Identification of the Critical Amino Acids of Helicobacter Pylori Virulence Factor GroES Involved in Inflammatory Response Induction

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Gastric cancer causes the second most death each year. Helicobacter pylori (H. pylori) secretes GroES, one of the critical carcinogens, which infects gastric epithelial cells and causes inflammation as well as gastric cancer. H. pylori GroES has the unique carboxyl extension of 28 amino acid fragment (91-118) in C-terminal, which is not found in GroES produced by other microbes. It was reported that the deletion of the extended amino acid residues of H. pylori GroES reduced interleukin 8 (IL-8) release. Therefore, we try to study the critical amino acid residues of GroES involved in inflammatory response induction. We deleted six amino acid residues once at a time from the end of GroES, and performed ELISA to investigate the critical sequences of the last 28 amino acids of GroES. The results indicated that none of the truncated GroES can induce IL-8 secretion in comparison with full-length GroES. Therefore, we disrupted disulfide bonds (Cys94-Cys111 and Cys95-Cys112) by using Dithiothreitol (DTT) or single or double point mutation, C111A, C112A and C111A/C112A to investigate the essential of the loop structure formed by the disulfide bonds in inflammatory response induction. The results indicated that when the disulfide bonds, single mutant of GroES still has the ability to cause inflammation, whereas double mutant does not. Taking together, present study could be developed for vaccines to prevent gastric cancer caused by H. pylori infection.