EFFECT OF STEROLS FROM THE NERVOUS TISSUE OF ACCLIMATED WORMS ON THE TISSUE RESPIRATION OF NORMAL WORMS
In our laboratory studies were made earlier on the effect of the body fluids of "cold" and "warm" acclimated worms on the oxygen consumption of the tissues of normal, cold and warm acclimated worms (Rao, 1962; Rao and Saroja, 1963; Saroja and Rao, 1965). Similar effects were noticed in the scorpion, *Heteromerus fulvipes* by Vijayalaxmi (1964). These effects of nervous tissue extracts and body fluids were later confirmed by Precht and his co-workers (Precht, 1964) in the fish, *Idus idus* and *Cyprinus carpio*.

However, the nature of the active substance in these extracts has not been established, although Vijayalaxmi (1964) showed that the effect persists even after heating the extract to 60°C. In the present investigation it was therefore considered fruitful to carry this part of the analysis a step further by extracting the non-saponifiable sterol fraction of the nervous extract. The sterol fraction thus obtained from the nervous tissue of cold and warm acclimated worms is studied for its effect on tissue respiration of normal worms.
2. MATERIAL AND METHODS

The sterol fraction from the nervous tissue of acclimated worms was procured by saponifying the tissue with alcoholic potassium hydroxide (2.5% in 95% ethanol) and the non-saponifiable sterol fraction was extracted with 95% alcohol.

To study the effect of the above extract on the respiration of normal tissues, 0.1 ml of cold or warm extract as the case may be was taken in the side arm of the experimental flask with 0.9 ml of the Ringer. 2 ml of the Ringer including the tissue was taken in the main chamber. Side by side, a control flask is prepared which differs from the experimental flask only in receiving 0.1 ml of the normal extract in the side arm instead of cold or warm extract.

The respiration was studied by Warburg's manometric technique as described by Umbreit et al., (1959) with the conditions described by Saroja and Rao (1965).
3. RESULTS AND DISCUSSION

From the data presented in table 18 and fig. 12 it is evident that the tissue respiration is higher in the 'cold' extract treated set than those of controls. An opposite trend is seen in the warm extract treated set.

The percent increase, in relation to controls in cold extract treated set is + 68.9 and the percentage decrease in relation to normal in warm extract treated set is - 21.23. The level of significance between 28°C and 20°C and that between 28°C and 35°C are 6.32 and 267.4 respectively and the data is highly significant at 1% and 10% levels.

The changes in the respiration of the tissues produced by the sterol fraction of the nervous tissue of cold and warm acclimated worms clearly indicated the presence of one or more hormone like factors which can produce in vitro effects. Generally, cold acclimation results in an increased metabolic rate of the tissues of normal animals while warm decelerates the same.

It can be presumed from this study and in the light of the results of the experiments in which the nerve extract from the cold and warm acclimated worms, was injected into no worms that a neurohormonal factor which activates or retards the metabolic rate of the tissues may be present in the sterol extract of the cold and warm acclimated worms respectively. The fact that this extract of cold acclimated
worms respectively. The fact that this extract of cold acclimated worms is capable of raising the metabolic rate of 'normal' tissues, and the warm extract, of depressing the metabolic rate of the tissues of normal worms, clearly suggests the presence of an activating factor in the sterol extract from the nervous tissue of cold acclimated worms and a substance with a decelerating effect in the sterol extract from the nervous tissue of warm worms, which are capable of producing the immediate in vitro effect on the respiration of normal tissues.
TABLE 18

Effect of sterols of the acclimated nervous tissue on the tissue respiration of normal worms.

<table>
<thead>
<tr>
<th>Nature of the extract used.</th>
<th>Number of observations</th>
<th>Micro liters of oxygen/gram/hour</th>
<th>Relative change with the alteration of the extract.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold extract treated animals.</td>
<td>11</td>
<td>$308.3 \pm 101.54$</td>
<td>1.689</td>
</tr>
<tr>
<td>Normal extract treated animals (controls).</td>
<td>9</td>
<td>$178.5 \pm 46.40$</td>
<td>1.000</td>
</tr>
<tr>
<td>Warm extract treated animals.</td>
<td>8</td>
<td>$140.3 \pm 38.06$</td>
<td>0.7877</td>
</tr>
</tbody>
</table>