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Comparison of Fatty-acid-binding Protein 4 and Adiponectin Levels in Infrapatellar Fat Pad and Subcutaneous Adipose Tissue, Synovial Fluid, and Plasma in Subjects with Knee Osteoarthritis

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Introduction: It was recently reported that inflammation is involved in the pathogenesis of osteoarthritis (OA). Fatty-acid-binding protein 4 (FABP4) and adiponectin are both adipocyte-derived cytokines closely related with inflammation pathways. The FABP4 exhibits a pro-inflammatory property while adiponectin shows anti-inflammatory effect. The study aimed to assess the expression of FABP4 and adiponectin in paired blood and synovial fluid from OA patients, and to examine whether the infrapatellar fat pad (IPFP) from OA subjects would release FABP4 and adiponectin similar to that of donor-matched subcutaneous adipose tissue (ScAT).

Materials and Methods: Plasma, synovial fluid, ScAT, and IPFP of 20 OA patients (4 males and 16 females) were collected during total knee arthroplasty. Levels of FABP4 and adiponectin were measured in plasma, synovial fluid, and fat conditioned media using ELISA (AIS, HKU).

Results: Levels of FABP4 were significantly higher in IPFP media than ScAT ($p = 0.015$), while the same were significantly higher in synovial fluid than in plasma ($p < 0.001$). There were no significant differences of adiponectin levels between IPFP and ScAT media ($p = 0.737$). Plasma levels of adiponectin were significantly higher than synovial fluid ($p < 0.001$).

Discussion and Conclusion: The OA patients exhibit an inflammatory state in local environment (IPFP and synovial fluid) compared with systemic environment (ScAT and plasma). The IPFP may play a key role in OA inflammation and may be an important resource of inflammatory mediators in synovial fluid.

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Assessment of Systemic Inflammation in Osteoarthritis Patients by Testing Fatty-acid-binding Protein 4 and Adiponectin in Plasma

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Introduction: Obesity not only increases risk of osteoarthritis (OA) in weight-bearing but also non-weight-bearing joints, indicating systemic mediators involved. It was recently reported that inflammation is involved in the pathogenesis of OA. Fatty-acid-binding protein 4 (FABP-4) has been described as a novel adipokine, playing a pro-inflammatory role in inflammatory pathways. Adiponectin has been widely reported with an anti-inflammatory function. This study aimed to evaluate the relationship of plasma levels of FABP4 and adiponectin and the presence of OA.

Materials and Methods: For FABP4 concentration determination, a total of 231 Chinese subjects (77 males and 154 females) were recruited, including 141 OA cases and 90 community-based controls. Circulating levels of FABP4 and adiponectin were determined using enzyme-linked immunosorbent assay (AIS, HKU).

Results: The mean (\pm standard deviation) FABP4 levels in OA patients (16.6 ± 15.5 ng/mL) were significantly higher than non-OA subjects (12.6 ± 10.1 ng/mL, $p = 0.0453$). Female subjects had significantly higher mean circulating levels of FABP4 than male counterparts both in case group (16.1 ± 14.9 ng/mL vs. 8.6 ± 7.3 ng/mL, $p < 0.0001$) and control group (17.1 ± 11.6 ng/mL vs. 7.9 ± 5.2 ng/mL, $p < 0.0001$). There were no significant differences of circulating levels of FABP4 neither between male cases and male controls ($p = 0.765$) nor female cases and female controls ($p = 0.261$).

Discussion and Conclusion: Female subjects had significantly higher concentrations of FABP-4 in plasma.