

## Patho-Physiology of Urease: Urease Inhibitors as a Significant Therapeutic Goal

Haroon Khan\*

Department of Pharmacy, Abdul Wali Khan University Mardan 23200, Pakistan

\*Corresponding author: Khan H, Department of Pharmacy, Abdul Wali Khan University Mardan 23200, Pakistan, Tel: +92-3329123171; E-mail: [hkdr2006@gmail.com](mailto:hkdr2006@gmail.com)

Received date: January 26 2015, Accepted date: January 27 2015, Published date: February 4 2015

Copyright: © 2015 Khan H. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited

### Editorial

Urease (urea amidohydrolase) is usually found in different bacteria, fungi, algae and plants. It is accountable for the hydrolysis of urea and thus, forming ammonia and carbamate, which is the final step of nitrogen metabolism in living organisms [1,2]. The carbamate intern quickly and spontaneously decomposes, yielding a second molecule of ammonia. These reactions may cause significant increase in pH and are therefore, responsible for negative effects of urease activity in human health and agriculture [3,4].

The experimental findings suggested that infections produced by bacteria such as *Helicobacter pylori* and *Proteus mirabilis* usually have a high urease activity. Urease is central to *H. pylori* metabolism and virulence, necessary for its colonization in gastric mucosa [5,6]. It is a potent immunogen that elicits a strong immune response. Urease represents an interesting model for metalloenzyme studies. Before the discovery of *H. pylori*, urease production was limited to human physiology. But now the contribution of this bacterium in urease production is well established. It contributes in urinary tract and gastrointestinal infections, probably augmenting the severity of several pathological conditions like peptic ulcers and stomach cancer etc. Ureasases are also involved in the development of different human and animal pathogenicity such as urolithiasis, pyelonephritis, hepatic encephalopathy, hepatic coma and urinary catheter encrustation [7-9]. Over urease production is also contributing in environmental hazards.

The enzyme has been recognized that it is one of the key agents in the pathophysiology of multiple human and animal disorders, targeting urease for treating pathogenic disorders caused by urease-producing-bacteria has already open a new line of treatment for infections caused by such bacteria. In reality more effective and potent compounds are mandatory with a complete new level of safety and specificity. Urease inhibitors for this purpose have gained incredible attention in recent times and therefore resulted into the discovery of numerous inhibitors [8,10-13].

To summarize, urease inhibitors are highly potential target for different pathological conditions induced urease hyperactivity.

### References

1. Khan AW (2012) Phytochemical analysis and enzyme inhibition assay of *Aerva javanica* for ulcer. *Chem Central J* 6:76
2. Khan H, Saeed M, Muhammad N, Gaffar R, Gul F, et al. (2013) Lipoxygenase and urease inhibition of the aerial parts of the *Polygonatum verticillatum*. *Toxicol Ind Health*: Epub ahead of print.
3. Khan H, Ali Khan M, Hussain I (2007) Enzyme inhibition activities of the extracts from rhizomes of *Gloriosa superba* Linn (Colchicaceae). *J Enzyme Inhib Med Chem* 22: 722-725.
4. Lateef M (2012) Evaluation of antioxidant and urease inhibition activities of roots of *Glycyrrhiza glabra*. *Pak J Pharm Sci* 25: 99-102.
5. Khan MA, Khan H, Tariq SA, Pervez S (2014) Urease inhibitory activity of aerial parts of *Artemisia scoparia*: Exploratory in vitro study. *Ulcers* 5:1-5.
6. Khan H, Khan MA (2014) Antiulcer Effect of Extract/Fractions of *Eruca sativa* Attenuation of Urease Activity. *J Evid Based Complementary Altern Med* 19: 176-180.
7. Kuwahara H, Miyamoto Y, Akaike T, Kubota T, Sawa T (2000) *Helicobacter pylori* Urease Suppresses Bactericidal Activity of Peroxynitrite via Carbon Dioxide Production. *Infect Immun* 68: 4378-4383.
8. Zhu-Ping X, Da-Hua S, Huan-Qiu L, Li-Na Z, Chen X, et al. (2007) Polyphenols based on isoflavones as inhibitors of *Helicobacter pylori* urease. *Bioorg Med Chem* 15: 3703-3710.
9. Uddin N, Siddiqui BS, Begum S, Ali MI, Marasini BP, et al. (2013) Bioassay-guided isolation of urease and  $\alpha$ -chymotrypsin inhibitory constituents from the stems of *Lawsonia alba* Lam. (Henna). *Fitoterapia* 84: 202-207.
10. Hanif M, Shoaib K, Saleem M, Rama NH, Zaib S, et al. (2012) Synthesis, urease inhibition, antioxidant, antibacterial, and molecular docking studies of 1,3,4-oxadiazole derivatives. *ISRN Pharmacol* 2012: 1-9.
11. Uesato S, Hashimoto Y, Nishino M, Nagaoka Y, Kuwajima H (2002) N-substituted hydroxyureas as urease inhibitors. *Chem Pharm Bull* 50: 1280-1282.
12. Tariq SA (2011) Urease inhibitors from *Indigoferagerardiana* Wall. *J Enz Inhibition Med Chem* 26: 480-484.
13. Khan H, Saeed M, Khan MA, Muhammad N, Khan A, et al. (2014) Lipoxygenase and Urease Inhibition of Extracts of *Polygonatum verticillatum* Rhizome: Augmented by its Isolated Compound, Santonin. *J Chem Soc Pak* 36: 865-869.