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A Comprehensive Study on the Gastric Proton Pump Inhibitor: Omeprazole

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Abstract: *Omeprazole, a widely prescribed proton pump inhibitor (PPI), plays a central role in the management of acid-related gastrointestinal disorders due to its potent and irreversible inhibition of the gastric H^+/K^+-ATPase enzyme system in parietal cells. As the prototype of the PPI class, it provides superior and longer-lasting acid suppression compared to H_2-receptor antagonists. Clinically, Omeprazole is indicated for peptic ulcer disease, gastroesophageal reflux disease (GERD), Zollinger–Ellison syndrome, and as part of combination regimens for* Helicobacter pylori *eradication. The drug is formulated with an enteric coating to prevent degradation in the acidic gastric environment and ensure optimal absorption in the intestine. It is primarily metabolized in the liver through CYP2C19 and CYP3A4 pathways. Although well tolerated, long-term or inappropriate use has been linked to adverse effects such as nutrient deficiencies, increased risk of gastrointestinal infections, and renal complications. Recent pharmaceutical advancements have further enhanced its bioavailability and therapeutic response. Overall, Omeprazole remains a cornerstone therapy for acid suppression, but its use should follow evidence-based guidelines to minimize potential risks.*

Keywords: Omeprazole, Proton Pump Inhibitor, H^+/K^+-ATPase, Peptic Ulcer, Acid Secretion

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