



Mr. Gyeongchan Jeonand

Gyeongchan Jeonand , Jiho Min*

Graduate School of Semiconductor and Chemical Engineering, Jeonbuk National University, Jeonju, South Korea

Skin pigmentation treatment of lysosomal fraction modified to overexpress glutathione peroxidase

All eukaryotes have lysosomes that contain hydrolytic enzymes, such as protease, that degrade waste materials and cellular fragments. As a cellular organelle, lysosomes function as the digestive system of the cell, serving both to degrade material taken up from outside the cell and to digest obsolete components of the cell itself. In a previous study, melanin compounds were bleached using lysosome-related organelle extract (LOE) in which glutathione peroxidase (GPX) contributed decisively to melanin decolorization. In this study, *Saccharomyces cerevisiae* was engineered to overproduce GPX, which increases the melanin color reduction activity of LOE. In addition, the peroxidase activity of the recombinant yeast was measured for each compartment. In spite of the modification to overexpress the GPX protein, with the peroxidase activity of the lysosome fraction specifically higher, the overall peroxidase activity of the cells remained constant. The overexpression of GPX2 among the GPX present in *S. cerevisiae* increased both the melanin-decolorization activity and peroxidase activity of LOE. These results indicate that the peroxidase activity is related to the melanin decomposition and antioxidant enzymes such as GPX. In an artificial skin tissue test, the LOE extracted from the recombinant yeast was efficient in reducing the melanin. These results confirmed the enzyme's ability to penetrate corneous tissue, and they suggest the possibility of further development as a new whitening cosmetic. This work was supported by Korea Institute of Planning and Evaluation for Technology in Food, Agriculture and Forestry (IPET) through Crop Viruses and Pests Response Industry Technology Development Program, funded by Ministry of Agriculture, Food and Rural Affairs (MAFRA) (321108-04)

Keywords: Melanin, Glutathione peroxidase (GPX), Lysosome, *Saccharomyces cerevisiae*, Antioxidant

Biography

He is studying on the application of useful cell organelles under the guidance of Prof. Jiho Min in the Molecular Biotechnology Lab. He has reported that lysosomal fraction improves skin health including whitening function, and has published several related papers. Currently, my goal is to develop a method that effectively regulates the amount of extracellular vesicles (EVs) secretion in various types of cells including yeast, and to apply EV to cosmetic or pharmaceutical field.