

# From Germ Theory to Germ Therapy

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## Abstract

The work of Robert Koch in the nineteenth century has established the “Germ Theory” (Koch’s Postulates) for infectious disease. With the application of microscope and advance of microbiology, more and more bacterial pathogens were found. In 1982, Barry Marshal and Robin Warren has discovered *Helicobacter pylori*, which is linked to gastritis, peptic ulcer and gastric malignancies. Revelation of the connection between *Helicobacter pylori* infection and gastritis has prompted new investigations pertaining to gastrointestinal diseases such as peptic ulcer and gastric malignancy. *H. pylori* –induced persistent and uncontrolled gastric inflammation nearly always precedes the development of cancer and is instrumental in initiating a multistep process leading to carcinogenesis. The clinical spectrum of *H. pylori* infection now ranges from asymptomatic gastritis and peptic ulcer to gastric malignancies. Although these new findings are not fully compatible with Koch’s postulate, the eradication of *H. pylori* has been considered as an effective way to prevent recurrence of peptic ulcer and occurrence of gastric cancer. To reduce the burden of gastroduodenal diseases in Taiwan, our group develops new and effective regimens for eradication of *H. pylori* and has launched a screening program in Matzu island and Chang-Hwa city. Our results demonstrate the strategy of test-and-treat is effective in reduction of peptic ulcer and gastric cancer, also reflecting in gradual decrease of incidence of peptic ulcer and gastric cancer in national disease registry. The discovery and investigation of *H. pylori* has opened a new direction in researches and illustrated the importance of gut microbiota in human health and disease. Indeed, the human gut is a bioreactor with a microbiota that encompasses hundreds or thousands of bacteria taxa. Through metabolites, immune and inflammatory

reaction and Gut-Host axis, gut microbiota can play an important role in host's health. Dysbiosis can not only result in common gastrointestinal disease but also non-GI or non-communicable disease such as obesity, diabetes mellitus, atherosclerosis, cancer and even degenerative diseases of brain. In addition to changing our viewpoints in pathogenesis, therapeutic interventions, especially stool bank and fecal microbiota transplantation, has become a hot topic and may revolutionize diagnosis and treatment of diseases.