8.2 Colon Cancer

1. Antitumor effect of whole body (Far Infrared) hyperthermia with alpha-galactosylceramide in a subcutaneous tumor model of colon cancer.


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**Abstract**

**AIM:** Whole body hyperthermia (WBH) has been used clinically as an adjunct to radio- and chemotherapy in patients with various cancers. Recently, it has been reported that an activation of the immune system has recently been reported as a possible contributor to the therapeutic effects of WBH. Conversely, the glycolipid alpha-galactosylceramide (alpha-GalCer) is recognized by natural killer (NK) T cells together with the monomorphic MHC-like antigen, CD1d, in mice and humans. This study investigated the antitumor effects of WBH combined with alpha-GalCer in a mouse subcutaneous tumor model of colon cancer.

**METHODS:** Colon26 cells were inoculated subcutaneously into male BALB/c mice to establish subcutaneous tumor. Colon26-bearing mice were treated with Whole body hyperthermia using far infrared rays three times/week. Rectal temperature was maintained for 60 min at 41°C. In some experimental groups, alpha-GalCer was intraperitoneally injected before WBH. We investigated the therapeutic effects of WBH, alpha-GalCer and combined therapy.

**RESULTS:**

1. Compared with controls, Whole Body Hyperthermia alone resulted in significant inhibition of tumor growth.
2. No inhibitory effect on tumor growth was seen with alpha-GalCer.
3. The combination of WBH and alpha-GalCer showed significant inhibition of tumor growth and prolongation of survival.
4. Serum IFN-gamma increased after 3 h and returned to basal levels by 24 h after alpha-GalCer administration.
5. CTL activity was enhanced following combination therapy with WBH and alpha-GalCer.

**CONCLUSION:** Whole Body Hyperthermia showed antitumor effects in a mouse subcutaneous tumor model of colon cancer. Addition of alpha-GalCer increased the efficacy of Whole Body Hyperthermia, probably via enhancement of immune response.