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Biological Polymorphisms of *Helicobacter pylori* on Drug-Susceptibility Test in Clinical Laboratory

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Letter to Editor

The drug-susceptibility test is necessary and important examination to perform effective antibiotic therapy for individual infectious disorders irrespective to acute and chronic infections. The methodology for drug-susceptibility test in clinical laboratory crucially contributes to select the effective antibiotics in the regimen. Routinely, a strain of the microorganisms causing the infectious disease is subjected to the drug-susceptibility test in clinical laboratory according to application of health issuance and cost-performance. However, the treatment with the antibiotics chose based on the drug-susceptibility test provides not always successful outcome. Concerning with the importance of the problem, we generally accept the bacteria and host-related factors as follows; minor antibiotic resistant which is not detected and poor adherence and individual pharmacokinetics/dynamics in the body.

One of the chronic infectious disorders, the persistent *Helicobacter pylori* infection in the human stomach causes to various manifestations of gastro and extra-gastric disorders as reviewed [1,2]. *H. pylori* is acquired in childhood and the stable colonization continues lifelong unless treated successfully [3]. *H. pylori* possesses a high genetic diversity/rearrangement, and is persistently colonizing in the stomach due to adapt to the microenvironment of stomach according to the change in the circumstances. The persistent *H. pylori* infection has been made possible by the coexistence of a variety of strains consisting with newborn mutant strains as a flexible *H. pylori* community (*H. pylori* flora) in individual stomachs, leading to biological polymorphism of *H. pylori* in the stomach [4,5]. Nowadays, the eradication therapy is performed worldwide, however, the eradication failure with antibiotics based on the drug-susceptibility test using a strain is increasing and is worthy of note. Thus, many scientists and medical practitioner are struggling to develop the best regimen for treatment of *H. pylori* infection. They are investigating to figure out more effective combination therapy with antibiotics and gastric acid secretion inhibitors via the randomized clinical trials [6]. Simultaneously the drug-susceptibility test before antimicrobial prescription should be performed with due consideration for the characteristics of the examinations and bacterial features. The difference of drug-susceptibility tests e.g. E-test and agar dilution sometimes differs the values of Minimum Inhibitory Concentration (MIC) [7,8]. Furthermore, in particularly, *H. pylori* utilizes the high proper adaptation strategies mentioned above and survives as *H. pylori* flora in the stomach [4,5], which probably affects the results of the drug-susceptibility test. In the fact, in the case of eradication failure, the discrepancy between the result from the drug-susceptibility test and clinical outcome is reported [6,9-11]. When a single strain is used in the examination, it is hard to provide the accurate result/MIC value for the effective antibiotic therapy. Thus, we are analyzing with at least each 10 strain from individual patients to clarify the biological polymorphism of *H. pylori* on the drug-susceptibility. Four antibiotics such as clarithromycin, amoxicillin, metronidazole and sitafloxacin, were used in the drug-susceptibility test. So far, the diversity of MIC value among the multiple strains in the stomach is confirmed by the drug-susceptibility test in clinical laboratory. Interestingly, antibiotic-sensitive and -resistant strains coexisted even in a stomach. Moreover, the MIC values differ among the resistant strains in a stomach. These results seem to relate with the anatomical site where *H. pylori* exists and the history of antibiotic therapy. We need more investigations with the increased cases including primary treatment and eradication failure to clarify the effect of such biological polymorphism of *H. pylori* on the drug-susceptibility.

References

1. Wang F, Meng W, Wang B, Qiao L. *Helicobacter pylori*-Induced Gastric Inflammation and Gastric Cancer. Cancer Lett. 2014; 345: 196-202.
2. Tsay FW, Hsu PI. *H. pylori* Infection and Extra-Gastroduodenal Diseases. J Biomed Sci. 2018; 25: 65.
3. Talebi Bezmin Abadi A. Therapy of *Helicobacter pylori*: Present Medley and Future Prospective. Bio Med Res Int. 2014; 124607.
4. Takeuchi H, Zhang Y, Israel DA, Peek Jr. RM, Kamioka M, Yanai H, et al. Effect of *Helicobacter pylori* cdrA on Interleukin-8 Secretions and Nuclear Factor Kappa B Activation. World J Gastroenterol. 2012; 18: 425-434.
5. Takeuchi H, Kira M, Konishi S, Uchiyama J, Matsuzaki S, Matsumura Y. Polymorphisms in The *Helicobacter pylori* NY43 Strain and Its Prophage-cured Derivatives. Microbiology. 2018; 164: 877-882.
6. Talebi Bezmin Abadi A, Yamaoka Y. *Helicobacter pylori* Therapy and Clinical Perspective. J Glob Antimicrob Resist. 2018; 14: 111-117.
7. Hachem CY, Clarridge JE, Reddy R, Flamm R, Evans DG, Tanaka K, et al. Antimicrobial Susceptibility Testing of *Helicobacter pylori*. Comparison of E-test, Broth Microdilution, and Disk Diffusion for Ampicillin, Clarithromycin, and Metronidazole. Diagn Microbiol Infect Dis. 1996; 24: 37-41.
8. Van der Wouden EJ, De Jong A, Thijs JC, Kleibeuker JH, Van Zwet AA. Subpopulations of *Helicobacter pylori* Are Responsible for Discrepancies in the Outcome of Nitroimidazole Susceptibility Testing. Antimicrob Agents Chemother. 1999; 43: 1484-1486.
9. Blümel B, Goelz H, Kist M, Glocker EO. Retrospective Study on Outcome of Salvage *Helicobacter pylori* Eradication Therapies Based on Molecular Genetic Susceptibility Testing. *Helicobacter*. 2018; 23: e12494.

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10. Arslan N, Yılmaz Ö, Demiray-Gürbüz E. Importance of Antimicrobial Susceptibility Testing for The Management of Eradication in *Helicobacter pylori* Infection. World J Gastroenterol. 2017; 23: 2854-2869.

11. Thung I, Aramin H, Vavinskaya V, Gupta S, Park JY, Crowe SE, et al. Review Article: The Global Emergence of *Helicobacter pylori* Antibiotic Resistance. Aliment Pharmacol Ther. 2016; 43: 514-533.

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