**Physiol-13A9** Describe the cough reflex.

**Background**

Cough reflex is an important airway protective mechanism

**Aims:**
- clears secretions from the airways
- protects airway from aspiration of foreign materials (particulate matters, pathogens, etc)

During anaesthesia, it is often required to chemically blunt the cough reflex in order to facilitate airway manipulation and surgery

**Cough Reflex Arc**

**(1) Afferent**
Irritant receptors located on wall of pharynx, trachea (esp carina) and bronchi
Absent beyond respiratory bronchioles

Receptor stimulation → impulse travels along vagus nerve → diffusely synapse in medulla

**(2) Central Pathway**
Central coordinating region for coughing is located in the upper brainstem and pons.
*(Currently, there is no single identifiable “cough centre”)*

**(3) Efferent**
Impulse from brainstem → vagus, phrenic, and spinal motor nerves → laryngeal, diaphragm and abdominal wall muscles → cough

**Efferent Mechanism**

(1) Rapid inspiration of large volumes of gas (up to 2.5L)

(2) Epiglottis and larynx close → gas is trapped within lungs

(3) Expiratory muscles (internal intercostals and abdominal) contract forcefully against the diaphragm → ↑↑ transpulmonary pressures (may exceed 100 mmHg)

(4) Sudden opening of epiglottis and larynx → rapid expulsion of gas from lungs (velocity may exceed 80 km/hr)

(5) Strong compressive forces on lung partially collapses non-cartilaginous parts of bronchi and trachea → rapid moving turbulent gas flow expels foreign materials adhered to airway mucosa
Examiner’s comments - 32% of candidates achieved a pass in this question

The cough reflex is an important protective airway mechanism, which paradoxically anaesthetists often need to suppress. Understanding this reflex and how to modify it is important to practise safe anaesthesia. An adequate answer to this question would describe the components of the reflex arc, with particular attention to the efferent limb due to its complexity. Good candidates could describe the interplay of laryngeal and respiratory muscles in stages in the generation of a cough.

The reflex arc was frequently outlined but with insufficient detail. There were many incorrect statements, for example, a sizable minority of candidates described the diaphragm as a muscle of exhalation, responsible directly for the forceful expulsion of air from the lungs. It appeared that few candidates had considered the physiology of coughing and had difficulty integrating some relatively simple respiratory physiology in the stress of the exam. Mindful practice of novel questions is a useful study technique.