A large number of patients are treated in various countries with the traditional radon spa therapy. Adequate oxygen stress induced by radon inhalation activates chemical biological protective functions, such as induction of the synthesis of superoxide dismutase (SOD) and glutathione peroxidase. We previously reported that radon inhalation elevated antioxidant enzymes in patients with bronchial asthma and osteoarthritis.

**Objectives:** Although many clinical studies have been reported, the reason why radon inhalation results in positive effects is still unclear. To elucidate the probability that activation of chemical biological protective functions alleviates various oxidation injuries, we studied the mechanisms of the effects of radon using small animals.

**Methods:** To examine whether radon inhalation activates antioxidative functions in mice, we developed a new facility for exposing small animals to radon and examined SOD activity, which is an antioxidative enzyme, in plasma, liver, pancreas, heart, thymus, kidney, brain, small intestine, lung, and stomach of mice. Mice were exposed to radon at a concentration of 250, 500, 1000, 2000, or 4000 Bq/m$^3$ for 0.5, 1, 2, 4, or 8 days.

**Results:** It was shown that continuous exposure to radon increases SOD activity in most organs of mouse. In addition, our data suggested some new indications for radon treatment. Next, we assessed whether radon inhalation provided protection from carbon tetrachloride (CCL$_4$)-induced hepatic and renal damage in mice. Results showed that radon inhalation inhibited CCL$_4$-induced hepatic and renal damage in mice due to activation of antioxidative functions in liver and kidney. Although hepatic and renal damage are not the main indication for radon therapy, radon inhalation mitigates liver and kidney damage due to activation of antioxidative functions in liver and kidney. This antioxidative effect against CCL$_4$-induced hepatopathy is comparable to treatment with ascorbic acid (vitamin C) at a dose of 500 mg/kg weight or α-tocopherol (vitamin E) treatment at a dose of 300 mg/kg weight and is due to activation of antioxidative functions. We also suggested radon inhalation inhibits streptozotocin (STZ)-induced type I diabetes in mice due to activation of antioxidative functions in pancreas.

**Conclusion:** Thus, radon inhalation very likely activates the defense systems in the body, and therefore, contributes to preventing or reducing reactive oxygen species (ROS)-related injuries, which are thought to involve peroxidation.
Keywords: Radon, Antioxidative functions, Oxidative damage

References