In our previous studies, we have found that during atmospheric pressure cold plasma treatment, oxidative stress pathways are required for yeast cell response. In addition, overexpressions of anti-oxidant SOD genes can remarkably protective yeast cells from plasma injury. These results are in coincidence with other groups’ findings with mammalian cells, thus encouraging us to explore more on the anti-oxidative responses in eukaryotic cells subjected to plasma treatment.

In this study, we investigated the collaboration of three important anti-oxidative systems in eukaryotic cells, superoxide dismutase (SOD) system, catalase (CAT) system and glutathione (GSH) system. The three systems can act both in accordance or discordance, or even have inhibition effects over one another. So the collaboration of the three systems after plasma treatment was studies. The SOD deletion and overexpression strains as well as wide type yeast cells were exposed to sub-lethal doses of plasma treatment. Then the SOD and CAT activities, as well as reduced GSH and oxidized GSH amount were tested and compared among the strains. We also looked into the specific live yeast cell derivative (LYCD) after plasma exposure. LYCD of cells after UV or H2O2 are reported to be UV or H2O2 protective. We want to find out whether similar effects can be induced in plasma treatment. Detailed results will be discussed at the conference.


* Work supported by Bioelectric Inc. (U.S.A.)