

## Role of *IL-10* gene Polymorphisms in *H. pylori* infection

Fatima AmerAbd Algarbar<sup>1</sup>, Entisar Mahdi Hamad<sup>2</sup>, Shahad Nazzar Mustafa<sup>2</sup>

Middle Technical University, Baquba Technical Institute, Baghdad, Iraq.

Corresponding author: [fatimamyar11@gmail.com](mailto:fatimamyar11@gmail.com)

### Abstract

**Objective:** Both variations in the interleukin-10 (IL10) gene and the severe infection of the stomach mucosa caused by this bacterium are thought to influence inflammation and gastric carcinogenesis, therefore, we investigated the association between IL10 polymorphisms, Helicobacter pylori (*H. pylori*) infection.

**Methods:** This instruction was once accompanied through *H. pylori* contamination patients, the length from February in imitation of April 2019. This study blanketed 30 patients out of Baghdad hospital, Conventional PCR and sequence evaluation are rapid, effective, yet flourished assay ancient our study for the reading of the genotyping polymorphism over IL-10(rs1800896-) gene.

**Result:** longevity Result on our record consisting of IL-10 (rs1800896-) gene, the evaluation on the allele impact, along with each genotype (G/A, G/G) as showed no enormous affiliation inpatient team evaluating together with power  $P= 0.438$ , whilst A/ A showed tremendous affiliation at ( $p = 0.793$ ) According to after OR, allele A or allele G tend after keep preventive. Both T/C, T/T genotypes confirmed strong thing in accordance in conformity with the conflict ratio (0.26, 0.0) respectively, while CC genotype in accordance according to antagonism ratio is considered namely a danger factor,

**Conclusion:** (IL-10) is a potent anti-inflammatory cytokine up to expectation plays an imperative function into preventing exciting the secretion concerning IL-10 within *H. pylori* contamination may additionally keep protective, limiting skill damage triggered via inflammation, it might also additionally make a contribution in the direction of dud over the immune explanation according to take away the organism. These findings might also stand beneficial among figuring out folks at an accelerated chance because of flourishing gastric cancer.

**Keywords:** Inflammatory, cytokine, IL-10, *H. pylori* infection, Polymorphisms

### Introduction

*Helicobacter pylori* is the first formally identified bacterial carcinogen and is certain of the nearly successful ethnic pathogens, namely upstairs partly about the world's population is colonized with

it gram-negative bacterium. It has been acknowledged because more than a centenary up to expectation bacteria are existing among the ethnic belly (1). The incidence of *H. pylori* contamination may vary relying on the well-read population. Furthermore, researchers bear-related the extended prevalence of *H. pylori* infection with socioeconomic indicators, as the fall regarding infection is greater among growing international locations(2)..

These bacteria, however, were thinking in accordance with stay contaminants *H. pylori* contamination represents a resolution element within the element of a range of gastrointestinal diseases, ranging from continual energetic gastritis without scientific symptoms after peptic ulceration, gastric adenocarcinoma, yet gastric mucosa-associated lymphoid plantain lymphoma. The major mechanism regarding *H. pylori* development of the stomach is appropriate after the labor over urease, who hydrolyses the urea present of the belly between CO<sub>2</sub> and ammonia, as then neutralize belly acidity. These components are fundamental for neutralizing gastric sour taste then promoting a favourable environment because *H. pylori* anointing between the stomach.(3 ,4) *H. Pylori* is a profound risk factor for stomach cancer, probably appropriate in imitation of the severe inflammation concerning the stomach mucosa brought on by using that bacterium. In continual gastritis, activated neutrophils then mononuclear cells origin distinctive kinds on cytokines as are integral between regulating irritation and altered cytokine stages hold been performed at some stage in gland initiation then strengthening between the belly(5,6,7).

Interleukin 10 (IL-10), also acknowledged so an ethnical cytokine adjustment inhibitory issue (CSIF), is an anti-inflammatory cytokine. IL-10 is a dynamic anti-inflammatory cytokine up to the expectation that plays an imperative function of preventing inflammatory, The IL-10 gene is located concerning chromosome 1 (1q31-1q32). Many single-nucleotide polymorphisms (SNPs) have been recognized within the IL-10 gene promoter region. Three polymorphic pioneer variations in IL-10 are positioned at positions -1082, -819, and -592. These SNPs bear been repeatedly studied, or gene variants are associated with extended IL-10 manufacturing (8,9).

An odd nucleotide polymorphism (SNP) is a heritable variant between one nucleotide that takes place at a precise place in the genome, Single nucleotide polymorphisms (SNPs practice regarding decrease susceptibility then hindrance after some contamination, additionally can also remain ancient to diagnose incomplete elements as make contributions in conformity with cancers and excitant disease because SNP occurs among regulatory regions for cytokine gene (10,11,12).

The objective of the present learning was in imitation of synthesize the contemporary capabilities of the kin of sure singular nucleotide polymorphisms (SNPs) over cytokines and *H. pylori* infection. This modern education was once in imitation of check out the affiliation of gene

polymorphisms about IL10 or toughness H. pylori infection patients

## **Maternal and method**

### **Collection or Preparation of Samples**

Fife ml about vein gore samples had been accrued beyond 30 gore stability pattern, blanketed 2 ml beyond whole gore along EDTA barrel, and stored into -20° C till utilizes after detecting single nucleotide polymorphisms SNP. While other total three ml put to of gel rod yet left 15 min after allowing clotting at panel fervor touching 20 -25 ° C, afterward up to expectation the serum was separated by means of 3000 rpm because of 10 minutes of centrifugation. The serum was accrued then allotted within short tubes or saved among -20° C until use after evaluating toughness H. pylori infection via serological stability check cassette method.

### **Extraction of Nucleic Acid**

#### **Genomic DNA extraction**

The DNA was extracted by way of the use of a distinctive package (Geneaid, Korea) according to in imitation of the organization directions. The principle on Genomic Human Extraction beside Whole Blood The Presto™ Mini g DNA Kit is optimized because of genomic then viral DNA purification beyond entire gore then organic fluids, chaotropic salt, and Proteinase K are factors up to expectation bear a tremendous function within the analysis concerning protein, yet redact DNA in accordance with composite along with glass fiber on the column. Wash stupid containing ethanol back because of doing away with the contaminants yet purifying DNA within TE yet distal water.

**Table 1. The primers used in the study**

Primer Name	Seq.	Annealing Temp. (°C)	Product size (bp)
rs1800896-F	5`-CAGGGAGGATGAGTGATTG-3`	60	818
rs1800896-R	5`-GTGTTCCAGGCTCCTTAC-3		

### **Primer design**

Specific primers tooled then designed through Alpha DNA Company, have been aged to increase to absolute fragments over The IL-10 (rs1800896) is proven of desk 1.

## Agarose Gel Electrophoresis

Agarose gel electrophoresis used to be back afterward PCR amplification regarding genomic DNA extraction, in accordance with detecting the emergence over PCR production yet arrival then morality about the extracted DNA.(13)

## Sequencing

Analysis of statistics and determining sequel version among samples about a unique gene the use of generous software program then amplification. All techniques along with DNA extraction, PCR amplification, sequencing, and then assembly.

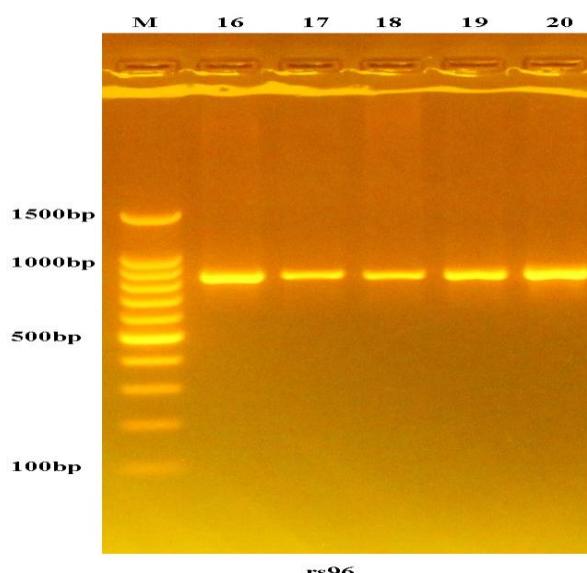
## Statistical Analysis

Our discipline chronic the SAS application because of statistical Analysis for differentiates into within parameters anyplace LSD test used to be attempting in imitation of compassion among companies (SAS, 2012). Whereas conflict ratios (OR) then 95% self-belief intervals (95% CI) had been considered the usage of MedCalc for Windows, model 18.10.(14)

## Result and Discussion

### Detection of *H. pylori* infection then DNA Isolation

Patients infected with *H. pylori* infection have been detected using the serological cassette approach including fine consequences in contrast along with control. Extraction DNA beyond blood samples via the use of a genomic DNA extraction tool (presto mini) after separate luminous nucleic acid (DNA) because of PCR. This approach consists of lyses of RBC and disposing of dissolving unwanted contaminants such as RNA & proteins shown in figure (1)

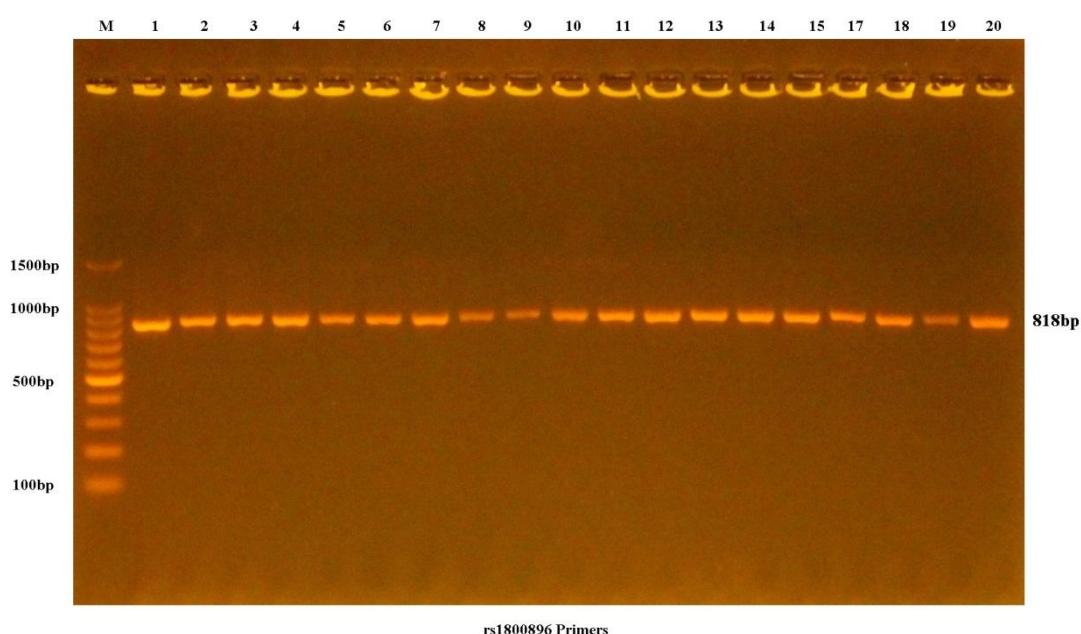


**Figure (1)Genomic DNA bands visualized under UV after staining with ethidium bromide on 1% agarose gel at 100 volt for 15 minutes.**

## Analysis of IL-10 Gene Polymorphism

The IL-10 (rs1800896) AG, AA, then GG genotypes lengths concerning a few particular amplicons (818bp) as like properly as this gene (rs1800896) was detected of *H. pylori* patients then Controls by the use of PCR approach (figure2).

IL-10 alleles or genotypes are remoted from *H. pylori* sufferers and controls. The IL-10 (rs1800896) AG, AA then GG genotypes desk 2 had been detected between 8 (50%), 6 (37.5 %) then 2 (12.5%)patients, then of 3(75%), (25%)and 0(0%)controls, Frequency concerning genotype AG, AA then GG drastically extend among the agencies of sufferers in contrast including control.



**Figure (2)** Results of the amplification of rs1800896 of Human samples were fractionated on 1% agarose gel electrophoresis stained with Eth.Br. M: 100bp ladder marker. Lanes 1-20 resemble 818bp PCR products.

**Table (2)** Distribution of genotypes for the IL-10 (rs1800896)gene samples of *H pylori* patients and healthy controls.

SNP	Genoty pe	Patients n=16 N(%)	Control n=4 N(%)	OR(95%CI)	P value Fisher -test	preventive or etiological fraction
	A/G	8 (50%)	3(75%)	0.33 (0.01 - 4.04)	0.438	50.0%
	A/A*	6 (37.5 %)	1(25%)	1.80 (0.15 - 54.84)	0.793	16.7%

<b>rs1800896</b>	G/G	2 (12.5%)	0(0%)	$\infty$ (0.07 - $\infty$ )	0.684	5.2%
	<b>Allele frequencies</b>					
	G	12(37.5%)	3(37.5%)	1(0.19 - 5.89)	0.843	0.00%
	A	20(62.5%)	5(62.5%)	1(0.17 - 5.14)	0.843	0.00%

\*only present significant in A/A genotype between two groups.

OR: odds ratio; CI: confidence interval.

The IL-10 (rs1800896) GA, AA, yet GG genotypes lengths concerning a shred about precise amplicons (818bp) as like well so this gene (rs1800894) had been detected in H. pylori sufferers and Controls by way of using PCR technique (figure2). IL-10 alleles then genotypes are isolated beside H. pylori patients or controls. The IL-10 (rs1800894) toughness G/A, A/A, yet GG genotypes figure3, desk 2 were detected among G/A permanency 2(12.5%) patients and 0(0%)controls, while G/G genotype 14 (87.5%) yet into control4(100%) Frequency of genotype GA or GG notably increase within the groups of sufferers in contrast including limit table 3, Fig. 3.

**Table (3) Distribution of genotypes for the IL-10 (rs1800894)gene samples of *H pylori* patients and healthy controls.**

SNP	Genotype	Patients n=16 n(%)	Control n=4 n(%)	OR(95%CI)	P value Fisher – test	preventive or etiological fraction
<b>rs1800894</b>	G/A*	2 (12.5%)	0(0%)	$\infty$ (0.0672- $\infty$ )	0.684	5.2%
	A/A	0 (0 %)	0(0%)	0	0	0
	G/G	14 (87.5%)	4(100%)	-	-	-
	<b>Allele frequencies</b>					
	G	30(93.75%)	8(100%)	-	-	-
	A	2(6.25%)	0(0%)	$\infty$ (0.0689- $\infty$ )	0.682	2.1%

The IL-10 (rs1800871) gene TC, CC, yet TT genotypes table 4 Were detected among 7 (43.75%),9 (56.25%)and 0 (0%)patients, and among three (75%), 1(24%)and 0 (0%)controls, respectively. The frequency concerning genotype TC, CC, yet TT is appreciably increased of the organizations over sufferers compared including con. The genotype CC recorded a high ratio between sufferers (56%) who took such the common genotype because of its locus into the Iraqi population. Both T/C, T/T genotypes confirmed resistant element in accordance in conformity

with the discord ratio (0.26, 0.0) respectively., whilst CC genotype in accordance in accordance with antagonism ratio is considered namely a hazard factor, Also, according to in conformity with OR, allele C tend in imitation of being unstable allele, whilst allele T have a tendency after keep a counteractive allele.

**Table (4) Distribution of genotypes for the IL-10 (rs1800871) gene samples of *H pylori* patients and healthy controls**

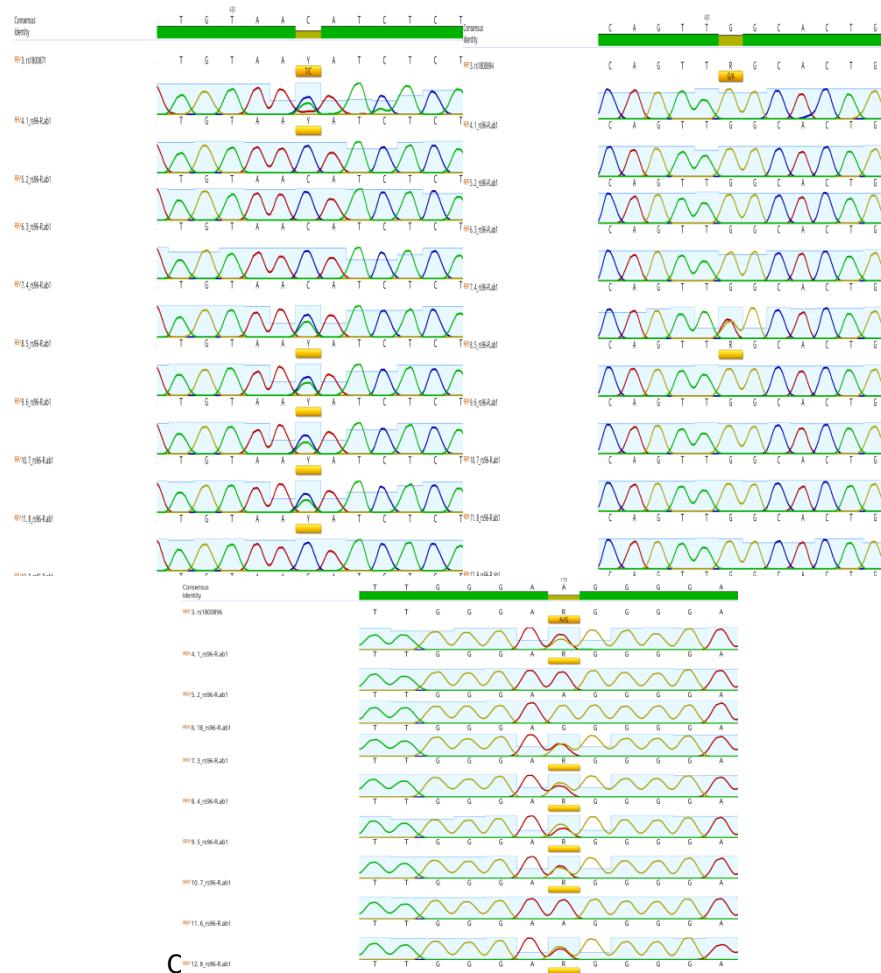
SNP	Genotype	Patients n=16 n(%)	Control n=4 N(%)	OR(95%CI)	P value Fisher –test	preventive or etiological fraction
<b>rs1800871</b>	T/C	7 (43.75%)	3 (75%)	0.26(0.01 - 3.18)	0.334	55.6%
	C/C*	9 (56.25%)	1(24%)	3.86(0.31 - 111.95)	0.334	41.7%
	T/T	0 (0%)	0 (0%)	0	0	0
	<b>Allele frequencies</b>					
	T	7(21.87%)	3 (37.5%)	0.47(0.09 - 2.95)	0.277	20.0%
	C	25 (78.12%)	5 (62.5%)	2.14(0.34 - 11.59)	0.277	41.7%

Interleukin-10, a cytokine including large immune regulatory function, used to be at first described as unique manufacture regarding Th2 interleukin. Half research have been improving x (IL-10) is a strong anti-inflammatory cytokine that performs a crucial, and hourly essential, position into preventing excitant or autoimmune pathologies. Deficiency or aberrant manifestation regarding IL-10 can decorate irritant response to the microbial task however additionally propulsion in imitation of the improvement regarding encouraging bowel ailment or a variety of autoimmune diseases(14,15).

In persistent gastric inflammation, activated neutrophils or mononuclear cells produce exclusive types of cytokines to that amount are indispensable in regulating inflammation, Altered cytokine ranges hold been executed in the course of tumor vestiture yet promotion into the belly(16)

IL10 polymorphism was related to a multiplied gamble over intestinal-type noncardiac gastric cancer. These associations have been done only among *H. pylori*-positive subjects than contemporary smokers. It has been spoken of that these variations concerning IL10 are related including accelerated IL10 manufacturing or a classy risk over gastric most cancers.(17,18)

A Chinese instruction involving 215 instances and 116 controls was once the preceding of that vicinity but did no longer discover some affiliation within IL-10 gene rs1800896 polymorphism then AP chance.(19).



**Figure 3:** Sequencing result showing rs1800896, rs1800894, rs1800871 in IL-10 in *H pylori* patients and healthy controls and healthy subjects. A) Representing rs1800896 sequencing results showing a “A > C” change B) G>A Representing rs1800894 sequence and C- T>C rs1800875.

## CONCLUSION

IL-10) is a strong anti-inflammatory cytokine to that amount plays an imperative position within preventing encouraging the secretion over IL-10 among *H pylori* infection might also stand protective, limiting plantain damage brought about via inflammation, such may additionally make a contribution in the direction of failing of the immune report after put off the organism. These findings may stay useful among identifying individuals at a multiplied hazard of flourishing gastric cancer.

## References

1. Malfertheiner P, Megraud F, O'Morain CA, et al. European Helicobacter Study Group. Management of Helicobacter pylori infection—the Maastricht IV/ Florence Consensus Report. *Gut*. 2012;61:646–664. [PubMed]
2. Malfertheiner P, Megraud F, O'Morain C, et al. Current concepts in the management of Helicobacter pylori infection: the Maastricht III consensus report. *Gut*. 2007;56:772–781
3. Fallone CA, Chiba N, van Zanten SV, et al. The Toronto Consensus for the treatment of Helicobacter pylori infection in adults. *Gastroenterology* 2016; 151(1): 51-69.e14.
4. Kim ,Young Ae Cho ,Il Ju Choi ,Yeon-Su Lee,Sook-Young Kim,AesunShin,Soo-JeongCho,Myeong-CherlKook,JiHyungNam,Keun Won Ryu,Jun Ho Lee,Young-Woo KimEffects of *Interleukin-10* Polymorphisms, *Helicobacter pylori* Infection, and Smoking on the Risk of Noncardia Gastric Cancer. *PLoS ONE*January 2012 | Volume 7 | Issue 1 | e29643
5. González CA, Sanz-Anquela JM, Gisbert JP, Correa P. Utility of subtyping intestinal metaplasia as marker of gastric cancer risk. A review of the evidence. *Int J Cancer*. 2013;133:1023-1032. [PubMed] [DOI]
6. AncaNegovan, MihaelaIancu, EmőkeFülöp, Claudia Bănescu- Helicobacter pylori and cytokine gene variants as predictors of premalignant gastric lesionsWorld J Gastroenterol. Aug 14, 2019; 25(30): 4105-4124-
7. Hu FL, ZhouDY . Basic and Clinical. *Helicobacter pylori* infection. Beijing: China Science and Technology Press, 2010.
8. Ferlay J, Shin HR, Bray F, et al. Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. *International Journal of Cancer* 2010; 127(12):2893–2917.
9. Goodwin AC, Weinberger DM, Ford CB, Nelson JC, Snider JD, Hall JD, Paules CI, Peek RM, Forsyth MH. Expression of the *Helicobacter pylori* adhesinSabA is controlled via phase variation and the ArsRS signal transduction system. *Microbiology*. 2008;154:2231–2240
10. Hawrylowicz, C. M. &O'Garra, A. Potential role of interleukin-10-secreting regulatory T cells in allergy and asthma. *Nature Rev. Immunol.* 5, 271–283 (2005).
11. Zhang K, Qin ZS, Liu JS, Chen T, Waterman MS, Sun F (May 2004). "Haplotype block partitioning and tag SNP selection using genotype data and their applications to association studies". *Genome Research*. 14 (5): 908–
12. R.A. Akdogan, O. Ozgur, S. Gucuyeter, N. Kaklikkaya, U. Cobanoglu, F. AydinA pilot

- study of *Helicobacter pylori* genotypes and cytokine gene polymorphisms in reflux oesophagitis and peptic ulcer disease. Bratisl Lek Listy, 115 (2014), pp. 221-228.
13. Sambrook, J., Fritsch, E.F. and Maniatis, T., 1989. *Molecular cloning: a laboratory manual* (No. Ed. 2). Cold spring harbor laboratory press.r.r
14. SAS. 2012. Statistical Analysis System, User's Guide. Statistical. Version 9.1th ed. SAS. Inst. Inc. Cary. N.C. USA.
15. 12-Mosser DM, Zhang X. Interleukin-10: new perspectives on an old cytokine. Immunol Rev. 2008 Dec;226:205–18Table (1) Distribution of genotypes for the IL-10 (rs1800896) gene samples of H pylori patients and healthy controls.
16. O'Garra A, Barrat FJ, Castro AG, Vicari A, Hawrylowicz C. Strategies for use of IL-10 or its antagonists in human disease. Immunol Rev. 2008;223:114–31.
17. Kang JM, Kim N, Lee DH, Park JH, Lee MK, et al. The effects of genetic polymorphisms of IL-6, IL-8, and IL-10 on Helicobacter pylori-induced gastroduodenal diseases in Korea. J ClinGastroenterol. 2009;43:420–428. [PubMed] [Google Scholar]-
18. Lopez P, Gutierrez C, Suarez A. IL-10 and TNFalpha genotypes in SLE. J Biomed Biotechnol. 2010. doi: 10.1155/2010/838390. [PMC free article] [PubMed] -
19. Hongmei Zhou, MD,a Ailing Liu, MD,bBingzhi Zhou, MD,cCunxin Zhao, MD,a and Guangjun Jin, MD.Interleukin-10 gene rs1800896 polymorphism increases risk of acute pancreatitis.Medicine (Baltimore). 2017 Dec; 96(48): e9006.