

**ABSTRACT:**

Bilirubin is a major product of the heme catabolism in the vascular bed with substantial antioxidant properties. These importantly contribute to pathogenesis of diseases associated with increased oxidative stress, including cardiovascular or cancer diseases.

In the first part of this PhD project serum bilirubin concentrations were examined in the 1 % representative sample of the general Czech population, together with determination of the prevalence of Gilbert's syndrome. Bilirubin concentrations were determined also within individual polymorphisms of the *UGT1A1* gene (*OMIM\*191740*) responsible for bilirubin biotransformation in the liver, including their association with the basic risk factors for atherosclerosis. We also assessed the activity of the standard liver enzymes (representing another significant risk factor for the development of cardiovascular diseases) with surprisingly high proportion of subjects with elevated values. Simultaneously, we determined the concentrations of serum bilirubin in a group of patients with an acute coronary syndrome, who manifested with significantly lower concentrations as compared to general population.

In the second part of this research project, the relationship between plasma concentrations of bilirubin and individual variants of *UGT1A1* gene polymorphisms and total and cardiovascular mortality was investigated.

At the end of the work I present partial results of other co-author's works projects I have been co-authoring. The increase in obesity and its metabolic impact is particularly alarming. In addition to traditional epidemiological indicators, new ones are also gaining in importance; in addition to serum bilirubin concentrations, uric acid concentrations also appear to be a potent biomarker.

**Key words:** Bilirubin, cardiovascular diseases, Gilbert's syndrome, *UGT1A1* gene promoter variants, mortality