Abstract

Biliverdin and bilirubin are bile pigments which are degradation products of heme. Biliverdin (BV) is greenish-blue pigment and is reduction product of tetrapyrrolic core of heme by influence of the hemoxygenase (HO). The final product of this degradation is yellowish-brown pigment bilirubin (BR) which forms from BV thanks to the biliverdinreduktase (BVR). Normal and slightly raised level of bilirubin in plasma has cytoprotective effects whereas high levels are cytotoxic often. In severe unconjugated hyperbilirubinemia cases (newborn children) unconjugated bilirubin (UCB) accumulates in central nervous system (CNS) and causes bilirubin-induced neurologic dysfunction (BIND). Unfortunately there is a limitation for finding UCB pathophysiology caused by difficult determination of UCB content and distribution in tissues and biological fluids. So the main purpose of this thesis is to find and integrate isolated methods which will serve as the basis of finding bilirubin distribution. This progress would have a significant effect on studies of bilirubin neurotoxicity on newborn children. This method is based on radioactive labeling of UCB. Preferentially atom C 10 used for binding suitable functional group (thiols) because conformation of indicated bilirubin shouldn´t change in this position. And then the isotope of iodine is incorporated into the molecule by nucleophilic substitution. So labeled UCB will be tested by MS, NMR. However results revealed that the addition of thiols on BV is not appropriate. Compounds created by this way are not stable and therefore it is not possible to mark them by suitable radioisotope. The only one possibility is the addition of other functional group which will be more resistant to external factors.

Key words: biliverdin, bilirubin, thiol, nucleophilic addition, hyperbilirubinemia, MS, tosylation