In rat osteoarthritis models, the composition of growth factors in the freeze-dried platelet factor concentrate varies with the severity of the donor's knee osteoarthritis and its efficacy.

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Introduction: Recently, platelet rich plasma (PRP) has been extensively used treatment of knee osteoarthritis (OA) and consequently, a variable methods and techniques to manufacture a PRP have emerged in clinical practice. The freeze-dried platelet factor concentrate (PFC-FD) is reported to preserve a bioreactivity of growth factors for a semi-permanent, having a capability of selectively the timing to draw a peripheral blood. However, it is unclear whether it is better to draw blood before or after the progression of knee osteoarthritis in order to produce PFC-FD with higher concentrations of growth factors. The aim of this study was to assess the efficacy of intra-articular PFC-FD injection in knee osteoarthritis and to determine the timing to draw a peripheral blood.
Methods: To prepare the two types of allografted PFC-FD, whole blood was drawn from both rats healthy or knee arthritis with intra-articular injections of monosodium iodoacetate (MIA). Thereafter, PFC-FD were prepared by second spinning and the using CaCl2: the Healthy rats-derived PFC-FD(HD-PFC-FD) and the Arthritis rats-derived PFC-FD(AD-PFC-FD). Knee osteoarthritis was induced in male Sprague-Dawley rats with intra-articular injections of monosodium iodoacetate (MIA) on day 0. On day 7, PRP was injected into the right knee of rats and saline was injected into the left knee as a control. We measured the struggle threshold of knee extension angle in order to assess pain of the knee joint on day 7,14, and 21. Rats were euthanized at day 21 for histological assessment of synovial tissue and cartilage. Concentrations of growth factors in the injected PRP were assessed to determine their association with outcomes.
Results: In both PFC-FD groups significantly reduced pain responses throughout 2 weeks post-dosing. In terms of a quantitive histological assessment, structural changes in the synovial tissue and cartilage degeneration were significantly inhibited in both groups compared with the controls. Additionally, the HD-PFC-FD yielded favorable results than the AD-PFC-FD. The concentrations of PDGF-BB were significantly higher, VEGF was significantly lower in HD-PFC-FD.
Discussion: This study provided the experimental evidence that in knee OA rats model, FD-PFC-FD injection exhibited a histologically and behaviorally significant improvement. In terms of the timing to manufacture the FD-PFC, no inflammation group was significantly higher concentration of PDGF-BB having a capability of a chondrogenic bioreactivity. It is suggested that FD-PFC might have the potential to have an efficacy on a mild OA.
Significance/Clinical Relevance: Suggested that PRP made from patient has knee osteoarthritis might be less effective.

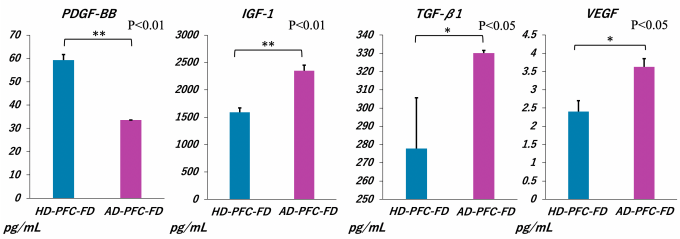

Figure 1 . Concentration of humoral factors using ELISA in PFC-FDs.

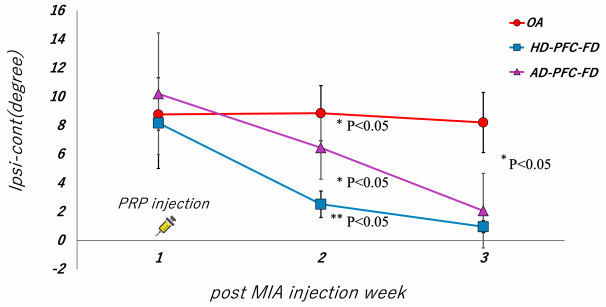

Figure 2 . The change of struggle threshold of extension angle and circumference of the knee.

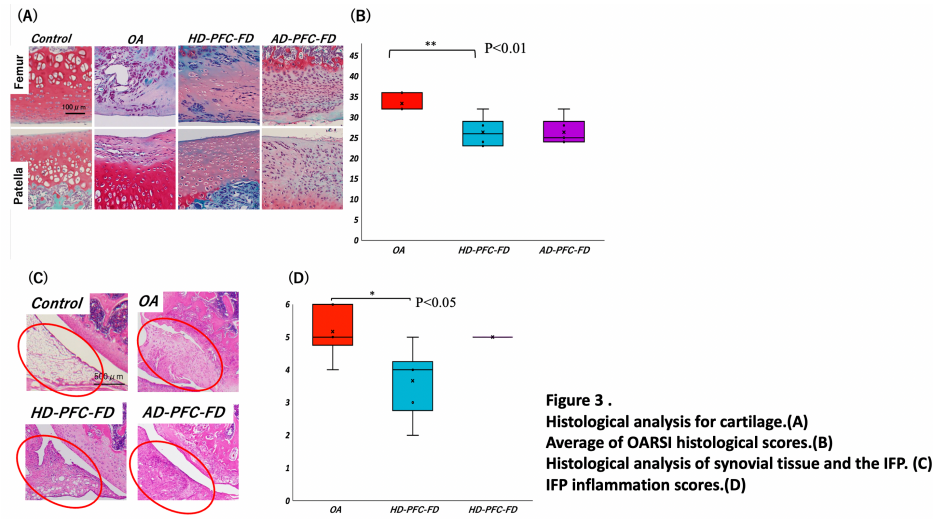

Figure 3 .
Histological analysis for cartilage.(A)
Average of OARSI histological scores.(B)
Histological analysis of synovial tissue and the IFP. (C)
IFP inflammation scores.(D)