and localization experiments, e.g. with immunological methods, could substantially aid the knowledge of membrane structure.

It has been suggested that the ATPase system in red cell membranes may be represented by an actomyosin-type protein[8,2]. In our hands, extracts of red cell membranes prepared by various procedures used for the isolation of contractile proteins from smooth and striated muscle[9,10] and from thrombocytes[11] contained no actomyosin-like protein neither on biochemical or on immunological analysis (including immunefluorescent studies).

Zusammenfassung. Menschliche Erythrozytenmembranen enthalten eine NEM-sensitive und eine NEM-insensitive ATPase, die wahrscheinlich beide an Membranoberflächen lokalisiert sind.

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Level of Ascorbic Acid and its Oxidation in the Liver of the Scorpion, *Palamnaeus bengalensis*

It is well known that in all vertebrates ascorbic acid is widely required in metabolism in addition to its role in the synthesis of collagen. Several workers have also reported the nutritional and metabolic status of ascorbic acid in invertebrates[1,2]. However, no information is available on the metabolism of ascorbic acid in arachnids. The concentration of total ascorbic acid in the liver of the scorpion, *Palamnaeus bengalensis*, and the rate of its oxidation in this organ is reported here.

Scorpions weighing approximately 5.0 g were collected locally and were used within 24 h of their collection. The liver was removed and immediately used for the estimation of ascorbic acid[3] using a Klett-Summerson colorimeter. The concentration of ascorbic acid in each sample was determined from a standard curve which was linear and was drawn each time. The average ascorbic acid concentration from the liver of 8 scorpions was found to be 5.567 ± 0.426 mg/100 g dry weight.

The rate of oxygen consumption of the liver homogenate with ascorbic acid and other substrates was studied manometrically. The temperature of measurement was 32 °C and the gas phase was air. The total volume of the reaction mixture after addition of the homogenate was 3.0 ml. The pH of the incubation mixture was maintained at 6.5 with phosphate buffer[4]. The centre well contained 0.2 ml of 20% KOH. Duplicate flasks were used for each experiment. The final concentrations of the various reagents of the reaction mixture were: sucrose 83.3; phosphate buffer 8.8; $MgCl_2$ 3.3; ascorbic acid 16.6; glucose, succinate and citrate 33.3 µmoles. Readings were taken at 10 min intervals for 60 min. The oxygen consumption was expressed as Q_{O_2} (ml O_2/g dry wt./h) after determining the dry weight of the tissue.

The level of ascorbic acid in the liver of scorpion is comparatively less than that of the rat (24.0 mg/100 ml) and frog (22.0 mg/100 ml)[5]. However, its concentration is as high as that of the fish (3.2–23.0 mg/100 ml)[5]. Similarly, the Q_{O_2} value with ascorbic acid is much higher than those obtained for other substrates (Table). The rates of oxidation of different substrates are: ascorbic acid > citrate > glucose > succinate.

The high concentration of ascorbic acid and its rapid oxidation in the liver of the adult scorpion is of particular interest since the collagen content of the animal is negligible. Therefore, it may be required for the 3 following functions: (1) the animal may require ascorbic acid for its metabolic activities as do rats[6]; (2) it may be an intermediate of the uronic acid pathway which is interlinked with the hexosemonophosphate pathway[7]; (3) it may be necessary for the metabolism of tyrosine as is reported for *Blatta conjuncta*[8]. The latter may be the major requirement for ascorbic acid since oxidation of tyrosine is needed for melanin synthesis of the cuticle as in the insects[9].

Q_{O_2} (ml O_2/g dry wt./h) of the liver homogenate of scorpion with various substrates

Substrates	Q_{O_2}
Ascorbic acid	0.42 ± 0.025 (4)
Glucose	0.27 ± 0.034 (5)
Succinate	0.15 ± 0.010 (5)
Citrate	0.40 ± 0.028 (5)

The figures in parentheses indicate the number of animals used.

Zusammenfassung. Kolorimetrische und manometrische Untersuchungen zur Konzentrationsbestimmung der Ascorbinsäure und ihrer Oxydationsrate in der Skorpionsleber bei *Palamaeus bengalensis*.

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