RSPT 1050 – MODULE J – SELF ASSESSMENT

1. List the three components which control ventilation:

   a. **CENTRAL CONTROLLER**
   b. **EFFECTOR SITE**
   c. **SENSORS**

2. What two groups of neurons are present in the medulla oblongata?

   a. **DORSAL RESPIRATORY GROUP**
   b. **VENTRAL RESPIRATORY GROUP**

3. Name the two centers in the pons.

   a. **APNEUESTIC CENTER**
   b. **PNEUMOTAXIC CENTER**

4. Describe what may happen with cerebral trauma to the medulla oblongata.

   WHEN INCREASED INTRACRANIAL PRESSURE IS PRESENT AS A RESULT OF CEREBRAL TRAUMA AND EDEMA OR OTHER INTRACEREBRAL ABNORMALITY (TUMOR), THE ABILITY OF THE BRAIN TO MOVE TO ACCOMMODATE SWELLING IS REDUCED (THE SKULL IS FIXED SPOT WITH ONLY ONE OUTLET – THE FORAMEN MAGNUM). AS SWELLING CONTINUES, THE MEDULLA OBLONGATA IS COMPRESSED AS IT PASSES THROUGH THE FORAMEN MAGNUM AND BLOOD FLOW TO THIS AREA REDUCES. EVENTUALLY, THIS LEADS TO BRAIN DEATH.

5. Central chemoreceptors are sensitive to

   a. $PaCO_2$
   b. PaO_2
   c. pH
   d. HCO_3^-

6. The blood-brain barrier is impermeable to **H^+** ions, but very permeable to **PCO_2**.

7. List the two sites where chemoreceptors are located peripherally.

   a. **CAROTID BODIES**
   b. **AORTIC BODIES**

8. Impulses from the carotid bodies are transmitted back to the brain by the **GLOSSOPHARYNGEAL (IX)** nerve.

9. Impulses from the aortic bodies are transmitted back to the brain by the **VAGUS (X)** nerve.

10. The peripheral chemoreceptors are sensitive to what oxygenation index? **PaO_2**

11. Describe the function of each of the following reflexes:

    a. Hering-Breuer Reflex: **THIS REFLEX IS ACTIVATED WHEN RECEPTORS LOCATED IN THE WALLS OF THE BRONCHI AND BRONCHIOLES SENSE THAT THEY ARE OVERSTRETCHED (AS MIGHT OCCUR DURING A DEEP INSPIRATION) AND A REFLEX RESPONSE IS TRIGGERED TO REDUCE THE TIDAL VOLUME.**

    b. Deflation Reflex: **WHEN THE LUNGS ARE COMPRESSED OR DEFLATED (AS MAY OCCUR WITH ATELECTASIS OR A PNEUMOTHORAX), THE REFLEX STIMULATES THE MEDULLARY CENTERS TO INCREASE FIRING, RESULTING IN TACHYPNEA.**

    c. Irritant Reflex: **THIS REFLEX CAUSES A VAGAL RESPONSE AND IS DUE TO MECHANICAL STIMULATION SECONDARY TO LOCAL IRRITATION. WHEN STIMULATED. THEY ALSO RESPOND TO CHEMICAL STIMULI THAT WOULD IRRITATE NASAL MUCOSA AND TRACHEOBRONCHIAL TISSUE IF INHALATION WOULD BE ALLOWED TO CONTINUE (NOXIOUS GASES). THE RESULTING REFLEX INCLUDE THE FOLLOWING RESPONSES: TACHYPNEA, COUGH, SNEEZE, LARYNGOSPASM, BRONCHOCONSTRICTION, AND A GAG REFLEX.**

    d. Juxtapulmonary Capillary Receptors: **J-RECEPTORS ARE LOCATED IN THE INTERSTITIAL SPACE BETWEEN THE PULMONARY CAPILLARIES AND THE ALVEOLI AND THEY RESPOND TO INCREASED PULMONARY CAPILLARY PRESSURE. WHEN STIMULATED, A REFLEX RESPONSE TRIGGERS A RAPID, SHALLOW BREATHING.**

    e. Paradoxical Reflex of Head: **PARADOXICALLY STIMULATES A DEEPER BREATH RATHER THAN INHIBITING FURTHER INSPIRATION (SIGHS AND THE FIRST BREATH).**