ABSTRACT

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Title of diploma thesis: Preparation of human DHRS1 enzyme and its basic characterization

Dehydrogenase/reductase SDR family member 1 (DHRS1, SDR19C1) is imperfectly characterized representative of the short-chain dehydrogenase/reductase (SDR) superfamily. Human SDRs catalyze especially NADPH-dependent reactions with many different substrates and play important roles in the biochemical pathways related to the metabolism of lipids, amino acids, steroid hormones, retinoids and prostaglandins. Besides physiological processes are human SDR enzymes involved in pathophysiological processes and detoxification of xenobiotics. It is believed that even previously uncharacterized members of SDR superfamily could have a similar or overly function. Even human DHRS1 shows phylogenetic similarity with enzymes playing an important role in the human body, but so far there is insufficient information to make this task of DHRS1 confirmed.

The aim of this study was to specify the basic biochemical properties of human DHRS1 and determine whether it is active towards substrates with a carbonyl group. This activity was tested on the basis of bioinformatics data, whereby it is considered possible involvement of human DHRS1 in reductive reactions. To test a catalytic activity, recombinant form of DHRS1 was prepared using methods of ligase independent cloning and baculovirus expression system. The obtained results of recombinant form DHRS1 shows that it is a peripheral microsomal protein that interacts with the membrane of the endoplasmic reticulum (at the outside) with the orientation of the polypeptide chain into the cytosol. Catalytic activity was detected towards some ligands with a carbonyl group e.g.: estrone, cortisone, glucose monohydrate, prednisone, ketotifen or 4-benzoylpyridine.