

bitter as caffeine, but D-tyrosine is still 5.5 times sweeter than sucrose. We may conclude that several amino acids, including the aromatic ones, are compounds of high taste intensity. They are no doubt of importance for the taste of many dietetic preparations, a fact which has not been considered in the past<sup>13</sup>.

**Zusammenfassung.** Der Geschmack der L- und D-enantiomeren Formen verschiedener Aminosäuren wurde in vergleichenden statistischen Degustationsversuchen ermittelt. Dabei dienten Caffein und Zucker als Standardsubstanzen für den bitteren, bzw. süßen Geschmack. Arginin, Asparaginsäure, Isoleucin, Lysin, Prolin, Serin, Threonin und Valin sind weitgehend geschmacklos, während Cystein, Glutaminsäure und Methionin komplexe Geschmacksnoten besitzen. Alanin, Histidin, Leucin,

Phenylalanin, Tryptophan, Tyrosin und Glycin besitzen einen ausgeprägten Eigengeschmack, wobei vor allem die L-Isomeren schwach bis stark bitter und die D-Isomeren schwach bis stark süß sind.

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## The Role of the Lymph Circulation in Free Fatty Acid Transport

Plasma FFA are known to be bound to the serum albumin in blood<sup>1</sup>. The part played by the lymph circulation in the interstitial transport of protein-bound FFA has not yet been studied, except for fatty acid absorption from the intestinal tract<sup>2</sup>.

In the present experiments, the FFA concentrations in lymph collected from five body areas were measured to study changes produced by increases in plasma FFA concentrations.

**Methods.** Dogs of either sex and 12 to 24 kg body weight were used after 16 h of fasting. Chloralose anaesthesia was employed. Lymph was collected<sup>3</sup> by cannulation from one of the lymphatics of the liver, from the lymph trunk of the leg, from the intestinal and cervical lymph trunks, and from the thoracic duct during 1 or 2 periods of 20 to 30 min before and during intravenous infusion of 2.5 µg/kg/min of noradrenaline<sup>4</sup>. Blood samples were withdrawn from the femoral artery and the portal vein. Samples of both blood and lymph were collected on powdered heparin. Long-chain FFA were deter-

mined by the method of DOLE and MEINERTZ<sup>5</sup>, and total esterified fatty acids by that of CONNERTY et al.<sup>6</sup>. Underlying the calculations were the mean values obtained for the lymph collection periods before and during noradrenaline infusion. Statistical analyses were performed with Student's *t*-test.

**Results and comments.** Before noradrenaline, the group-average FFA concentration was higher in the lymph from the intestine ( $p < 0.05$ ) and the thoracic duct ( $p < 0.05$ ) than from the plasma, and lower in the lymph from the liver, the leg, and the neck ( $p < 0.05$ ) (Figure). The explanation of the difference in the first case is that the FFA is absorbed from the intestine by means of the intestinal lymph, and of that in the second case, that the lymph from the respective body areas is really plasma filtrate. Noradrenaline produced a significant rise in the FFA concentration of the plasma ( $p < 0.001$ ) and the lymph from the liver ( $p < 0.01$ ) and the neck ( $p < 0.05$ ) in relation to the starting values. It decreased the total esterified fatty acid concentration in the hepatic lymph from  $362 \pm 50$  mg% to  $301.4 \pm 40.5$  mg% ( $p < 0.05$ ), and in the lymph from the thoracic duct from  $340.2 \pm 30$  mg% to  $228.7 \pm 19$  mg% ( $p < 0.05$ ).

**Zusammenfassung.** Es wurde in der Leber- und Halslymphe des Hundes eine niedrigere Konzentration der freien Fettsäuren gefunden als im Blutplasma. Sie wird durch Noradrenalininfusion signifikant erhöht.

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<sup>1</sup> D. S. FREDRICKSON and R. S. GORDON JR., *Physiol. Rev.* 38, 585 (1958).

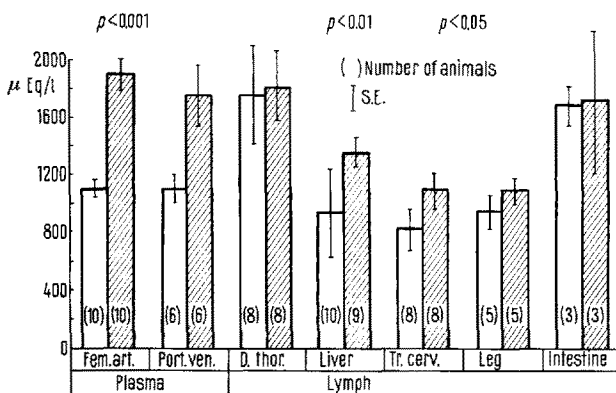
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<sup>3</sup> I. RUSZNYÁK, M. FÖLDI, and Gy. SZABÓ, *Physiologie und Pathologie des Lymphkreislaufes* (Akademischer Verlag, Budapest 1957).

<sup>4</sup> J. E. WHITE and F. L. ENGEL, *Proc. Soc. exp. Biol. Med.* 99, 375 (1958).

<sup>5</sup> V. P. DOLE and H. MEINERTZ, *J. biol. Chem.* 235, 2595 (1960).

<sup>6</sup> H. V. CONNERTY, A. R. BRIGGS, E. H. EATON JR., *Clin. Chem.* 7, 37 (1961).



Plasma FFA concentrations and FFA concentrations in the lymph before and during noradrenaline (white column: before, and oblique hatching during, noradrenaline). Abbreviations: Fem. art. = femoral artery; Port. ven. = portal vein; Tr. cerv. = truncus cervicalis; D. thor. = ductus thoracicus.