

## ABSTRACT

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Obesity and related comorbidities occur more frequently in the population and belong to the most studied contemporary health topics. Aging of the organism is much discussed topic as well. Various animal models are used to observe changes in the organism at the organ, tissue, cellular and molecular levels. Comparison of specific activities and protein expressions of glutathione peroxidase (GPx) and glutathione reductase (GR), and specific activity of glutathione-S-transferase (GST) in the liver of obese mice and healthy controls according to the pathological state, aging and sex was the aim of this study. Mice with monosodium glutamate (MSG)-induced obesity, osmolal controls (NaCl) and mice without treatment of both sexes and at 8 and 20 weeks of age were used. Specific enzyme activities were determined spectrophotometrically. Protein expressions were determined using polyacrylamide gel electrophoresis followed by immunoblotting. The biggest obesity-related changes in enzyme activity were observed in GST, which activity declined in obese male mice by 50%, while in female mice was the difference insignificant. The specific activities of GR and GPx enzymes did not change significantly upon obesity induction. Among studied enzymes, the activity of GST was the most influenced by the gender. Male mice in control groups had twice as high GST activity as females of the same age; this difference was suppressed by obesity. The activity of studied detoxification enzymes remained almost unchanged with increasing age. Protein expression of GR has increased by one- or two-thirds due to obesity in comparison with control groups. GR protein expression usually slightly decreased with age and in most groups was GR expression slightly lower in males than in females. GPx2 protein expression changed ambiguously and mainly in males.