Docket #: S22-172

A liquid biopsy platform for diagnosis of early Osteoarthritis

Stanford inventors have developed a novel diagnostic tool that identifies distinct immune signatures in the peripheral blood of osteoarthritis patients using mass cytometry (CyTOF) and applied machine learning.

Osteoarthritis (OA) is a chronic disease characterized by joint dysfunction and several adverse effects on life, commonly affecting older people. No disease-modifying drugs exist, making major joint replacement surgery the only viable long-term solution. A critical hindrance to developing disease-modifying drugs for osteoarthritis is its usual late detection in patients, making it challenging to reverse disease pathogenesis.

Immune cell involvement in OA pathogenesis has been identified, but the specific cell types involved, their spatiotemporal dynamics in disease, and cellular crosstalk that results in joint degeneration have not been extensively studied. Studying the peripheral blood of patients is a low-cost, accessible way to gain insight into the OA immune landscape.

Stanford researchers identified differentially abundant immune populations in OA peripheral blood using mass cytometry (CyTOF) and deployed machine learning to identify OA immune signatures. They also profiled at-risk populations like patients with anterior cruciate ligament (ACL) tears and degenerative meniscal tears (DMT). Hence, they compiled the first comprehensive immune cell atlas for OA and at-risk patients.

Stage of development
Prototype

Applications

- Diagnostic kit for early detection of osteoarthritis.
- Patient stratification for clinical trials and precision medicine.

Advantages

- Cost-effective
- Non-invasive
- Accessible

Patents

- Published Application: WO2023224985
- Published Application: 20250316378

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