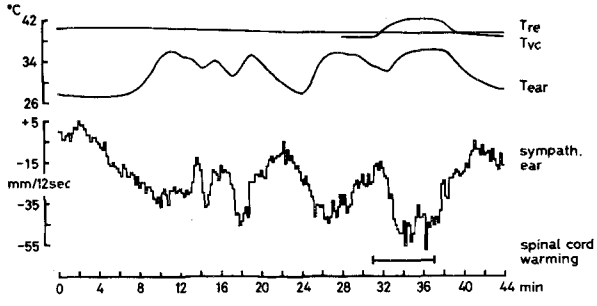
rectal and air temperature; water and air temperatures were then maintained constant. For comparative purposes, the effects of warming the spinal cord to 41–42 °C were also observed

Results and discussion. Efferent sympathetic activity and the various temperatures were monitored for up to 8 h. The results presented in the Figure show that even with rectal, plate and air temperatures essentially constant, spontaneous oscillations in ear skin temperature occur and are accompanied by inverse changes in the level of electrical activity of the nerve. Ambient air temperature was usually about 25 °C, plate water 40 °C, and rectal temperature about 39.5 °C. Ear skin temperature varied by up to 8 °C, while nerve activity changed by as much as 90% of the difference in level of activity seen in the constricted and fully dilated states; the duration of oscillations was 2–70 min. Warming the spinal cord could result in complete abolition of spike activity in excess of the baseline noise level, and was associated with a 0.5–8 °C increase in ear skin temperature over a period of approximately 6 min.



Integrated cutaneous efferent sympathetic activity (sympath. ear), and temperatures of the ear (T_{ear}), vertebral canal (T_{vc}) and rectum (T_{re}) of a rabbit lying on a pad at 37.8–38.1 °C with ambient dry bulb temperature 23.8–25.1 °C.

The observed changes in ear skin temperature are indicative of oscillations in blood flow. The spontaneous nature of these events is characteristic of the activity of thermoregulatory mechanisms when an animal is in the thermoneutral zone. At this time, thermoregulatory effector mechanisms exhibit minimal activity, and the fine adjustment of body temperature is brought about by small adjustments in cutaneous blood flow (e.g., see symposium edited by MONTEITH and MOUNT[7]). The spontaenous oscillations in sympathetic acitivity controlling the cutaenous blood flow indicate that the previously reported changes which were experimentally evoked[2–4] represent normal physiological phenomena.

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Changes in the Free Amino Acid Pattern of Haemolymph of the Common Indian Scorpion *Palamnaeus bengalensis* During Moulting

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Summary. Haemolymph of *Palamnaeus bengalensis* contains normally 12 and during moulting up to 15 free amino acids, being in maximal number at the end of ecdysis. Aminoacidaemia is most pronounced during the pharate stage. Tyrosine appeared for tanning of the cuticle. Taurine and methionine were not present.

SHRIVASTAVA[2,3] described structure and histochemical composition of the various layers of cuticle of *P. bengalensis* in the different stages of their development during moulting. In the present study, corresponding changes in the free amino acid pattern of *P. bengalensis* during different stages of moulting have been studied. Though data is available on free amino-acids (FAA) in insects, much less is avalable in arachnids[4–8] and none on the changes of FAA during moulting of scorpions.

Materials and methods. Known quantities of haemolymph samples of *P. bengalensis* in different stages of moulting were collected and extracted in ethanol for their amino acids which were detected by thin layer chromatography and the two dimensional paper partition chromatography. Standard solutions of pure amino-acids prepared in 10% isopropanol were used for the identification and quantitative assessment.

Observations and discussion. Hemolymph of *P. bengalensis* was found to contain normally 12 and during a moulting period up to 15 free amino acids (Table). The analyses also revealed remarkable variations in their pattern during different stages of moulting.

At premoulting stage, these were present in larger quantity and in greater number than when moulting was in progress, apparantly due to the dissolution of some of the old cuticle. Decrease of amino-acids while moulting was in progress was likewise due to their incorporation in the new cuticle. Then increase to a maximum number at the end of ecdysis shows that some are added from the body.

Seven amino-acids, namely alanine, arginine, aspartic acid, glutamic acid, its amide glutamine, glycine, and tyrosine, were present during all the stages of moulting and the intermoult, but they also showed decline after the ecdysis. Decrease in aspartic acid, leucine, lysine, phenylalanine, threonine, tryptophan, and valine appeared to be related to increase in body size of the scorpion, taking place during this period, and decrease of arginine, glycine, phenylalanine, proline, tryptophan and tyrosine was related specially to moulting.

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Free amino acids present in various stages of moulting in the haemolymph of the Indian scorpion *P. bengalensis*

Amino acid	Stage 1	Stage 2	Stage 3			Stage 4
			a	b	c	
Alanine	++	+++	++	+	+	++
Arginine	+	++	++	++	+	+
Aspartic acid	+	+	+	+	+	+
Glutamic acid	+	+++	++	++	++	+
Glutamine	++	+++	+	+	+	+
Glycine	+	++	++	++	++	+
Leucine	+	++	+	—	+	+
Lysine	+	++	—	—	++	—
Phenylalanine	—	+	+	+	+	—
Proline	—	—	—	—	++	+
Serine	+	++	+	—	+	+
Threonine	+	++	—	—	+	+
Tryptophan	—	+	—	—	+	—
Tyrosine	+ (weak)	+	++	+++	++	+
Valine	+	++	—	—	+	+
Total amino acid present	12	14	10	8	15	12

Stage 1, normal stage; 2, premoulting or pharate stage; 3a, animal just started moulting; 3b, animal in which ecdysis was in progress; 3c, animal in which ecdysis was at the end; 4, animal in which tanning was in progress.

Alanine's decline might be due to its incorporation in the new cuticle while decrease of glutamic acid level indicated an increased nervous tissue metabolism during moulting. Sharp decrease in serine could have been likewise explained by its conversion into methionine and incorporation in the new cuticle, had there not been evidence contrary to this[2] and also that contrary to *Buthus tamulus*[4]. Methionine was not found in *P. bengalensis*. It was also reported to be absent in *Androctonus australis*[5]. Tyrosine at the premoulting stage accumulated up to the end of ecdysis but decreased sharply as the ecdysis was over. Similar observations with respect to tyrosine are reported for *Bombyx mori*[9]. Proline was present only in the haemolymph of the *P. bengalensis* in which ecdysis was coming to an end. It may be incorporated in the developing cuticle. Insect cuticular proteins are known to have a high concentration of proline[10]. Taurine reported in high concentration in *Androctonus australis*[5] was not found in *P. bengalensis*. Taurine is also reported to be absent in *Limulus polyphemus*[8].

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Dietary Linoleic Acid and Lipogenesis in Rat Adipose Tissue

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Summary. Weanling rats were fed diets in which linoleic content varied from 0.4 to 11%. The changes of epididymal adipose tissue lipogenesis from glucose do not depend upon the linoleic content of the diets.

It is well known that adipose tissue lipogenesis is reduced in response to feeding high fat diet[3,4]. However, our previous investigations showed that sunflower oil (67% linoleic acid) is less effective than lard (7% linoleic acid) to depress in vitro adipose tissue lipogenesis[5,6]. These results do not agree with those of Du and Kruger[7] who reported that linoleate is more efficient than oleate to suppress lipogenic activity in adipocytes. Hence we attempted to establish whether or not an essential fatty acid can play an inhibiting role on the de novo lipogenesis. The rats which were used in the Du and Kruger' studies received a fat-free diet for 4 to 6 months after weaning and the effect of an additional dose of linoleic acid was tested when animals showed every symptom of an essential fatty acid deficiency. The present study was carried out on healthy young rats. In order to evaluate the importance of the diet linoleic content on the in vitro adipose tissue lipogenesis from glucose, they received different vegetable oils and in addition to determine whether other oil components can mask linoleic effect, pure methyl esters were also given to rats.

Materials and methods. Several fratries of weanling male Wistar CF rats (40–50 g) were divided into 6 groups of 5 rats (experiment 1) or 6 rats (experiment 2). They were supplied diets (Table I) and water ad libitum for 3 weeks. In a 3rd experiment, 2 groups of 8 rats were fed A5 diet for 10 days after weaning and then they received

Table I. Nomenclature and composition (% by wt.) of the synthetic diets

Diets	Fat composition			Sucrose
	Oil		C18:2	
LP	0.7	sunflower	0.4	63
A5	5	peanut	1.3	58
O5	5	olive	0.4	58
M5	5	corn oil	2.8	58
O20	20	olive	1.4	43
M20	20	corn oil	11.1	43

In addition each diet contained: NBC, vitamin free casein: 29%; NBC, salt mixture: 5; UAR, vitamin mixture: 1; cellulose: 2.

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