

## Reflex Lab

### **PART A – Stretch Reflexes**

**Stretch reflexes** are those that result from the stimulation of stretch receptors. Here, reflex arcs will be tested that are initiated by stretch receptors within the muscle. Some of these will produce a quite noticeable contraction; others will only display a slight rippling or dimpling of the muscle.

#### **1. Patellar tendon reflex**

The patellar tendon reflex, or knee-jerk reflex, is a monosynaptic stretch reflex that assesses the nervous tissue between (and including) the **L2 and L4** segments. It can be elicited by sharply tapping the patellar ligament (just below the knee) with the base of a reflex mallet. Have your partner sit on a table with his/her legs dangling above the floor. Tap the knee sharply. Repeat with the other limb. Switch roles.



- What did you observe happen?
- What muscles are used to produce this movement?

Test the effect of mental concentration on the patellar reflex by having the subject read a book that blocks their vision of their leg. Repeat with the other limb.

#### **4. Triceps reflex**

The triceps reflex is another stretch reflex. The triceps reflex is mediated by the C6 and C7 nerve roots, predominantly by C7. Have your partner sit on the table. Supporting your partner's arm with the elbow flexed at a 90° angle, sharply tap the posterior surface of the upper arm approximately 2 inches above the **olecranon** (bony "tip" of the elbow). Switch roles. If you are having difficulty eliciting a response, have the subject lie on their back on the desk with the elbow bent, so that the arm lies loosely across the abdomen. Strike the triceps tendon approximately 2 inches above the elbow. If no response, try striking to either side of the first site.



- The olecranon is a part of which bone?
- Describe the movement of the arm.

### **PART B – Cutaneous Reflexes**

Cutaneous reflexes are those that result from the stimulation of cutaneous (skin) receptors.

#### **1. Plantar reflex**

The plantar reflex is elicited by cutaneous receptors of the foot rather than deep receptors in muscles or tendons. In a normal individual, stimulation causes flexion of the big toe and the other toes flex and draw together. This requires uninterrupted conduction of impulses along the pyramidal motor tracts. Damage anywhere along these pathways produces **Babinski's Sign** to this stimulation where the big toe extends and the other toes fan laterally. Babinski's sign is normal in infants whose neural control is not yet fully formed (nerves have not fully myelinated).



Have the subject lie on their back with knees slightly bent and thigh rotated so that the **lateral** side of the foot is resting on the table. Draw the **handle** of reflex mallet along the **lateral** border of the subject's sole, starting at the heel and continuing toward the big toe (across the ball of the foot).

- What movement was observed?

### **PART C – Cranial Reflexes**

Cranial reflexes are a type of reflex mediated by the brain.

**Pupillary reflexes** are centered in the brainstem and involve cranial nerves and autonomic reflex centers. In a dimly lit room, the subject should look out toward a wall until his/her eyes dilate. Observe for any irregularities or asymmetry.

- Measure the approximate pupillary size with a metric ruler. Be very careful near the subject's eyes.

The experimenter should place an index card on the bridge of the subject's nose to separate each eye's field of vision. Then the experimenter should bring a flashlight from the side to within 5 to 7 cm of the subject's face. Shine the light from the penlight flashlight into the left eye. As soon as the pupil responds remove the light. The response of **both** eyes should be observed.

- What is the pupillary response?
- What is the advantage of this response?
- Which division of the autonomic nervous system was active during the pupillary reflex?