
Evaluation of resistance of microbes against plasma mediated oxidative stress

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Atmospheric pressure plasma has been studied as a novel tool for the sterilization of wounds or inflammatory sites to reduce the burden by microbes. Complex reactive oxygen species (ROS), the products of plasma, are known to kill microbes, even multi-drug resistant species. However, it should be clarified whether the plasma therapy can also induce resistance in microbes to those complex ROS, which may reduce the efficiency of plasma treatment. To verify this, we evaluated whether various plasma sources induce resistance against oxidative stress in some microbes. We hypothesized that if microbes acquired resistance during the repeated treatment of plasma, the size of inhibition zone would be decreased. We selected *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Candida albicans* as common pathogenic microbes. The colony located at the boundary of inhibition zone was picked up and repeatedly treated by plasma for 10 passages. The results show that the size of inhibition zone decreased as passages passed, but the reduction depended on the species and the plasma treatment time. Although how microbes acquire resistance remains to be elucidated, our study showed the possibility of the microbial acquisition of resistance to the repetitive plasma treatment.

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