ABSTRACT

*Helicobacter pylori* a fastidious human pathogen with a small genome is an ideal model for studying gastric cancer. *H. pylori* survives by adapting itself by exclusively colonizing in the acid stomach of human the most stressful conditions to induce gastritis, ulcers and cancer. The current available treatment modalities include the usage of drugs to relieve pain and acidity. However, there are no specific reports on drugs that target *H. pylori*. Hence, there is a need for discovery of drug targets and drugs for *H. pylori*. An objective of this current study is to identify drug targets and drugs for *H. pylori* using *insilico* approach.

Four approaches subtractive genomics, pathogenic island analysis, metabolic pathways analysis and meta-analysis microarray data analysis were implemented to identify 123 drug targets for 23 *H. pylori* strains. Subtractive genomics, pathogenic island analysis, metabolic pathways analysis and meta-analysis of microarray data identified 29, 31, 42 and 21 drug targets respectively. Of these 123 drug targets 69 were experimentally validated, 57 were critical and 29 were novel. Seven drug targets D-alanine-D-alanine ligase B, molybdopterin-guanine dinucleotide biosynthesis protein MobA, thiamin phosphate pyrophosphorylase/hydroxyethylthiazole kinase, 4-diphosphocytidyl-2-c-methyl-D-erythritol kinase, NADH ubiquinone oxidoreductase subunit is complex, shikimate dehydrogenase, UDP-N-acetylmuramoyl-L-alanine-D-glutamate ligase were further subjected to screening of compounds.

Screening of databases for drugs resulted in a total of 28 drugs. D-alanine-D-alanine ligase B; Molybdopterin-guanine dinucleotide biosynthesis protein MobA; Thiamin phosphate pyrophosphorylase/hydroxyethylthiazole kinase; 4-diphosphocytidyl-2-c-methyl-D-erythritol kinase; NADH ubiquinone oxidoreductase subunit is complex; shikimate dehydrogenase; and UDP-N-acetylmuramoyl-L-alanine-D-glutamate ligase identified 5, 3, 2, 1, 3, 11 and 3 drugs respectively. Seven drug targets were docked against their respective drugs. Docking studies, ADMET properties and Lipinski rule favored p-hydroxymercuribenzoate which can be further tested *invivo*. These methods enabled rapid identification of drug targets and drugs of immense potential for therapeutic intervention of *H. pylori*.