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YEAST AS A SUITABLE SYSTEM *TO STUDY MECHANISMS OF* TRANSCRIPTIONAL CONTROL OF OXIDATIVE STRESS RESPONSE

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Exposure to xenobiotics and heavy metals, excessive training and misbalanced diets lead to oxidative stress that is implemented in development of aging and many diseases. The most important reactions of oxidative damage to the cell including lipid peroxidation, protein carbonylation, oxidation of DNA as well as principal mechanisms of cellular defense against oxidative stress are common for higher and lower eukaryotes.

Yeasts cells are widely used in biotechnology as well as in other applied and fundamental research. They provide suitable eukaryotic systems to study transcriptional response to environmental changes that are stressful. Understanding of this response requires unravelling how the stress signal is sensed and transduced to the nucleus, identification of the genes that are induced under each stress condition, studying mechanisms of regulation of decay of certain RNAs and elucidation of influence of non-coding RNAs on expression of genes involved in stress respose. Such information can be used to isolate and characterize stress-related proteins in higher eukaryotes and to increase stress resistance in organisms of industrial interest.

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MOLECULAR RESPONSES OF SENTINEL ORGANISM TO WASTEWATER EFFLUENTS. WINDOWS OF TOLERANCE

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Traditionally, main attention in the assessment of environmental toxicity is paid to individual hazardous substances that derived from pointed sources. However, novel environmental challenges relate mainly to the combine harmful effects. The aim of the present study was to elucidate the ability of molecular systems of detoxification and stress-response in bivalve mollusks Unionidae to withstand the model effect of thiocarbamate fungicide Tattoo, medicine nifedipine, toxic metals, nanonized Zinc oxide (n-ZnO) and elevated temperature depending on the history of population and/or in the mixed exposures. The set of markers included the characteristics of oxidative stress, transformation of xenobiotics, metallothionein-related detoxification of metals, signs of cytotoxicity, apoptotic activity. The applied approach has demonstrated the exhausting of adaptive responses in the mussels under the joint effect of studied substances and elevated temperature. Particularly, combine exposure to n-ZnO and elevated temperature provoked the decrease in the level of stress-responsive and metal-keeping protein metallothionein, whereas the single exposures caused its up-regulation. Overall, our data show that the short term heat acclimation drastically impacts the cellular protective responses in mussels, whereas the long term acclimation gives some preferences for the withstanding additional heating.