

A REVIEW ON SYNTHESIS OF VONOPRAZAN FUMARATE

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ABSTRACT

The class of drugs that competitively block the potassium binding site of gastric H⁺/K⁺ ATPase, thus potentially overcoming the limitations of proton-pump inhibitors. Different studies evaluated the efficacy of vonoprazan versus proton-pump inhibitors (PPIs) for the treatment of acid-related disorders, and, therefore, P-CABs present the same indications of PPIs: gastroesophageal reflux disease, gastric and duodenal ulcer healing, management of upper gastrointestinal bleeding, nonsteroidal anti-inflammatory drug (NSAID)-associated ulcers and Helicobacter pylori eradication therapy. the role of vonoprazan for the treatment of peptic ulcer disease (PUD) and the management of gastric ulcer occurring after endoscopic submucosal dissection (ESD). In pre-clinical studies, VPZ was unaffected by changes in pH, making it 1.2–2 times more potent than PPI, both in vivo and invitro. Vonoprazan (aka TAK-438), has been approved for clinical use in Japan to reduce intragastric pH. VPZ is a potassium-competitive acid blocker (P-CAB). This review article suggests that Vonoprazan is 400 times more efficacious than PPIs. The safety profile of Vonoprazan in Reflux Gastritis is just similar to that of PPI use. Also, VPZ is much more cost effective as compared to PPI's.

Keywords: Gastric Acid, Doudenal Ulcer, H.Pylori, Mucosal Injury.

I. INTRODUCTION

Gastroesophageal reflux disease is one of the most prevalent conditions worldwide which is conventionally treated by proton pump inhibitor therapy. However, around 40% of people have reported some form of resistance to this therapy. Gastroesophageal reflux diseases and H. pylori-induced duodenal and gastric ulcers are some of the most prevalent medical conditions worldwide, with a prevalence rate reported to be 10–20%. The mechanisms of this resistance are thought to be poor control of gastric acid secretion, esophageal hypersensitivity, and changes in the esophageal epithelium. Recently, a new drug, Vonoprazan (aka TAK-438), has been approved for clinical use in Japan to reduce intragastric pH. When increases the acid level in stomach then many disorders are occur like a gastric or doudenal ulcer ,gastric mucosal injury, H.pylori infection this types many disease condition are occurred . occur like a gastric or doudenal ulcer ,gastric mucosal injury, H.pylori infection this types many disease condition are occurred. When human body stomach present in 3types of a stomach acid (gastric acid)Hydrochloric acid (HCL), potassium chloride (KCL) ,sodium chloride (NaCL) .stomach acid (aka hydrochloride acid or HCL) is one of the most important players in the domino effect of digestion . When you eat food ,this acid produces by parietal cells that line the stomach . Beyond its role of breaking down and sterilizing the food you just ate ,HCL also triggers the next stages of digestion in the small intestine.

Vonoprazon, a potassium-competitive acid blocker, is under investigation in the United States and Europe for the treatment of erosive esophagitis and Helicobacter pylori infection. Population pharmacokinetic (popPK) analysis allows the identification of factors that could affect drug exposure in population subgroups. Vonoprazan-based dual and triple therapy regimens are non-inferior to lansoprazole-based triple therapy in patients infected with H.pylori strains not resistant to clarithromycin or amoxicillin, based on eradication rates in the PHALCON-HP trial.

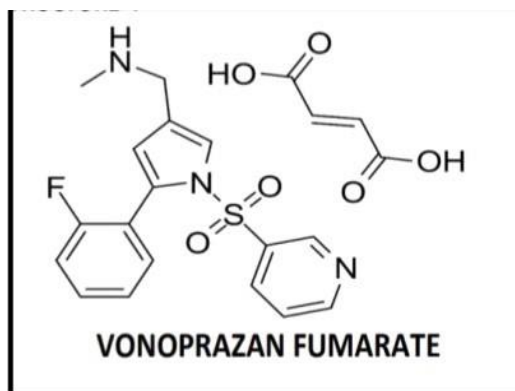
Additionally, the vonoprazan-based regimens are superior to lansoprazole-based triple therapy in Patients who have a clarithromycin-resistant strain of H. pylori and in the overall population, based on PHALCON-HP

❖ WHAT ABOUT ACID REFLUX?

Acid reflux (aka heartburn or GERD) affects many people . It occurs when stomach acid / Contents flow back into the esophagus , causing a burning sensation in the chest . It is often Caused when the flap of tissue that controls that junctons is weakened , which allows stomach Acid to escape and irritate the tissue .If you

experience this ,try eating smaller meals, reducing alcohol consumption, chewing food to a Liquid, and minimizing water with meals. Melatonin,d-limonene, licorice, chamomile, aloevera ,and turmeric have also been shown to Relieve symptoms and promote healthy stomach function

Vonoprazan Fumarate :



❖ **CHEMICAL FORMULA :-** C17H16FN3O2S

❖ **WEIGHT :Average:** 345.39 Monoisotopic: 345.094726104.

❖ **Vonoprazan side effects:-** Get emergency medical help if you have signs of an allergic reaction (hives, difficult Breathing, swelling in your face or throat) or a severe skin reaction (fever, burning eyes, skin Pain, red or purple skin rash with blistering and peeling). Vonoprazan may cause serious side effects.

Call your doctor at once if you have:

- blood in your urine, burning when you urinate, little or no urination;
- seizures, mood changes;
- severe stomach problems, including severe stomach pain, diarrhea that is watery or bloody, or Fever that will not stop;
- sudden pain or trouble moving your hip, wrist, or back;
- shortness of breath, sudden dizziness (like you might pass out), numbness or tingling in the Arms and legs, muscle weakness, pale skin, feeling tired; or
- irregular heartbeat, jitteriness, muscle aches or weakness, or spasms.
- altered sense of taste;
- vaginal itching or discharge;
- bloating, indigestion, direia, stomach pain;
- common cold-like symptoms;
- headache, high blood pressure; or
- pain and burning when you urinate, painful urination

❖ **MECHANISM OF ACTION :-**

Vonopprazan is a potassium competitive acid blocker (PCAB).



That inihits the H+,K+,AT-Pase enzyme system in a potassium competitive manner.



Through this mechanism ,vonoprazan suppresses basal and stimulated gastric acid secretion .At the secretory surface of gastric parietal cell.

OR

Vonoprazan

reaches gastric lumen

Binds to the E₂ form of the enzyme

Prevents K⁺ binding to the enzyme

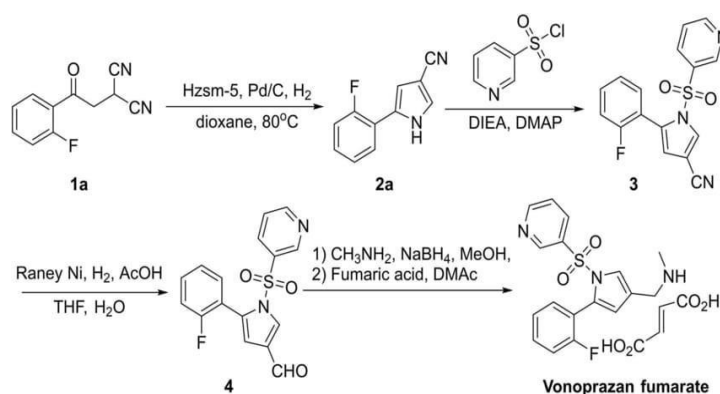
Inhibits K⁺-dependent dephosphorylation of enzyme

Prevents the conformational change of enzyme from E₂ to E₁

Reversibly inhibits H⁺ K⁺-ATPase

Inhibits acid secretion

• **SYNTHESIS REACTION OF VONOPRAZAN FUMARATE =**



• **USES=**

In combination with amoxicillin and clarithromycin, for the treatment of Helicobacter pylori (H pylori), infection

- -In combination with amoxicillin, for the treatment of H pylori infection.
- -Vonoprazan is used in adults to reduce stomach acid and promote healing of erosive Esophagitis (damage to your esophagus caused by stomach acid).
- -Vonoprazan is also used in combination with antibiotics for treating infections caused by Helicobacter pylori (H. pylori).
- -Vonoprazan may also be used for purposes not listed in this medication guidesecretion At the secretory surface of gastric parietal cell.

Aim and objectives :

Aim : To study on development the synthesis of Vonoprazan Fumarate.

Objective:

- 1) Study the bioavailability of drug.
- 2) Study of residence time in stomach.
- 3) Study of dosing frequency of drug.
- 4) Study of absorpition window.

II. METHOD OF EVALUATION

Evaluation synthesis is a complex process that involves several methods, including:

Locating evidence: Find relevant studies and other sources of information

Assessing evidence quality: Determine the quality and relevance of the evidence

Extracting information: Select the most relevant information from the evidence

Synthesizing information: Combine the information into findings

Use an analysis plan to compare findings across studies

Presenting findings: Create a presentation to simplify the findings and conclusions

III. CONCLUSION

It has been demonstrated that the potassium-competitive acid blocker (P-CAB) vonoprazan fumarate is effective in treating acid related condition, such as H.pylori eradication and gastrophageal Reflux disease. Acid-related illness vonoprazan fumarate exhibits a Prolonged inhibition of acid production by directly inhibiting the H⁺,K⁺-AT-Pase enzyme. According to certain studies, vonoprazan Fumarate may be a better treatment for gastroesophageal reflux Disease than proton pump inhibitors. Elimination of H.pylori Eradication, with less side effects associated with traditional PPIs. The FDA authorized voquezna Triple Pak and Voquezan Dual Pak, two combination medicine containing vonoprazan, in 2022 for The treatment of adult H.pylori infection. However, tolerance, side Effects, and medication interactions may restrict the usage of Vonoprazan fumarate. Constipation, diarrhea, nausea, rash, edema, and an inflated feeling in the abdomen Are typical adverse effects.

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