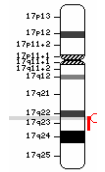


ANGIOTENSIN CONVERTING ENZYME POLYMORPHISM IN SAUDIS

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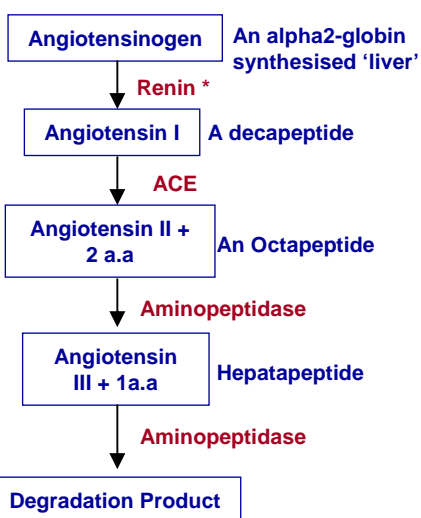


Introduction

Angiotensin Converting Enzyme (ACE) is a Zn⁺⁺-metallopeptidase, glycoprotein in nature, present in lungs, endothelial cells and plasma. It is involved in the renin-angiotensin system, which is implicated in regulation of blood pressure and electrolytes.

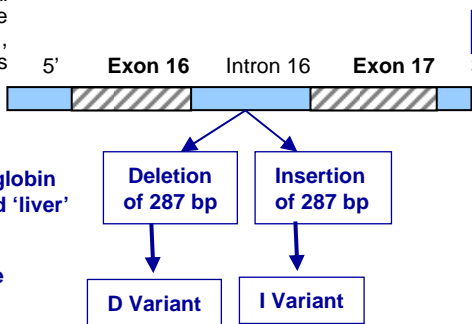
It removes two carboxyl terminal amino acids from the decapeptide angiotensin I to form angiotensin II, a vasoconstrictor, that degrades bradykinin, a vasodilator.

Action of ACE



The ACE gene is located on chromosome 17 (17q 23-q24) and has 26 exons and 25 introns. It exhibits extensive polymorphism in different populations. Insertion/deletion (I/D) polymorphism in intron 16 is reported in many studies and may be linked to hypertension and cardiovascular disease and obesity development.

I / D Polymorphism of ACE Gene



Objectives:

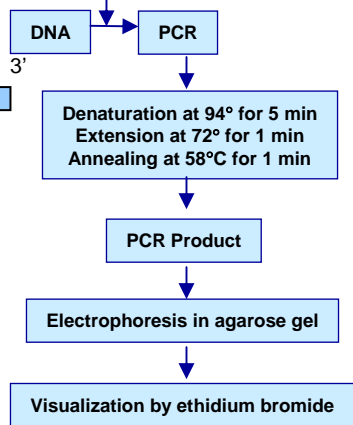
- To determine the allele frequency of ACE gene I/D alleles in Saudi population.
- To compare the frequency in Saudis with those in other populations.
- To investigate the frequency in patients with and with diabetes mellitus, obesity and hypertension.
- To investigate the frequency in NIDDM patients with renal disease with those without renal disease.

Patients and Materials

This study was conducted on patients suffering from diabetes mellitus (421), obesity (214), hypertension (157) and controls (389).

Steps involved in the study of ACE gene polymorphism in Saudis

- 100 pmol each primer
- 5 mM/ Mg Cl₂
- 50 mM/ KCl
- 0.6 mmol/l dNTP
- 0.1% gelatin
- 20 ng DNA
- 1.0 ul Taq polymerase



Results

Electrophoretic pattern of the I / D variants of ACE gene



Conclusions

The deletion (D) allele occurs at a high frequency in Saudis, similar to the reports from Kuwait but significantly higher, while I allele is significantly lower compared to several other populations. In obesity the DD allele occurs at a significantly higher frequency. Increased frequency of DD genotype and D allele is not seen in Saudi diabetic patients. NIDDM patients with renal disease do not show any significant differences in the frequency, but have elevated creatinine level. The D allele is associated with elevated level of ACE in plasma. Whether this has any clinical consequences in Saudis has yet to be determined.

Genotype and allele frequency of I / D alleles of ACE in normal Saudi population and those suffering from different diseases

Saudi population	Genotype frequency (%)			Allele frequency	
	DD	ID	II	D	I
Normal	56.03*	41.84*	2.31	0.759*	0.230
Hypertensive	52.17	43.48	4.34	0.739	0.261
Obese	76.9*	19.66*	3.42	0.87*	0.13
NIDDM with end stage renal dis.	54.3	37.1	8.6	0.729	0.271
NIDDM without renal disease	46.8	61.06	2.13	0.723	0.276

Genotype and allele frequency of I / D alleles of ACE in Saudis compared to other populations

	Genotype Frequency (%)			Allele Freq	
	DD	DI	II	D	I
Germany	30.4	55.4	14.1	0.58	0.418
Korean	17.0	41.0	49.0	0.449	0.551
Kuwait	52.0	46.0	2.0	0.75	0.25
Turkey	29.4	57.3	13.3	0.493	0.507
Japan	14.0	43.0	43.0	0.42	0.58
Greece	29.0	40.0	15.0	0.58	0.42
Caucasian	36.0	40.0	24.0	0.56	0.44
Denmark:	26.7	49.7	23.6	0.513	0.487
Finland	43.0	45.0	12.0	0.65	0.35

