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Differential survival of *Saccharomyces cerevisiae* UE-ME3 and BY4741 strains to titanium dioxide nanoparticles depend on glutathione level increase and Catalase T induction

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Nanotechnology has released materials into the environment whose action on living organisms is poorly known and needs urgent clarification. Some authors have shown that these materials behave as ROS generators, a reason which justifies its use in studies of stress. In general, the cell health is correlated with elevated values of GSH/GSSG ratio, a marker of stability linked to a highly reducing environment. Changes in this parameter are frequently used as markers of oxidative stress, sometimes responsible for the induction of cell growth and differentiation or in the activation of signaling pathways and cell death. The wild-type *S. cerevisiae* UE-ME3 strain isolated from the musts of Alentejo, Portugal, was used in this work in order to detect singular physiological properties that facilitate their survival in extreme environments for the life, comparing with the response exhibited by *S. cerevisiae* BY4741, a strain belonging to the Eurocast collection extensively used in physiological and biochemical studies of stress. Cells growing at mid exponential phase in liquid YEPD medium with 2% (w/v) glucose, at 25 °C, were exposed during 200 min to 0.1 or 1.0 μg/mL of titanium dioxide nanoparticles (TiO_2-NP), prepared by sonication, at same temperature conditions. Samples of each treatment were used to obtain the post-12,000 *g* supernatant for determination of proteins, glutathione, ROS and MDA contents as well as CAT T activity. The results show that UE-ME3 strain, at 25 °C, has greater capacity to adapt to TiO_2-NP presence in the culture media than demonstrated by the BY4741 strain, since the protein and glutathione content in UE-ME3 strain was significantly highest in either treatment. It's probable that adaptive response to titanium nanoparticles detected in the UE-ME3 strain, partly depends on antioxidant activity mediated by GSH/GSSG ratio and CAT T activity, significantly highest in the wild-type strain which protect the cells from the ROS generation by TiO_2-NP.

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