# Introduction of the work

Diabetes mellitus has become one of the world's most important public health problems. Globally, the number of people with diabetes is expected to rise from the current estimate of 150 million to 220 million in 2010 and 300 million in 2025 ***(Buse et al., 2003).***

The chronic complications of D.M affect many organ systems and are responsible for the majority of morbidity &mortality associated with the disease ***(Powers 2001).***

Chronic complications can be divided into vascular and nonvascular complications, the vascular complications of D.M are further subdivided into microvascular (retinopathy, neuropathy, nephropathy) and macrovascular (coronary artery disease, peripheral vascular disease & cerebrovascular disease) ***(Powers 2001).***

Type 2 DM is a vascular disease, more than 3 out of 4 diabetic patients die of causes related to atherosclerosis, in most cases (75%) because of coronary artery disease, yet; 70% of diabetic persons do not believe they are at serious risk for cardiovascular disease ***(Grundy et al., 2002).***

Some results suggest a role for chronic hyperglycemia in the development of macrovascular complications, for example; coronary heart disease events and mortality are two to four times greater in patients with type 2 D.M. But this evidence is less conclusive than in microvascular complications. Because of these observations, it is suspected that a genetic susceptibility for the developing particular complications exists ***(Grundy 1999).***

Individuals with D.M may have several forms of dyslipidemias, these lipid abnormalities should be aggressively detected & and treated as part of comprehensive diabetes care ***(Kreisberg 1998).***

Apolipoproteins are the structures that constitute the protein moiety of the lipoprotein particles, they include Apolipoprotein A-I, Apo A-II, Apo A-IV, Apo B-100, Apo B-48, Apo C-I, Apo C-II, Apo C-III, Apo D &Apo E ***(Brewer 1998).***

Apolipoproteins carry out several roles, while they form part of the structure of the lipoprotein; they are also enzymes cofactors and they act as ligands for interaction with lipoprotein receptors in tissues ***(Hussein 1996).***

Apolipoprotein E is one of these apolipoproteins, it contains arginine to the extent of 10% of its total amino acids, it accounts for about 5-10% of total VLDL apolipoproteins in normal subjects ***(Brewer 1998).***

Apolipoprotein E is synthesized mainly in hepatocytes; but is also made in other cells; including macrophages and glial cells ***(Lee et al., 2002).***

Apo E is found in chylomicrons, intermediate density lipoproteins, very low density lipoproteins & high density lipoproteins. It mediates the uptake of these lipoproteins in the liver by both the LDL receptor and the LDL receptor- related protein (LRP). Apo E also binds to the heparin-like proteoglycan molecules on the surface of all cells ***(Lehtinen et al., 2003).***

The role of Apo E in the development of dyslipidemia is unclear; but it is present in excess in the broad B-VLDL of patients of type III hyperlipoproteinemia ***(Hussein 1996).***

Apolipoprotein E gene is the gene that codes for Apolipoprotein E. There are three major alleles of the Apolipoprotein E gene $\varepsilon_2$, $\varepsilon_3$, $\varepsilon_4$ resulting in six common genotypes, these isoforms differ in sequence at two positions ***(Lee et al ., 2002).***

Apolipoprotein E gene polymorphism resulting from nucleotide substitutions in exon 4 ***(Lehtinen et al., 2003).***

***Haddy et al., (2002)*** concluded that Apo E plays an important role in lipid metabolism; and that total cholesterol and triglycerides concentrations are significantly dependant on Apo E genotypes in both sexes**.**

***Mustafina et al., (2002)*** has concluded that the Apo E gene polymorphism was associated with higher risk of myocardial infarction in Russians and Tatars, and there was higher frequency of APO $E_4$ allele in these patients.

# Aim of the work

The purpose of this work is to study the relation between the apolipoprotein E gene polymorphism and the occurrence and severity of coronary artery disease in type 2 diabetic patients.