Bernsteinsäureoxydation und Glukoseabbau in Lebern normaler und akut urämischer Ratten und in Normalrattenlebern nach 20stündiger Einwirkung von Normal- oder Urämieserum. Werte der Kontrollen = 1

Methode	Untersuchungsmaterial	Resultate	Signifikanz
Bernsteinsäureoxydation	Leber: Normalratten	1,0	
	akut urämische Ratten	1,14	$p < 0{,}01$
	Normalrattenleber nach 20stündiger Einwirkung von Normalserum	1,0	
	Urämieserum	1,12	$p < 0{,}001$
Glukoseoxydation	Leber: Normalratten	1,0	
	akut urämische Ratten	0,93	$p > 0{,}3$
	Normalrattenleber nach 20stündiger Einwirkung von: Normalserum	1,0	
	Urämieserum	0,84	$p < 0{,}001$

Vermutlich werden Leberfunktionen durch toxische biogene Amine, Xanthoproteinsubstanzen, Azidose, Elektrolyt- und Wasserhaushalt-Störungen, Anämie und Vitaminmangel bei chronisch-urämischen Zuständen geschädigt. Zum Beispiel könnte die Bildung biogener Amine zunehmen, da Aminosäuren bei abnehmendem Sauerstoffgehalt der Gewebe vermehrt dekarboxyliert werden.

Der Glukose-Abbau war in der Leber akut urämischer Ratten nicht signifikant, in Lebergewebe, das 20 h mit Urämieserum in Kontakt war, signifikant vermindert. Die Aktivierung des Zitronensäurezyklus kann deshalb nur auf Steigerung von Fettsäuren- und/oder Aminosäureabbau zurückgeführt werden. H. THÖLEN

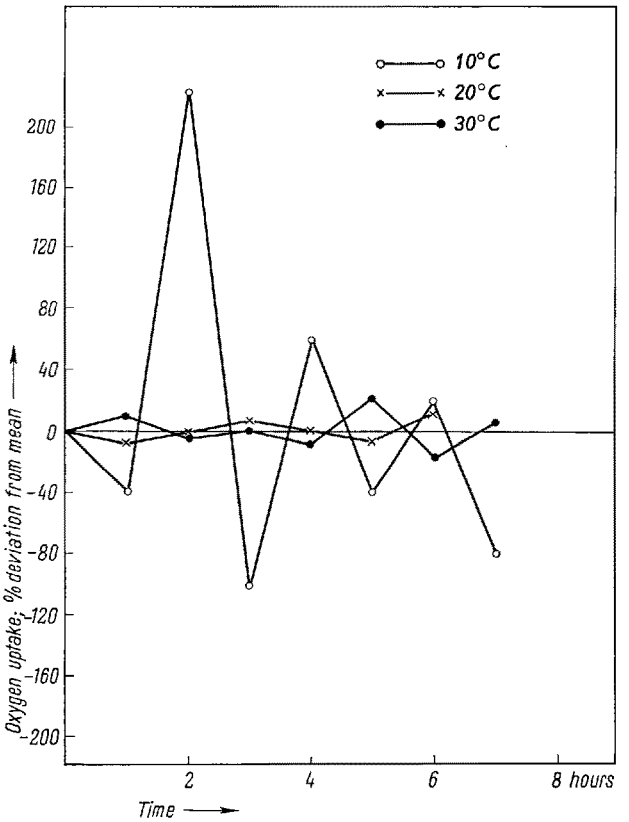
Medizinische Universitätsklinik Basel, 22. Juli 1959.

Summary

The oxydative desamination of amino acids in the liver of acute uremic rats is increased. Simultaneously the citric acid cycle in the liver of these rats is stimulated. It is suggested that the ketone-acids formed by the increased amino acid degradation are removed by the activated citric acid cycle.

Oscillatory Respiration in Balanus amphitrite Darwin

Attention has been drawn by GRAINGER[1] to the fact that a sudden rise or fall in temperature, following upon maintenance under constant conditions, leads to an overshoot in the oxygen consumption of a number of crustaceans. This overshoot takes the form of a damped oscillation leading eventually to a steady value which is typical of the new temperature. He detected no such oscillations in carbon dioxide output, and the respiratory quotient must, therefore, fluctuate with oxygen consumption. He points out that the phenomenon of overshoot may be explained if the organism is considered as a steady state system and if, on transference to the new conditions, there is a temporary accumulation or deficiency of metabolic substances before the appropriate steady state is established. Oscillatory metabolic changes are also known to occur in the general adaptation response that follows shock and these lead either to a state of exhaustion (persistent shock) or to a state of resistance (counter shock).



Oxygen uptake of *Balanus amphitrite* as percentage deviations from means.

Attention is here drawn to the oscillatory character of the oxygen consumption, following a reduction in temperature, in *Balanus amphitrite*. The animals were taken from the Salton Sea, Southern California, where there is a dense population on all submerged material. The 'Sea' although extremely saline[2] ($33^0/_{00}$) is not marine and has a somewhat different ionic composition from that of sea water. The animals were maintained in Salton Sea water at the prevailing temperature of 20–25°C between collection and the experiments. The experiments, which formed part of a large series, were made on isolated animals detached from their calcareous shells by cutting through the small muscles attaching the body to the opercular valves; injury was slight and had no detectable effect on the results (see BARNES and BARNES[3] for further details).

[1] J. N. R. GRAINGER, Nature *178*, 930 (1956).

[2] L. H. CARPELAN, Limnol. Oceanogr. *3*, 373 (1958).

[3] H. BARNES and M. BARNES, Veröff. Inst. Meeresforsch. Bremerhaven (in press).

Oxygen uptake was determined by the standard Warburg technique the animals being maintained in Salton Sea water with no addition of substrate: 10 mg/l chloromycetin was added to inhibit bacterial action. Readings were taken at hourly intervals.

Typical results are shown in the Figure. Since the mean oxygen uptake varies with temperature, the percentage deviations from the mean values over the whole period are given. The animals on which the results are quoted were large and of similar size; oxygen uptake is weight dependent, but no difference in relative behaviour was found with the different size groups. It is evident that while there is some variation in the oxygen uptake from hour to hour at 20° and 30°C, the changes are small compared with the hourly fluctuations when the animals are held at 10°C; these take the form of a damped oscillation. A large number of species of barnacles have been investigated under a wide variety of experimental conditions and marked oscillations of this type and magnitude have only been found in this species. (It must be pointed out that small oscillations particularly if they were of a short period would require a different technical approach.)

In intertidal species which are subjected to rapid changes of temperature in their natural habitat, the metabolic processes might be expected to be so coupled as to reduce the oscillatory behaviour, whether it is overshoot or response to shock. It is, however, not so evident why other sub-littoral species which live in a comparatively constant environment should not show a similar behaviour when subjected to equally large temperature changes. It is perhaps, therefore, of significance that *B. amphitrite* was the only warm water and tropical sublittoral species investigated. The fact that northern forms when subjected to a rise in temperature do not behave in an oscillatory manner comparable to that of this southern form when subjected to similar falls in temperature suggests that the coupling of the metabolic processes may be different in the two types of species; further work on this line would perhaps help to elucidate some of the factors concerned in determining their respective distribution.

H. Barnes and Margaret Barnes

The Marine Station, Millport (Scotland), April 20, 1959.

Résumé

Chez *Balanus amphitrite*, espèce des eaux chaudes, l'utilisation de l'oxygène par des individus isolés (extraits de leur coquille), soumis à une température peu élevée est de forme oscillatoire, contrairement à ce que l'on observe chez des espèces des eaux froides. Il se peut que cette différence caractérise de manière générale deux types d'espèces.

Action of Insulin *in vitro* on the Glucose Uptake of the Spinal Cord of the Rat*

It is not yet clear whether insulin has any effect on the metabolism of glucose through the nervous system or not[1]. Recently Rafaelsen[2] published his results, according to which the spinal cord of the rat appears to be sensitive to this hormone. Since most authors[3], as also we ourselves[4], were unable to find any effect of insulin on the nervous system, we thought it interesting to repeat Rafaelsen's test in order to try to confirm his results.

Table I

Action of Insulin on the Glucose Uptake and Oxigen Consumption of the Spinal Cord. Krebs Buffer. Not anesthetised

	Mean	t	P	No. experiments
Glucose uptake mg × 100 mg of tissue				
Insulin 10^{-1} . .	0·236	0·000	> 0·9	8
Control	0·236			8
Oxygen consumption microlitres × 100 mg of tissue × h				
Insulin 10^{-1} . .	13·4	0·209	$0{\cdot}8 < P < 0{\cdot}9$	8
Control	13·5			8

Methods. We utilised rats with a body weight of 100 to 160 g, fasted for 24 h. The extraction of the spinal cord was made following exactly the same method as Rafaelsen[2], after a previous anesthetic by inhalation of a mixture of 50% CO_2/O_2. In some other groups of experiments, the rats were decapitated in order to elucidate the effect, if any, of the anesthetic.

The medullary portion was divided into two parts weighting 100–120 mg, their weight being determined through the weighting differences of the incubation flasks. These pieces were directly incubated in 2 cm³ of the Gey and Gey (Rafaelsen) or Krebs medium according to the cases. For this purpose, Warburg glasses with a total volume of 15 cm³ were employed and the incubation (Warburg S. L.) was made at a temperature of 37·5°C for 120 min, at 80–90 oscillations/min and 4 cm amplitude. The flasks were aerated with a mixture of 95% oxygen and 5% carbon dioxide, for 1 min. Glucose was determined by the glucose-oxidase method, with a maximum development of colour. The insulin employed was Lilly[5], free from glucagon, at a concentration of 10^{-1} I. U. per cm³.

The glucose uptake was calculated from the decrease of glucose level in the medium during the incubation and expressed as: mg glucose per 100 mg of tissue (spinal cord) per 60 min. The determination of the consumption of oxygen is expressed in microlitres consumed per 100 mg of tissue per 60 min. Student's 't' test was used for statistical analysis of the data.

Results. Table I contains the results obtained in tests made with rats decapitated utilising the Krebs buffer. There are no differences in the glucose consumption between the series treated with insulin and the control animals. There are also no differences in oxygen consumption. There is no sensitiveness to insulin.

Tests reproduced in Table II were made with rats decapitated utilising the same buffer as Rafaelsen (Gey and Gey). The difference is not significant, either in the consumption of glucose or in that of oxygen. There is no sensitiveness to insulin.

* Preliminary communication.

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[2] O. J. Rafaelsen, Lancet *1958*, 941.

[3] C. P. Park, L. H. Johnson, J. H. Wright, and H. Batsel, Amer. J. Phys. *191*, 13 (1957).

[4] D. Martin-Hernandez, R. R-Candela, and J. L. R-Candela, Rev. iber. Endocrin. *5*, 39 (1958).

[5] We are indebted to Dr. W. R. Kirtley for the generous supply of this hormone.