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HVJ-Liposome-Mediated Gene Transfer to Healing Rat Meniscal Tissue

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İlhan ÖZKAN Norimasa NAKAMURA Konsei SHINO Takashi NATSU-UME Tetsuya TOMİTA Yasufumi KANEDA Takahiro OCHI Faculty of Medicine, Osaka University, Osaka, Japan Abstract : The success rate of a repaired torn meniscus is not more than 70%. Gene transfer to healing soft tissues appears to be a feasible method for manipulating the healing process. In an attempt to evaluate the feasibility of gene transfer to meniscal tissue we tried to transfer a reporter gene (Echerichia coli, b-galactosidase gene) by using HVJ-liposome mediated gene transfer. After performing complete radial tear on the medial meniscus of fifty 14-week-old male Wistar rats, HVJ-liposomes with DNA were injected into the femoral artery of 15 rats and into the knee joint of the other 15 rats. HVJ- liposomes without DNA were injected in the same way into 10 rats in each group as controls. Three rats from each experimental group and two rats from each control group were sacrificed 3, 7, 14, 28 and 56 days after the injections. After X-gal staining the efficiency of transfection was estimated as 2.4% on day 3, 4.8% on day 7, 4.9% on day 14, 0.9% on day 28 and 0.3% on day 56 in the intra- arterially injected group. The same ratios for the intra-articularly injected group were 2.8%, 4.7%, 5.1%, 0.7% and 0.3% on post- injection days 3, 7, 14, 28 and 56 respectively. In all control sections of both groups the blue-stained cells were few at any point. In conclusion we succeeded in introducing a reporter gene to healing rat meniscal tissue both by intra-arterial and intra-articular injection of HVJ-liposomes. We believe that particularly the intra-articular injection model appears to have the potential to be applicable in healing studies of intra-articular tissues within the knee joint.

Key Words: Gene therapy, hemagglutinating virus of Japan, meniscal healing, liposome

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