General

Material and Methods

Material:

Adult cockroaches (*Periplaneta americana*) of both the sexes were used throughout the experiments. They were housed in a cage maintained at a constant temperature (25°C) in the laboratory. Food in the form of bread and glucose biscuits and water were supplied regularly.

Dissection:

Cockroaches were decapitated and dissection was carried out in cockroach Ringer's solution. The cockroach Ringer's solution consisted of the followings: NaCl, 215 mM; KCl, 3.1 mM; CaCl$_2$, 1.8 mM; NaHCO$_3$.2H$_2$O, 2.0 mM; NaH$_2$PO$_4$, 0.1 mM; pH 7.0 (Pearson et al., 1976).

The brain was exposed from the dorsal side of the head after the cuticle was removed and the brain was taken out. The frontal ganglion was also exposed from the dorsal side of the head. Both anterior branches and lower recurrent branch were cut carefully with fine scissors. The ganglion was taken out and kept immersed in cockroach Ringer's solution. This isolated ganglion was used for the recording of electrical activity. All of these experiments were carried out *in vitro*. The ganglia, used for the experiments, were undamaged with long side branches and free of fat bodies and tracheal parts, and these were detached from the central nervous system and endocrine system like corpus cardiacum and corpus allatum etc.
Measurement of spontaneous electrical activity:

Set up of the experiment:

Suction glass capillary electrodes were used for the recordings. Soft sodium glass tubes (1 mm internal diameter) were used for electrodes and vertical electrode puller was used for electrode making. The electrical activity was recorded from anterior and recurrent branches. The diameter of anterior branch of the frontal ganglion was 100 μ, so electrodes with 100 μ tip size were used to record the electrical activity of this branch. The diameter of recurrent branch was 70-80 μ, so electrodes with 70-80 μ tip size were used to record the activity of this branch. These electrodes were fitted with micromanipulators and could be adjusted accordingly. The capillary electrodes were filled with cockroach Ringer's solution and one of the anterior branches or recurrent branch was sucked in the electrode tightly.

Recording of electrical activity:

The normal spontaneous electrical activity from anterior and recurrent branch of the frontal ganglion was recorded at different time intervals after dissection. The signals were fed through a high impedance preamplifier, into a storage oscilloscope. The electrical activity observed on the oscilloscope screen was photographed either with a high speed polaroid film or with simple oscilloscope camera. The storage oscilloscope was useful for such experiments because sweeps could be stored on the screen and it was easy to count the number of spikes and also to photograph them.