THE NEUROHUMORAL REGULATION OF THE CRUSTACEAN HEART

Set up crayfish hearts in a dish, ventral side up, so that they are held by their suspensory ligaments to the dorsal carapace and epimeral plates. Perfuse, and introduce drugs, by means of a canula inserted into one of the ostia. Initially, place very dilute methylene blue in the bath to aid in finding the regulator nerves. These may be taken up in suction electrodes for stimulation. Compare the effects of glutamic acid with accelerator nerve stimulation and of gamma-aminobutyric acid (GABA) with inhibitory nerve stimulation. Compare the effect of picrotoxin on inhibition produced by GABA and by nerve stimulation. Compare accelerator nerve stimulation to the effects of an extract of crab pericardial organs (PO's). If time permits you may wish to find and try crayfish PO material.

If you wish to try recording from the cardiac ganglion, try first a preparation of a lobster heart set up in the same way. Make a small cut in the heart on the ventral midline from the sternal artery forward, just enough to reveal the ganglion. Cut one of the branches of the ganglion and take it up in an exactly fitting suction electrode.

Finally, if equipment is available, you may try to use the hanging microelectrode technique to record the membrane potential changes of lobster heart muscle responding to the spontaneous activity of the cardiac ganglion. Attempt stimulation of nerve branches from the cardiac ganglion of the lobster heart, after ablation of the ganglion cells.

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THE NEUROTRANSMITTERS OF THE REGULATOR NERVES OF THE CRUSTACEAN HEART.

Set up lobster hearts so that they may be perfused continuously while the excitor and inhibitor nerves are stimulated. Test and compare the effect of drugs on the heart and on the action of the regulator nerves to develop evidence for the identity of the transmitters.

If time permits, we may be able to find equipment for intracellular recording of muscle potentials using dangling microelectrodes.

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