

A Lipase in the Milk of the Gorilla

In 1901 MARFAN, a French paediatrician, discovered a lipase in human milk by using monobutyryl as a substrate and titrating the formation of butyric acid with alkaline solution. This effect could be found only in a very low degree in cows' milk. There was no splitting of high molecular fats. In 1928 it was shown by the author that MARFAN had made an error because the lipase in human milk had to be activated. After activation even fats of high molecular weight, such as those in human and cows' milk and in plants, could be split. Activation was brought about by bile acids such as cholic acid, desoxycholic acid, glyco- and taurocholic acid, but not by lithocholic acid. Scymnol of sharks' bile was also an activator and/or neutralized human gastric juices or extracts of gastric mucosa.

The effect of the latter group was based on the activation of the substrate by which the triglycerides are changed to di- and monoglycerides. These can be split by the lipase of human milk without the presence of bile acids, similar to the action on low molecular esters. For methods and literature used see FREUDENBERG¹. This is demonstrated in Table I.

Even highly purified (by chemical and physical procedures, finally by electrophoresis) human milk lipase is inactive against high molecular fats and must be activated.

In 1965 the author investigated the presence of lipase activity in gorilla milk. At present, a lipase is not known to exist in any animal's milk, except as having weak action against esters of low molecular weight in the cow, the goat, the mare, the dog, the rabbit and the guinea-pig.

Table I. Influence of activation of bile acids on splitting of different substrates of lipase in human milk

Substrates	Non-activated lipase	Activated lipase
Monobutyryl	+	++
Tributyryl	+	++
Methylbutyrat	+	++
Äthylbutyrat	+	++
Laurel oil	0	+
Olive oil	0	+
Fat of cows' milk	0	+
Fat of human milk	0	+
Acetylcholin	0	0
Lecithin	0	0

After activation by bile acids, gorilla milk, on the other hand, can split the fat of its own milk, of boiled cows' milk and of olive oil. Without activation there was splitting of tributyrin. Against inactivation of the lipase by chinin and/or physostigmin, human and gorilla milk showed the same properties (as indicated in Table II).

The similarity of the effect of the poisons on the lipases of human and gorilla milk is as convincing as the similarity of the activation by bile acids and/or gastric juices and the parallelism of action on low molecular esters. It would be desirable to undertake similar research on the milk of the lower apes.

Table II

Poison	Pancreatic lipase	Gastric lipase	Human milk lipase	Gorilla milk lipase
Chinin	Suppression	Suppression	No suppression	No suppression
Physostigmin	No suppression	No suppression	Suppression	Suppression

Zusammenfassung. Gorillamilch hat nach Gallensäureaktivierung eine ähnlich spaltende Wirkung auf echte Fette wie Menschenmilch. Ohne Gallensäure kann hochmolekulares Fett auch im Zusammenwirken mit neutralisiertem menschlichem Magensaft oder Magenmucosaeextrakten angegriffen werden, indem hierbei Di- und Monoglyceride entstehen. Ebenso werden niedrig molekulare Ester direkt angegriffen wie zum Beispiel Tributyrin. Die Gorillamilch ist die einzige Tiermilch, bei der ein der Menschenmilch genau entsprechendes Verhalten der Lipase bisher gefunden wurde.

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¹ E. FREUDENBERG, *Die Frauenmilchlipase* (J. Karger, Basel and New York, 1953).

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Die alkalische Phosphatase-Aktivität des Ratten-serums nach anaphylaktoidem Schock

In früheren Untersuchungen konnte festgestellt werden, dass anaphylaktische¹ und anaphylaktoide² Reaktionen eine Erhöhung der alkalischen Phosphatase (AP)-Aktivität des Rattenharnes bewirken. Unter normalen Bedingungen entstammt die gesamte AP des Harnes den Nierentubuli, eine Ausscheidung von Serum-AP findet nicht statt. Unter pathologischen Bedingungen (bei Proteinurie oder bei erhöhter Serumaktivität) konnte jedoch eine Ausscheidung von AP des Serums durch die Niere festgestellt werden³. Deshalb erschienen Untersuchungen

der AP des Rattenserums zu verschiedenen Zeitpunkten nach Auslösung eines anaphylaktoiden Schocks angezeigt, um Veränderungen der Serum-AP als allfällige Ursache der gesteigerten AP-Aktivität des Harnes auszuschliessen.

Material und Methoden. Als Versuchstiere dienten Albinoratten von 200 g Körpergewicht. Nach Bestimmung der AP-Aktivität im Serum normaler Tiere (50

¹ W. RAAB, *Nature*, im Druck.

² W. RAAB, *Experientia*, 22, 91 (1966); *Naturwiss.* 53, 43 (1966).

³ C. A. FLOOR, E. B. GUTMAN und A. B. GUTMAN, *Am. J. Physiol.* 120, 696 (1937). – G. NAVA und L. SZASZ, *Folia endocr.* 3, 437 (1950).