Experiment AN-5: Cockroach Leg Mechanoreceptors

Equipment Required

PC or Mac Computer

IXTA, USB cable, IXTA power supply

iWire-B3G input cable

C-ISO-N3 lead wires with needle electrodes(3)

Non-toxic modeling clay

Glass probes (pulled over a Bunsen burner)

Dissecting scissors

Dissecting microscope or magnifying glass

Micromanipulator (optional)

Connect the iWire-B3G prior to turning on the IXTA.

Cockroach Leg Recording Setup

1. Locate the iWire-B3G recording cable and insert the connector on the end of the recording cable into the isolated inputs of the iWire 1 channel.
2. Locate the C-ISO-N3 lead wires with needle electrodes.
3. Attach the red, black, and green C-ISO-N3 lead wires to the corresponding sockets on the lead pedestal of the iWire-B3G recording cable.

If there is a problem with electrical noise, please see the Appendix.

Figure AN-5-S1: The iWire-B3G recording cable.

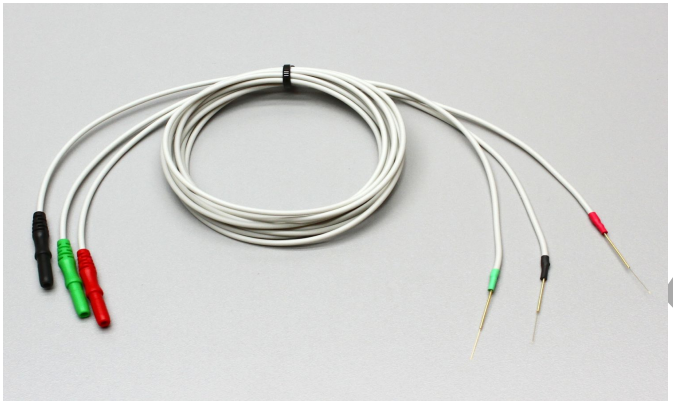

Figure AN-5-S2: C-ISO-N3 lead wires with needle electrodes.

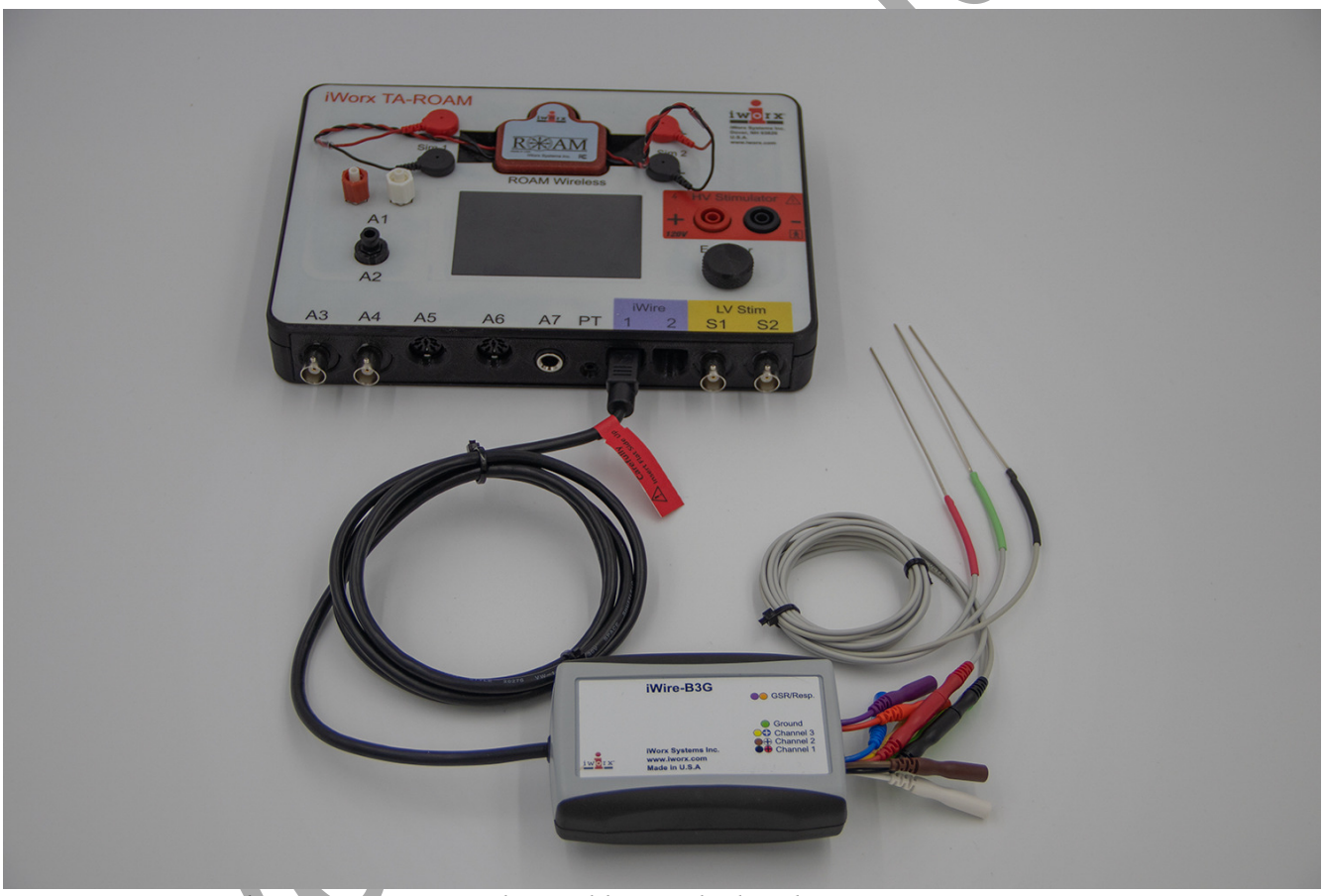

Figure AN-5-S2: The iWire-B3G recording cable attached to the IXTA.

Preparation of the Cockroach Leg

1. Remove the hind leg (the largest one) from a cold-anesthetized cockroach, taking care to include the portion of the leg (the coxa) closest to the body.

Note: *While it is possible to perform this experiment without a microscope, a dissecting scope makes it easier to create much more consistent stimuli. A handheld magnifying glass may even be sufficient to view the structures more clearly.*

2. Prepare an indentation in a small block of modeling clay, in the approximate size and shape of the leg's coxa and femur. Gently press the coxa and femur into the clay, leaving the tibia free to move. Place the leg on the clay in a position such that as the tibia is flexed or extended, the tibial spines won't make contact with the clay.
3. Observe the various mechanoreceptors under the microscope. You should be able to see short setae on the femur and tibia, smaller spines bordering the edge of the femur, and the large tibial spines. You will most likely not be able to see any hair patches, or the actual campaniform sensilla.
4. The needles on the C-ISO-N3 lead wires with needle electrodes will serve as the recording electrodes.
5. Place the needle electrode on the green ground (C) lead wire through the coxa and into the clay.
6. Place the needle electrode on the red (+1) lead wire near the end of the femur closest to the tibia. This needle is the distal recording electrode for the preparation.
7. Place the needle electrode on the black (-1) lead wire at the proximal end of the femur. This needle will function as the proximal recording electrode.

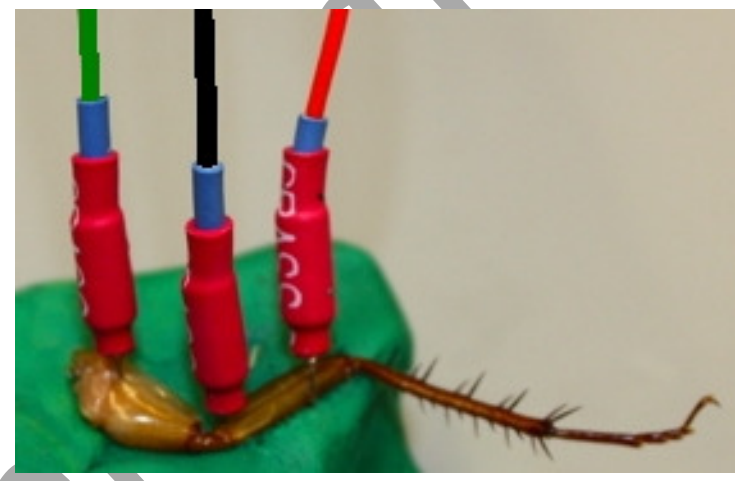

Figure AN-5-S4: Cockroach leg with needle electrodes on C-ISO-N3 lead wires positioned to record sensory responses to mechanical stimulations on the tibia.

Warning: The cockroach preparation used in this experiment is functional for a limited period of time. To conserve time, complete all the exercises in the experiment before analyzing the data. It is important to keep the leg moist at all times to retain functionality.