

## **Whole Body Hyperthermia and Mammary Tumors In Mice**

**Inhibition by whole body hyperthermia with far-infrared rays of the growth of spontaneous mammary tumors in mice.**

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To evaluate possible therapeutic benefits of irradiation with far-infrared rays (FIR) on breast cancer, we examined combined effects of the chronic exposure to FIR at ambient temperature (26.5-27.5 degrees C) and the whole-body hyperthermia (WBH) induced by FIR (WBH) (35-41 degrees C) on the growth of spontaneous mammary tumors of mice. A high mammary tumor strain of SHN virgin mice born on the normal rack or FIR rack were maintained on the respective racks until mammary tumor appearance. When the mammary tumor size reached approximately 7 mm, some mice in each group received no further treatment (Control and FIR groups, respectively) and the remaining mice received 3 hours of WBH each of 5 consecutive days (C + WBH and FIR + WBH groups, respectively). There was little difference between the control and FIR groups in the tumor growth over 10 days of examination. On the other hand, the tumor growth was inhibited significantly in both C + WBH and FIR + WBH groups and the degree of inhibition was similar. The data confirmed that the chronic exposure to FIR at ambient temperature has little effect on the growth of spontaneous mammary tumors in mice. WBH with FIR, however, strongly inhibited the tumor growth without deleterious side-effects, while chronic FIR irradiation itself again had little effect in this process. This WBH regimen may serve as a useful animal model for long-term studies of a noninvasive treatment of breast cancer.

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Effects of far-infrared ray on reproduction, growth, behavior and some physiological parameters in mice.

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The effects of chronic exposure to far-infrared ray (FIR) on reproduction, growth, behaviour, survival time and some related parameters were examined in SHN mice. The reproductive parameters differed slightly between the females on the normal racks and those on the FIR racks, which emitted FIR from the ceiling. The age and body weight on the day of vaginal opening was lower in the experimental mice born and maintained on the FIR rack than in the control on the normal rack. In both sexes, the levels of urinary components in the experimental group was significantly higher than the control at 6-7 months of age. Spontaneous motor activity of females during the light and dark phases were higher and lower, respectively, in the experimental group than the control. The survival rate was significantly higher in the experimental group than the control. These findings suggest that FIR has "normalization" effects' on the organisms.