prevent complete Na^+-extrusion, when the $[K_i]/[Na_i]$ ratio is very high. Such a mechanism would have its counterpart in the inhibitory action observed for high external sodium concentrations[6].

Zusammenfassung. Radioaktive Untersuchungen zeigen, dass intrazelluläre K^+-Ionen den aktiven Na^+-Austausch hemmen.

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Dexamethasone Effects on Liver β-Glucuronidase and Tryptophan Oxygenase Activities in Rats of Different Ages

The factors that regulate the lysosomal enzyme activity in tissues are poorly understood. The β-glucuronidase, a representative lysosomal enzyme, is under androgen control in the kidney[1], but in other tissues production of this enzyme appears constitutive[2]. The possibility exists that these enzymes may be under glucocorticoid regulation. These hormones decrease the activity of various hydrolases in the liver and intestine during growth[3,4] and in lymphocytes and monocytes during their in-vitro transformation[5,6]. The naturally occurring and synthetic glucocorticoids like dexamethasone have a stabilising effect on lysosomal membranes[7,8] and their administration to cells in vitro produces a striking prolongation of life-span[9].

The effects of dexamethasone administration in vivo on β-glucuronidase activity and distribution in the lysosomal, microsomal and supernatant (cytosol) fractions of the liver of intact young and senescent rats and, for comparison, on a glucocorticoid-inducible liver enzyme such as the tryptophan oxygenase[10,11] have been examned.

Male Wistar rats, 4 and 24 months old, fed ad lib. until death, were employed and divided in 2 groups. One group was treated daily with i.p. injections of dexamethasone-21-phosphate (Decadron, Merck, Sharp and Dohme) for 72 h and 4 mg/kg total dose, while the control group was injected with the solvent. 96 h after the injections started, the animals were killed by cervical dislocation and the livers were excised, divided in 2 parts and weighed.

One part of the liver was employed for β-glucuronidase (EC 3. 2. 1. 31) determination by the following procedure.

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