Introduction
Peptic ulcer is the term that refers to the breakdown of the mucosal epithelium of the stomach and/or duodenum. It is one of the most common diseases affecting the mankind. It kills few but troubles many. The incidence has been estimated variously ranging from 3 to 10% [1]. Peptic ulcer results from an excess auto-peptic power in gastric juice over the defensive power of gastric mucosa. Excessive amount of acid or pepsin and impaired mucosal resistance or both can lead to peptic ulcer [2]. A variety of factors have been identified that may favour the development of peptic ulcers, but no single pathophysiological defect applies in all ulcer patients.

The gastric mucosa has an extraordinary capacity to secrete acid. The parietal cells scattered along the course of the mucosal glands of the body and fundus of the stomach secrete hydrochloric acid (HCl) by a process involving oxidative phosphorylation. Each secreted hydrogen ion (H⁺) is accompanied by a chloride ion (Cl⁻). For each hydrogen ion (H⁺) secreted into the gastric lumen, one bicarbonate ion (HCO₃⁻) is released into the gastric venous circulation, accounting for the so-called alkaline tide; bicarbonate is released from carbonic acid generated from CO₂ by parietal cell carbonic anhydrase [3].

Multiple chemical, neural and hormonal factors participate in the regulation of gastric acid secretion. Acid secretion is stimulated by gastrin and by post-ganglionic vagal fibres via muscarinic cholinergic receptors on parietal cells. Reduction of the intra-gastric pH to 3.0 produces partial inhibition of gastrin release and further reduction to pH 1.5 or below completely blocks release of gastrin in response to almost all stimuli [3]. Zollinger-Ellison syndrome (ZES) is seen in
patients with gastrinomas i.e. tumors that secrete gastrin. These tumors can occur in the stomach and duodenum but most of them are found in the pancreas.

Hypersecretion of gastric acid may also be due to the proteolytic effects of pepsin. Human gastric mucosa contains 2 immuno-histochemically distinct pepsinogen groups, i.e., pepsinogen I and pepsinogen II. Pepsinogen I is found in the chief and mucous cells in the body and fundus of the stomach. Pepsinogen II is located in mucous cells in the body and fundus as well as in cells of the pyloric glands, cells of Brunner's glands of the duodenum and mucous cells of the gastric cardiac glands. Gastric acid catalyses the cleavage of inactive pepsinogen molecules, converting them to proteolytically active pepsins and also provides the low pH required for peptic activity. Most agents that stimulate gastric acid secretion also stimulate the secretion of pepsinogen [3]. The mechanism by which the normal stomach and duodenum resist the corrosive effects of acid and pepsin (i.e. the mechanism of mucosal defense) have not been defined completely. However, a variety of factors have been identified that contribute to or compromise mucosal defense [3].

The mucosal bicarbonate barrier normally prevents irritation and auto-digestion of the mucosa by the gastric secretion. Bicarbonate secretion is by the surface mucosal cells. The “visible mucus” is secreted by the neck and surface mucosal cells in the body and fundus of the stomach. It forms a flexible gel that coats the mucosa. The substances/agents which tend to disrupt the “barrier” and cause irritation include (a) infection with a bacterium “Helicobacter pylori”, (b) ethanol, (c) bile salts and (d) non-steroidal anti-inflammatory drugs (NSAID) for example aspirin, brufen, indomethacin, voveran etc. These drugs inhibit synthesis
of prostaglandins which stimulate mucus secretion and inhibit acid secretion. This is the reason why the incidence of peptic ulcer especially gastric ulcer increases in persons taking NSAID.

During the last decade, more information has poured in about the prevalence and changing pattern of the disease with respect to NSAIDs, the influence of environmental factors and on the role of recently characterised bacterial organism, Helicobacter pylori which colonises in the gastric mucosa, particularly in the antral region [4].

Four classes of agents inhibit the secretion of acid by directly affecting parietal cells: antagonists for the histamine H₂ and muscarinic receptors, compounds such as omeprazole that inhibit hydrogen potassium adenosine triphosphatase (H⁺ K⁺-ATPase) that drives acid secretion and prostaglandins which inhibit adenylyl cyclase [5]. Agents that promote mucosal defense mechanisms are becoming increasingly popular in the treatment of duodenal ulcers and probably in gastric ulcers too. However, their requirement for multiple daily doses makes them somewhat less attractive at present to most patients. The search for new remedies to prevent peptic ulcer production has not stopped, because of many lacunae in the knowledge of the mechanism of ulcer production and hence there is scope for the development of new drugs.

Prostaglandins enhance mechanisms thought to be involved in mucosal defense of chronic ulcers and also have been proposed as one of the endogenous mediators of cytoprotection [6]. They inhibit the secretion of acid and stimulate the secretion of mucus and bicarbonate as well as hydrophobic surfactant like phospholipid in the gastric epithelial cells. Prostaglandin E has tropic effect on the
Gastroduodenal mucosa. Prostaglandins are effective in preventing NSAID induced ulcers [7]. The mucosal gel thickness is increased by the E prostaglandins and reduced by aspirin and other NSAIDs. Bicarbonate secretion is stimulated by certain prostaglandins of E and F series and inhibited by aspirin, NSAIDs and ethanol [3].

The term ‘cytoprotection’ means protection against gastric mucosal injury by a mechanism other than inhibition or neutralisation of gastric acid. Several mechanisms of gastric cytoprotection have been proposed like increased mucus and bicarbonate secretion, strengthening of gastric mucosal barrier, increased gastric mucosal blood flow, decreased gastric motility, increased formation of prostaglandins and sulphydryls, scavenging of free radicals, stimulation of cellular growth and repair, decreased release of leukotrienes etc. In addition, to the cytoprotective drugs that are in clinical use for peptic ulcer, studies in several laboratories all over the world have focussed on testing a variety of drugs for their possible cytoprotective action. As the concept of cytoprotection is becoming widely accepted, the list of drugs which have shown a cytoprotective action in animal experiments is growing rapidly. This list includes zinc sulphate, meciadanol, propranolol, vitamin A, vitamin E, interleukin 1β etc. [8] as well as vitamin C [9].