150 Effects of 4.7T Static Magnetic Field on Ossification

Ryuji OKAZAKI[1], Akira OOTSUYAMA[1], Soushi Uchida[2] and Toshiyuki NORIMURA[1]; [1]Dept. of Radiat. Biol. & Health., [2]Dept. of Orthop. surg., Univ. of Occup. & Environ. Health, Japan

We previoiusly reported that a 4.7T static magnetic field (MF) had harmless effect on fetal development in ICR mice. We suggested that the MF promoted to the ossification of cartilage. To clarify the effects of static magnetic fields on cartilage, we measured DNA and proteoglycan synthesis in rabbit cartilage cells in growth plates and knee joints in vitro. The expression of vascular endothelial growth factor (VEGF) in the breast bone of fetal ICR mice after magnetic exposure was examined.

Primary cultured cartilage cells were obtained from the growth plates of costal cartilages and the femoro-tibial joints in Japanese white rabbits. At the subconfluent state, the cartilage cells were exposed to MFs for 24 h. DNA and proteoglycan synthesis were evaluated by ^{3}H-thymidine and ^{35}S-sulfate incorporations, respectively. The pregnant ICR mice were exposed to MFs from day 7.5 to 9.5 of gestation to a whole body, and sacrificed on day 18.5 of gestation. The expression of VEGF in the breast bone of fetal mice was investigated by immunocytochemistly.

There were no differences in DNA and proteoglycan synthesis between magnetic exposed cartilage cells and control. Immunoreactivity for VEGF was detected on cartilage cells in breast bone in control. In contrast, VEGF expressing cell decrease after magnetic exposure on day 18.5 of gestation.

These results suggest that the ossification after MF exposure may require the other factors.

151 BLOOD PLATELETS AGGREGATION UNDER MAGNETIC FIELDS

Michihiro Takeuchi, Masakazu Iwasaka, and Shoogo Ueno; Dept.Biomed Engng., Grad. School of Med.,Univ. of Tokyo

In the present study, we investigated the effects of intense magnetic fields on blood platelet aggregation by measuring the time course of optical transmission of blood plasma during a platelet aggregation process with and without static magnetic fields of up to 14 T. We used a horizontal type of superconducting magnet. The system has an external optical cell holder in the superconducting magnet's bore.Blood platelets in the rabbit plasma were stimulated by collagen, and the plasma coagulation started. We measured the optical transmission of plasma suspension at 600 nm. It was observed that the transmission of platelet suspension under magnetic fields started to increase earlier than control by 300 sec. The particle of aggregated platelet with magnetic field exposure was larger than the particle without exposure. We concluded that platelet aggregation was enhanced by magnetic field exposures with 14 T. A possible mechanism of the effect is magnetic orientation of platelets. The observed phenomenon is considered to be useful in medical treatment of thrombosis diseases.