

## The Nerve and Muscle Practical Class

### A – The Nerve Practical Class

#### 1. The nerve action potential

##### **Objectives:**

1. To understand that when action potentials are elicited in vitro a biphasic response should be produced.
2. To perceive that a stimulus has two components i.e; time and amplitude.
3. To measure the conduction velocity of the nerve from which an action potential can be produced.

##### **Equipment:**

- PC running windows.
- Biopac software: Biopac student lab PRO
- Biopac Data Acquisition Unit (MP30)
- Biopac stimulator (BSLSTM)
- Biopac disposable electrodes (EL 503)
- Biopac electrode lead set (SS2L)
- Biopac human stimulator probe (HSTM0I)
- Abrasive pads (ELPAD)
- Electrode gel (Gel 1)
- Ruler (cm)
- Adhesive Tape (Tape I)
- NERVE CHAMBER
- PREPARATION OF NERVE
- RINGER'S SOLUTION

**A- PROCEDURE:**

1. Place the nerve obtained from the frog in the nerve chamber and mark the proximal end with the thread. Pour on it Ringer's solution.
2. Now attach the stimulating electrodes coming from the stimulator to the proximal end of the nerve and Recording electrodes (SS2L) on the distal end.
3. Attach SS2L on CH 2 on MP30.

**Note:**

Active Red Electrodes from the stimulator and from the SS2L should be on the same side of the Nerve Chamber.

Black and White electrodes from the stimulator and MP30 SS2L should be on the other side of the chamber. Make steel wire clips to attach the electrodes to the side holes of the nerve chamber.

Open the *Nerve Practical Class* by choosing:

MP30 Menu > SETUP ACQUISITION> CLICK ON APPEND then RESET  
BUTTON

Click START; STIMULATOR ON

## Extracellular Recording of Nervous Activity.

**BIPHASIC ACTION POTENTIAL:** Place two Recording Electrodes on the surface of the nerve.

**MONOPHASIC ACTION POTENTIAL:** Place one electrode on the surface of the nerve, and the other inside or crush a small segment of the nerve between the two recording Electrodes.

### Monophasic and biphasic action potentials



Diagram (b-i)

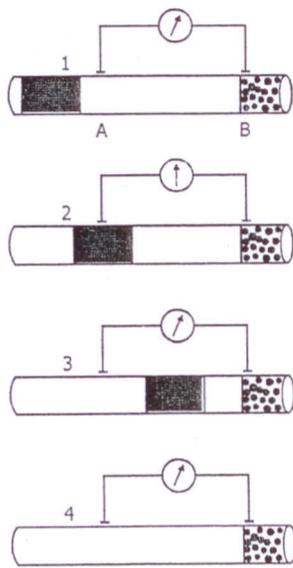


Diagram (b-ii)

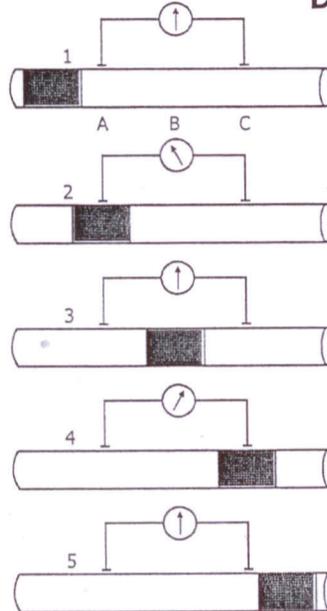
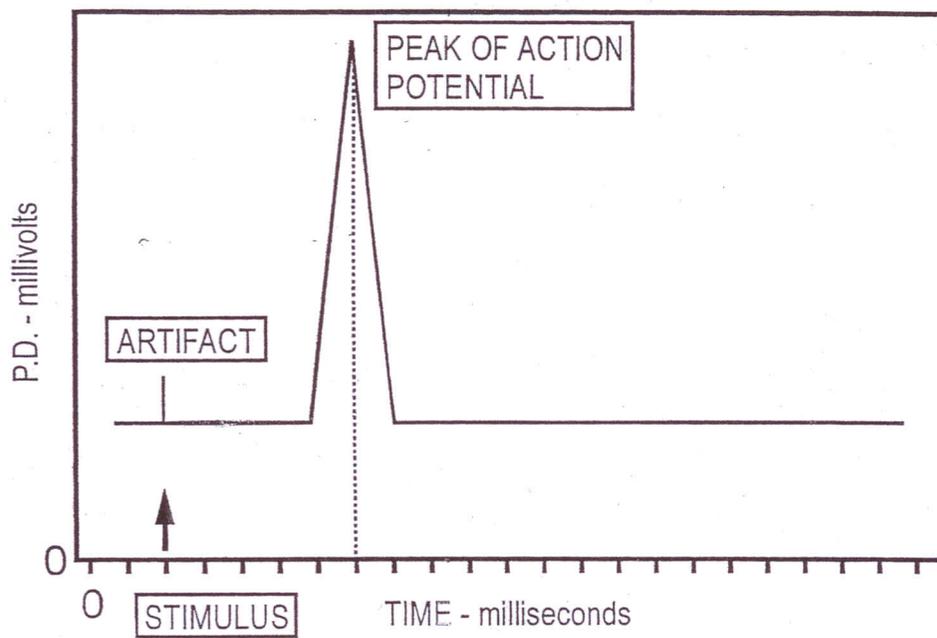


DIAGRAM SHOWING THE TIME TAKEN FROM  
THE POINT OF STIMULUS TO PEAK OF THE  
ACTION POTENTIAL



**B- Conduction Velocity:**

To know the conduction velocity:

- a) Measure the distance with a cm ruler between the Stimulating electrodes and the Recording electrodes in the nerve chamber on the nerve.
- b) To take time, measure the squares from the stimulus artifact to the peak of the action potential.

The conduction velocity is,

$$C.V = \frac{\text{Distance}}{\text{Time}}$$

• Change cm to meters and milliseconds to seconds.