Q10 Outline the mechanism of action of drugs commonly used to prevent stress ulceration in intensive care (March 2010)

Standard of care in intensive care practice includes gastric ulcer prophylaxis. Agents can be divided into groups based on action:

DECREASING ACID PRODUCTION

- PROTON PUMP INIHBITORS → (eg, pantoprazole) Pantoprazole accumulates in the acidic environment of the parietal cells after absorption and is converted to its active form, which binds to the H/K ATPase anti porter, inhibiting the proton pump and causing potent and longlasting suppression of basal and stimulated gastric acid secretion.
- HISTAMINE-2 RECEPTOR ANTAGONISTS → (eg; ranitidine) Bind to the H2 receptor on the basolateral surface of the parietal cell to reduce H2-stimulated acid secretion from the H/K ATPase on the luminal side of the cell.
- MUSCARINIC ANTAGONISTS → (eg, pirenzipine) Relatively specific M3 receptor antagonist which reduces the acetylcholine-mediated stimulation of the proton pump

DECREASING GASTRIC ACIDITY

- ANTACIDS → (eg, Mylanta, Gastrogel). Weak bases which usually contain aluminium and/or magnesium compounds to chelate H+ ions

MUCOSAL PROTECTORS

- PROSTAGLANDINS → (eg; misoprostol). Act via GPCR mediated inhibition of adenylyl cyclase, decreasing camp and reducing proton pump activity. Also enhance the mucosal protective layer by improving blood flow to the mucosal proliferative zone.
- SULCRAFATE → composed of aluminum hydroxide sulfate salts surrounding a core of sucrose molecules. Sucralfate adheres to epithelial cells to coat the gastric mucosa and creates a thin, protective layer between the mucosa and gastric acid in the stomach lumen.

Examiner comments:
For a good answer candidates were expected to mention the following key broad points, being there are drugs that act by decreasing acid production in the stomach, drugs that act as mucosal protectors and drugs that reduce intra gastric acidity. Based upon that candidates would be expected to mention and outline the mechanism of action of H2 receptor antagonists, H+K/=ATPase (proton pump) inhibitors, sucralfate's mechanism of action and antacids. Candidates who structured their answer tended to provide more complete answers and score better. Candidates who failed did so because of a lack of sufficient knowledge of the mechanism of action of the drugs.