IL-1B (C+3954T) Gene Polymorphism and Susceptibility to Gastric Cancer in the Iranian Population

Ahmad Ismaili1*, Kheirollah Yari2,3, Mohammad-Taher Moradi2,3, Maryam Sohrabi2,3, Danial Kahrizi2,4, Elham Kazemi2,5, Zahra Souri6

Abstract

Background: Gastric cancer as one of the most important diseases affecting health in all worldwide. Current studies have confirmed associations of cytokine gene polymorphisms with the risk of gastric cancer development. The current research aimed to assess the association of IL-1B+3954 genotypes with the risk of gastric cancer in the Iranian population. Materials and Methods: This case-control study covered 49 gastric cancer patients compared to 53 cancer free individuals as a control group. Genomic-DNA extraction was carried out from bioptic samples of patients and peripheral blood of healthy volunteers. Polymorphism of IL-1B +3954 genotypes were analysed with a polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) method. Results: The frequencies of IL-1B +3954 A1A1, A1A2 and A2A2 genotypes in healthy individuals were 26.4, 66 and 7.6 %, respectively. However, in gastric cancer patients, A1A1, A1A2 and A2A2 with 4.1, 51 and 44.9% were observed (p<0.05). Conclusions: The findings of our results show a positive association between the IL-1B+3954 genotype distribution and the risk of gastric cancer disease in the Iranian population.

Keywords: Gastric cancer - IL-1B+3954 - gene polymorphism - Iran

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Introduction

Gastric cancer (GC) is well-documented as one of the most common cancers that affected health in all over the world (Zare et al., 2013; Huang, 2014; Yu et al., 2014). Gastric cancer is the second common cause of mortality rate in the worldwide (Kulmambetova et al., 2014). The peak occurrence of gastric cancer is in the 70th decade, and the disease is roughly twice as common in men as in women. There is a noticeable geographic variation, with the highest rates reported in East Asia, South America and Eastern Europe and the lowest rates in the United States and Western Europe (Forman and Burley, 2006). Regions of northern and northwestern of Iran are high risk areas for gastric cancer-related death (Moradi et al., 2013). Pathogenesis and progression of gastric cancer disease depend on interactions between genetic background, lifestyle and environmental risk factors such as infectious, dietary, cigarette smoking, alcohol, pollutants, stress, obesity and physical inactivity (Anand et al., 2008). Reported studies indicate that genetic factors such as single nucleotide polymorphisms, insertion or deletion mutations and rearrangements might have a strong influence on individual's susceptibility to gastric cancer (Zeng et al., 2003; Camargo et al., 2006; Yu et al., 2014). Helicobacter pylori infection leads to persistent colonisation and chronic inflammation of the gastric mucosa and increasing the risk of gastric malignancies (Rad et al., 2004). Therefore, now it is recognized as the most common etiologic factor of infection-related cancers (Moradi et al., 2013). Cytokines as the putative mediator of immune system play an significant role in some of biological activities such as cell proliferation, tissue development, gene expression, DNA repair and inflammation processes (Ayazi et al., 2013). One of the well studied cytokines that its genotypes are correlated with gastric cancer occurrence is interleukin-1 genotype. IL-1 genes family with two distinct but functionally similar types, IL-1α, IL-1β, are located in a cluster on the long arm of human chromosome 2q13 (Nicklin et al., 1994; Ayazi et al., 2013). Interleukin-1 beta (IL-1B), a proinflammatory cytokine expressed by activated macrophages and numerous other types of cells, is supposed to play a critical function in the pathogenesis of some diseases (Liu et al., 2010). Epidemiological evidence confirmed that IL-1β is highly polymorphic, and a few of the genetic polymorphisms of this cytokine are associated with an increased risk of pathogenesis of gastric cancer. The plausibility of this association rests in the fact that several of these genetic polymorphisms

1Department of Agronomy and Plant Breeding, Faculty of Agriculture, Lorestan University, 2Medical Biology Research Center, Kermanshah University of Medical Sciences, 3Zagros Bioidea Company, Razi University Incubator, 4Department of Agronomy and Plant Breeding, Faculty of Agriculture, 5Department of Biology, Faculty of Science, Razi University, 6Social Security Organization, Kermanshah, Iran *For correspondence: ismaili.a@lu.ac.ir; ahmad_ismaili@yahoo.com