**Introduction**: This thesis deals with the calcium-phosphate metabolism and its role in the development of chronic diabetic complications. It examines calcium sensitive receptor, which can be crucial in affecting calcium metabolism. Calcium-sensitive receptor may play a role in intracellular signaling and metabolic pathways that lead to cell proliferation and extracellular matrix early diabetic nephropathy. We investigated two polymorphisms of the gene for calcium-sensitive receptor (intron 4 and codon 990).

**Material and Methods**: The study included 313 diabetic patients, 41 patients with type 1 diabetes, 106 patients with type 2 diabetes, 110 diabetic patients with type 2 diabetes who had diabetic nephropathy and 56 patients with renal failure non-diabetic (NDRD). It was also examined 72 non-diabetic patients with chronic renal failure (CKD) and 96 healthy blood donors (ZK). Classification of diagnoses is listed in the theory. DNA was isolated by QIAamp DNA Blood Mini Kit and salting method. The specific fragments of gene for the CaSR were amplified by PCR. For detection, restriction fragment length polymorphism and TaqMan probes were used. The expression levels of mRNA were determined by real-time PCR.

**Results**: For the codon 990 polymorphism, we found statistical significance of the genotype frequencies (AA, AG, GG) in type 2 diabetic patients compared with healthy controls (P <0.05). GG genotype appeared as a protective factor against the development of diabetes, it was found only in the group of healthy controls and type 2 diabetics. In allele frequencies (allele A major, minor allele G), statistical significance was not found. For the intron 4 polymorphism, we found no statistically significance difference in the allele frequencies (T allele major, minor allele C), but we found statistically significant differences in the genotype frequencies (TT, TC, CC) between type 1 diabetics, type 2 diabetics, type 2 diabetics with diabetic nephropathy and in patients with chronic renal failure, and healthy controls. For all the named groups of patients statistical significance was demonstrated (P <0.05). Heterozygous genotype TC appeared as a protective factor against the development of diabetes and nonspecific renal complications.

**Conclusion**: The gene for the calcium-sensitive receptor could play a role in the etiopathogenesis of diabetes and its complications, as we found statistically significant differences in genotyping between patients and controls. However, to understand the relationship between CaSR and diabetes will be study other polymorphisms in this gene.