and denser the strands of mucus the more efficient the upward movement, require rationalization.

Zusammenfassung. Untersuchungen mit dem Weissenberg-Rheogoniometer zeigen, dass Speichel viskoelastisch ist und dass dessen dynamische Viskosität sich über einen Frequenzbereich von 2.5×10^{-3} bis 10 Hz und von 400 bis 0.1 Poise bewegt.

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The Development of 3′,5′-cyclic Nucleotide Phosphodiesterase in White and Brown Adipose Tissue of the Rat

It is now well established that lipolysis in adipose tissue is induced by cyclic adenosine monophosphate[1]. This compound is formed from ATP by a cyclase and is broken down to AMP by phosphodiesterase. The presence of both enzymes has been demonstrated in adult white adipose tissue[1]. No data are available for brown adipose tissue and nothing is known about the development of either enzyme in both white and brown adipose tissue.

It has been shown previously that the activity of hormone sensitive lipase in rat adipose tissue increases with age[2] and this might be related to changes in the activities of adenyl cyclase or phosphodiesterase. Hence phosphodiesterase activity was determined during postnatal development of the rat.

Adipose tissue was homogenized in an all glass homogenizer with 0.25 *M* sucrose, in 10 volumes for interscapular and 2 volumes for gluteal white tissue. Phosphodiesterase was determined according to[3] in 0.1 ml of the fat free supernatant obtained by centrifuging the homogenate in the cold at $10{,}000 \times g$ for 20 min. The supernatant was incubated with 25 μmoles *Tris* HCl, 2.5 μmoles $MgCl_2$, 10 μmoles ammonium sulfat and 0.75 μmoles cyclic AMP for 20 min at 37 °C. After boiling in water and cooling, snake phospholipase (*Crotalus adamanteus* venom) was added and incubation was continued for another 20 min. The reaction was stopped with 10% trichloracetic acid.

It is evident from the Table that in both types of adipose tissue phosphodiesterase activity is highest in the youngest age groups. Per unit wet weight activity is always higher in brown adipose tissue than in white adipose tissue. Per unit protein content, however, activity is higher in brown than in white tissue only in the suckling period.

Phosphodiesterase activity of white and brown adipose tissue

Age	μmoles *P* released/ mg protein		μmoles *P* released/ g wet weight	
	B.F.	W.F.	B.F.	W.F.
Fetus	0.49 ± 0.015	–	10.8 ± 0.32	–
3 days	0.50 ± 0.010	0.31 ± 0.02	11.0 ± 0.31	2.2 ± 0.16
10 days	0.52 ± 0.02	0.11 ± 0.006	11.2 ± 0.40	0.8 ± 0.06
20 days	0.19 ± 0.011	0.09 ± 0.010	3.5 ± 0.15	0.8 ± 0.05
30 days	0.21 ± 0.009	0.15 ± 0.01	2.0 ± 0.11	0.8 ± 0.04
Adult	0.11 ± 0.006	0.105 ± 0.007	1.9 ± 0.10	0.8 ± 0.031

4 to 6 determinations for each group ± S.E.

It is tempting to relate these developmental changes in phosphodiesterase activity to changes in the activity of hormone sensitive lipase[2]. The postnatal rise in the activity of the latter enzyme might be due to a decrease in the rate of breakdown of cyclic AMP during that period of development. Another fact that is in agreement with such a mechanism is the higher rate of spontaneous lipolysis in white than in brown adipose tissue in the neonatal period[4]. In white adipose tissue, however, this rate decreases with age, a change not to be expected if phosphodiesterase were the decisive factor for lipolysis. Undoubtedly many factors regulate the rate of lipolysis in adipose tissue and probably control of adenyl cyclase activity is more important than the regulation of phosphodiesterase. In brown adipose tissue at least, adenyl cyclase activity does not seem to change during postnatal development[5], though its hormone sensitivity does, and hence it is possible, though not proven, that the postnatal decline in phosphodiesterase activity in both types of brown adipose tissue is related to the high fat diet consumed by the rat during that period[6] and the assumed lesser need for lipolysis.

Zusammenfassung. Nachweis einer Abnahme der Phosphodiesterase im braunen und weissen Fettgewebe mit dem Alter erklärt die erhöhte Hormonempfindlichkeit der Depotfettgewebe bei älteren Ratten.

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