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The use of specific IgY to control *Helicobacter pylori* infection in human: some study results in Japan

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Abstract

Helicobacter pylori (*H. pylori*), first discovered by Warren J.R and Marshall BJ in 1982, is considered the most important cause of gastritis, gastric ulcer and stomach cancer. Recent investigations revealed that about 50% population in the world is infected with *H. pylori*. In Japan about 80% of people older than 60 are positive to *H. pylori*.

Medication with a combination of 2-3 antibiotics is the common therapy of *H. pylori* infection. But antibiotic therapy fails in 10-20% of cases due to the development of antibiotic resistance.

While most microbes are killed in the acidic environment in the stomach, *H. pylori* can survive and grow there because it produces a strong urease enzyme that accumulates on the surface of the bacterium. The enzyme degrades urea in foods to form ammonium and carbonic acid. This reaction increases local pH in stomach enabling the bacterium to grow. Besides, urease also functions as an adhesin to allow *H. pylori* to bind firmly on gastric mucin layer.

In our study, our research group extracted urease from *H. pylori* and used it as an antigen to immunize layer chickens. From the eggs laid by the immunized chickens we prepared specific antibody (IgY) and examined its efficacy against *H. pylori* infection by using experimental animal models and on human volunteers. In trials conducted on hairless mice and Mongolian gerbils the IgY antibody reduced *H. pylori* load as well as inflammation levels in the stomach. Various clinical trials on human volunteers in Japan also indicate that the IgY decreased *H. pylori* number in the stomach based on UBT test and stool ELISA assay. All these results show that anti-*H. pylori* urease IgY is a useful tool to control *H. pylori* infection and could be used as a supportive therapeutic measure to increase efficacy of drugs especially in case of antibiotic resistance.