TNF-α Detection for Osteoarthritis

Direct Detection Assay

Osteoarthritis (OA), or degenerative joint disease, is a chronic condition characterized by progressive cartilage destruction and loss, new bone formation at the joint, changes in the subchondral bone, synovitis, and thickening of the joint capsule. This systemic inflammatory disease of the synovial joints results in pain, inflammation, joint enlargement, swelling, and joint instability or buckling and causes a significant impact on the function and quality of life for OA patients. Tumor necrosis factor-α (TNF-α) is a 17 kDa inflammatory cytokine believed to be involved in the initiation and progression of OA. Early detection of TNF-α in synovial fluid followed by early aggressive therapy can thus help the long-term outcome of OA progression.

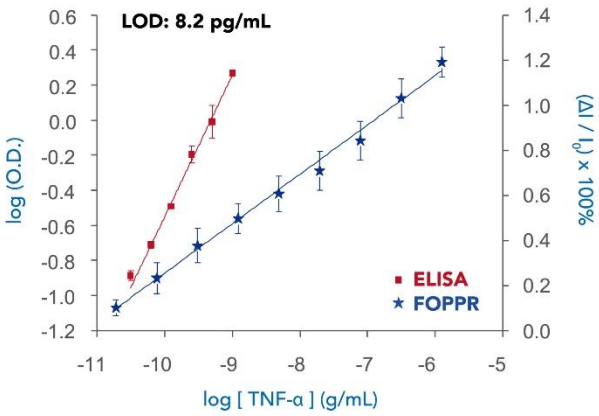

Fig. 1 Standard curves for TNF-α with the FOPPR™ (blue) and ELISA (red) methods.

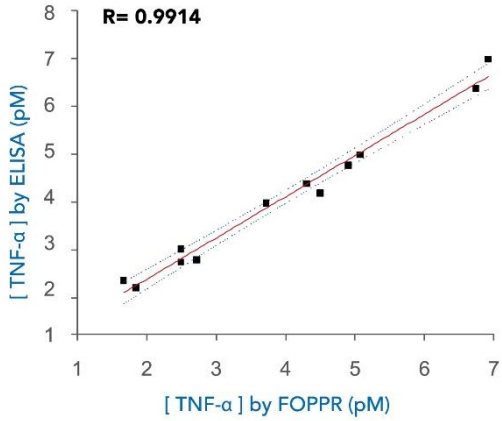

Fig. 2 Correlation between FOPPR™ and ELISA.

Fig. 1 shows the standard curve of TNF-α with the FOPPR™ Direct Detection Assay in comparison to the sandwich ELISA method. With FOPPR™, the limit of detection (LOD) is 8.2 pg/mL (0.48 pM), approximately two times lower than 18 pg/mL (1.06 pM) offered by the ELISA method, while accommodating a wider linear dynamic range (five orders). Results between the FOPPR™ Direct Detection Assay and the sandwich ELISA assay show a high correlation with R = 0.9914 (Fig. 2), demonstrating the potential of using FOPPR™ in place of the conventional ELISA method for protein analysis.

Reference:
[1] Huang et al. *Analyst* 2013, 138, 4599.

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