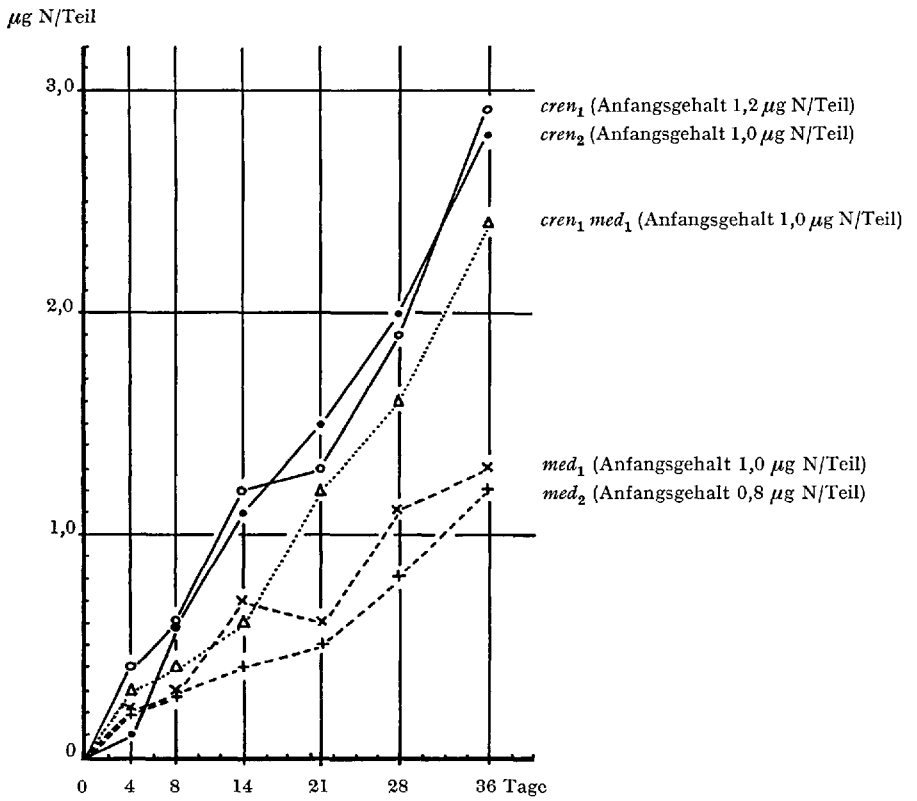

Zunahme an nicht in Trichloressigsäure löslichem N in µg N/Teil (Bezeichnungen $cren_1$, $cren_2$, med_1, med_2 und $cren_1 med_1$ siehe Text). (Tag 0 = 2. Tag nach Amputation bzw. Transplantation)

Es wäre nicht überraschend, wenn sich kleinere Unterschiede ergeben würden, da in den zweikernigen Systemen die Massenverkleinerung der Kerne nicht unmittelbar bestimmt werden kann, sondern nur ihre ungefähre Volumenverringerung. Bisher wurden jedoch solche Unterschiede nicht gefunden.

Zu Abbildung 1 sei noch angemerkt, dass die idealen Kurven in allen Systemen eine lineare Proteinzuwachsrate ergeben, womit frühere Befunde von VANDERHAEGHE[10] und BRACHET[11] bestätigt werden. Diese Linearität gilt jedoch nur, solange von ganzen Pflanzen mit maximalen Kernen oder ihren Regeneraten ausgegangen wird. In Zellen mit jungem, noch wachsendem Kern ist die Zunahme nicht linear (unveröffentlichte Versuche, von HÄMMERLING[6] bereits angeführt).

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Summary

(1) The rate of protein synthesis was found to be different in *Acetabularia crenulata* and *Acetabularia mediterranea* the higher cytoplasmic protein synthesis in *A. crenulata* depending upon the diameter of the stalk.

(2) In systems containing one or two nuclei, there was no difference in the rate of cytoplasmic synthesis of proteins. This corresponds to the diminution of size and efficiency of the nuclei in binucleated systems.

(3) In interspecific grafts, the rate of cytoplasmic protein synthesis corresponds nearly to the rate of protein synthesis of *Acetabularia crenulata*. Corresponding to morphogenetic processes, the *cren*-action is prevalent.

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Quantitative Changes of Muscle Proteins After Stimulation of the Muscle

Increase of the bulk of muscle occurring during physical training is a very well-known fact, but the mechanism of this increased proteosynthesis is not yet clear. The proteins of the muscle are considered to be metabolically not very active, according to the small incorporation of labelled amino acids into the whole muscle[1] and into isolated actine and myosine[2] which take up about 60% of all the muscle proteins. The increase of ammonia following contraction of the muscle, which might point to increased catabolism of proteins, is generally considered to be the result of deamination of ATP[3].

The work of DUBUISSON, however, shows that stimulation of the muscle leads to a change of the muscle proteins themselves. There is a qualitative change of the

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Time after stimulation	No. of rats	Dry weight (mg)		No. of rats	TN (mg N)		No. of rats	Non collagen PN (mg N)		Significant to*
		Control	Stimulation		Control	Stimulation		Control	Stimulation	
Immediately	6	72·3 ± 1·7	70·9 ± 2·2	6	10·61 ± 0·25	10·52 ± 0·12	7	9·45 ± 0·28	9·37 ± 0·26	$P > 0{\cdot}5$
4 h	9	65·0 ± 2·6	67·7 ± 1·9	9	8·30 ± 0·16	8·65 ± 0·14	8	9·04 ± 0·18	9·51 ± 0·27	$P > 0{\cdot}01$
8 h	6	63·8 ± 1·5	64·8 ± 2·3	8	9·36 ± 0·85	9·40 ± 0·85	–	—	—	$P > 0{\cdot}5$

* The per cent difference between the muscles of the right and left side of the normal animal are compared with the per cent difference between the muscles of stimulated and control side.

proteins and also a change in the quantitative relations of the known proteins[4]. Moreover contractin, a protein not known in the state of rest, appears[5].

A change in the turnover of proteins after functional activity is indicated by the observation of increased proteolytic activity after stimulation of the muscle[6]. There is also an increase of amino acids in the muscle of the hind limbs of rats after running in the tread-mill[7], and finally an increase in the arterio-venous difference of non-protein nitrogen in the muscle of the hind limb of the cat after faradic stimulation of the sciatic nerve[8].

In this paper we studied the changes in the absolute amounts of muscle proteins after direct stimulation of the m. tibialis anticus of rats. The muscle was stimulated by galvanic pulses at a frequency of 300 impulses/min for 6 min. To exclude the plasma proteins, which are increased after stimulation, due to increased blood flow through the muscle, the extremities of the stimulated and the control side were perfused by Tyrode solution (37° C, oxygenated and containing 100 mg% of glucose). The time of perfusion, i.e. until clear perfusion fluid was obtained, was 15–20 min. Immediatelly, 4 and 8 h after stimulation the muscle of the stimulated and of the control side were excised and their absolute dry weight and total nitrogen content was determined. The amount of non collagen proteins was determined immediately and 4 h after stimulation with the 'Biuret method' of GORNALL *et al.*[9].

There are no significant changes immediately after stimulation. However 4 h after stimulation there is an increase of dry weight by 4·1% and of total nitrogen by 4·2%.

The changes in dry weight and total nitrogen can be masked by the changes in non-protein nitrogen which in the experiments reported above increases 4 h after stimulation by 40%.

Using the Biuret method, the absolute amount of non-collagen proteins 4 h after stimulation of the muscle was therefore determined. The homogenized muscle was extracted with 0·1 *n* NaOH and the proteins where determined in the extract, using the Biuret-method[9], the accuracy of the method being 0·05 mg N. The values are expressed as milligrams of KJELDAHL's nitrogen, as the method had been calibrated with the standard Kjeldahl method. By this method, specific for proteins, an increase of 5·2% of non collagenous proteins was observed. The changes are therefore more manifest after elimination of metabolically inert[10] collagen.

This increase in the amount of proteins after stimulation of muscle is only a transient one. 8 h after stimulation of the muscle there is no longer any difference between the muscles of the stimulated and the control side.

We have therefore to deal with an overshoot reaction of similar character described in the metabolism of glycids[11] and ions[12]. It appears therefore that these overshoot reactions, following functional activity of muscle are significant for the metabolic changes taking place after training of the organism.

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Czechoslovak Academy of Sciences, Institute of Physiology, Prague, August 27, 1956.

Zusammenfassung

Nach direkter Reizung des Muskels von Ratten mit einer Frequenz von 300 Impulsen/min wurde folgendes beobachtet:

a) Direkt nach Muskelreizung kommt es zu keiner statistisch signifikanten Erniedrigung von Trockengewicht, Gesamtstickstoff und Nichtkollagen-Proteinen des Muskels.

b) 4 h nach Muskelreizung erfolgt eine Erhöhung des Trockengewichts und des Gesamtstickstoffs um 4,2%, der Nichtkollagen-Proteine um 5,2%.

c) 8 h nach Muskelreizung sind die Normalwerte wiederum erreicht.

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Serum Phosphoglucomutase Activity in Human Virus Hepatitis

We have investigated the phosphoglucomutase activity in human serum (from normal individuals and from cases of epidemic hepatitis). Phosphoglucomutase activity, as determined according to NAJJAR's method[1] in normal human sera (18 cases) has been found very poor

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