Effect of Temperature on the Spontaneous Activity from the Isolated Ganglia of the Slug, Cockroach and Crayfish

Most biological reactions respond to an increase in temperature by an increase of rate, and decrease their rate if the temperature is lowered. However, two preparations, that of the elasmobranch ampullæ of Lorenzini described by Sand[1] and by Hensel[2]; and that of mammalian peripheral nerve described by Bernhard and Granit[3], show an anomalous transient response to temperature.

In these, when the temperature is increased the preparations show a transient decrease in rate of spontaneous activity, whereas if the temperature is decreased, the activity shows a transient increase. The final rate of activity shows the normal temperature effect: it is faster at higher temperatures.

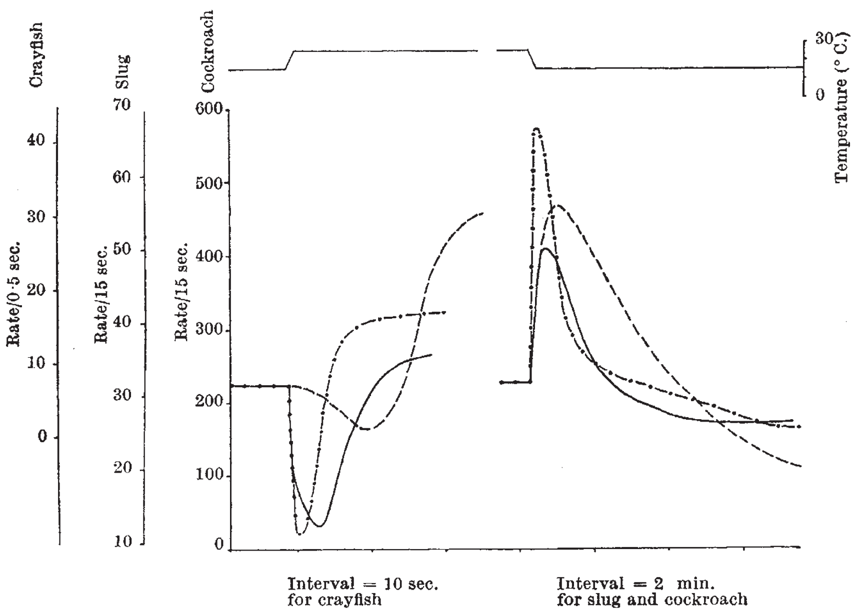

Fig. 1. Effect of change of temperature on the spontaneous electrical activity from the pedal ganglion of the slug ———, the abdominal ganglia of the cockroach —•—•—•, and the abdominal ganglia of the crayfish — — —

We have found three other preparations that show a similar anomalous transient response to temperature. These are the isolated pedal ganglion of the slug, the isolated thoracic and abdominal ganglia of the cockroach, and the isolated thoracic and abdominal ganglia of the crayfish. All three of these show spontaneous activity the rate of which is affected by temperature and temperature change. These effects are shown in Fig. 1. In all three an increase in temperature is followed by a transient decrease in spontaneous activity, whereas decreasing the temperature is followed by a transient increase in activity. This is true both for the rate of activity of single units and also for the number of units that become active. The effect is most clearly seen in the slug, where it takes approximately three to four minutes before the normal temperature effect is seen; it is most transient in the crayfish, where it lasts for about fifteen seconds after the temperature change.

Full details concerning the sensitivity of these preparations to temperature change will be published elsewhere.

G. A. Kerkut
B. J. R. Taylor

Department of Physiology and Biochemistry,
University of Southampton.
March 28.

[1] Sand, A., *Proc. Roy. Soc.*, B, **125**, 524 (1938).
[2] Hensel, H., *Z. vergl. Physiol.*, **37**, 509 (1955).
[3] Bernhard, C., and Granit, R., *J. Gen. Physiol.*, **26**, 257 (1946).

Effect of Spore Coalescence on the Early Development of *Gracilaria verrucosa* (Hudson) Papenfuss

Carpospores and tetraspores of *G. verrucosa* have been grown on microscope slides in running, natural sea water under constant illumination. After the initial attachment to the slide, divisions occur which correspond, in general, with the observations of Killian[1]. These produce, in 40–45 days, a dome of cells which may be 30–35μ high and 120μ in diameter. In the majority of isolated sporelings there is a great reduction in activity at this stage; but in some cases development of the shoot begins, in circumstances described below. The peripheral growth of closely adjacent spores leads to their meeting and coalescing into irregularly shaped 'rafts'. In these rafts individual sporelings cannot be recognized after a time unless their positions have been mapped at earlier stages. On all slides shoots have been first observed arising from rafts of this kind. Isolated sporelings, on the other hand, rarely show any change from the 40-day condition after several months, by which time coalesced sporelings of the same age have produced shoots several millimetres long. Shoots are not produced by all sporelings in a raft, and, when an extensive raft produces numerous shoots, these are well spaced out and seldom arise from adjacent sporelings. Furthermore, it will be seen from Fig. 1 that the larger rafts tend to bear proportionately longer shoots. On the slide concerned, the longest (1·8 mm.) occurred on a raft of about five sporelings. Larger rafts on the same slide bore more than one shoot, but none was longer. The largest raft, containing about fifty sporelings, bore ten shoots averaging 0·61 mm. in length, the longest measuring 1·6 mm. A ratio of five sporelings to each shoot seems usual in the larger rafts; but the frequency of the small shoots produced on isolated sporelings is much lower than 1 in 5.