Abstract

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Title of Thesis: Characterization of carbonyl-reducing enzymes in barber's pole worm

Barber's pole worm (*Haemonchus contortus*), one of the most pathogenic parasites of small ruminants as sheep and goats, has developed resistance against all used anthelmintic drugs. Detoxifying enzymes, which represent the main defense system against harmful xenobiotics, can also contribute to the development of drug resistance, and they are not fully explored in this organism. This research is focused on the study of carbonyl-reducing enzymes in barber's pole worm using specific substrates and inhibitors. Subcellular fractions (cytosol and microsomes) were prepared from adult worms for following *in vitro* experiments. Protein concentration and reductase activity towards different substrates were determined in each fraction. Substrates were chosen based on knowledge of human biotransformation enzymes. The highest activity in cytosol has been detected for glyceraldehyde (8,22 ± 0,82 [nmol/min/mg]) and menadione (4,63 ± 0,46 [nmol/min/mg]), in microsomal fraction for menadione (4,38 ± 0,36 [nmol/min/mg]) and metyrapone (1,92 ± 0,14 [nmol/min/mg]). Specific inhibitors (glycyrrhetinic acid, luteolin, naringenin, quercitrin and silibinin) have significantly decreased the activity of reducing enzymes in cytosolic and microsomal fractions of *H. contortus*. According to results the presence of cytosolic enzymes AKR1B10 and AKR1C from aldo-ketoreductase superfamily (AKR) and cytosolic CBR1 and microsomal 11β-HSD1 from short-chain dehydrogenase/reductase superfamily (SDR) can be presumed.