ABSTRACT

Osteogenesis imperfecta is an inherited disorder caused mainly by collagen type I genes mutations, COL1A1 and COL1A2. These mutations affect especially connective tissue. Disease is characterized by fragile bones, deformations and increased frequency of fractures. It´s worldwide extensive disorder regardless of age, sex, nationality or races. The incidence is 1: 16 - 20 000 births. Currently, we described nine clinically distinct forms of Osteogenesis imperfecta. Only the first four types OI, type I-IV, are caused by collagen type I genes mutations . In these nine types there are distinguished mild and severe forms. Type II and III are lethal forms, death occur offen during prenatal period or in the first days of the life affected individuals. Characteristic clinical features of collagen forms OI are an increased incidence of fractures, deformations of bones, blue sclera, hearing loss, Dentinogenesis imperfecta small or subnormal growth (Marini, 2010).

This study alignment is mainly the description of the clinical forms, exploring the molecular basis of disease and determine the relationship between the type and position of the mutation and the resulting phenotype of affected individuals.

We have analysed exons 31-40, including associated non-coding regions, of the COL1A1 gene (so-called **MLBR** = **M**ajor **L**igand **B**inding **R**egion) in 25 Czech patients diagnosed with OI, type I-IV. This seqeunce is coding a „multi ligand binding region“ binding other extracellular matrix components, such as integrins, COMP, fibronectin and others. This modifications result in increased bone flexibility and strength.

We have observed COL1A1 gene mutations and single nucleotide polymorfisms in seven of twenty-five studied individuals. These changes are found both in exons and introns in the gene. In all cases, genetic changes in exons are a single point mutations resulting in either amino acid substitution, STOP codon production or the mutations don´t alter the readinframe during the transaltion.

Keywords: Osteogenesis imperfecta, COL1A1, collagen type I, collagenopathies, mutations, the Czech population