Detecting and predicting progression of osteoarthritis by biomarker analysis

Unmet Need

Osteoarthritis (OA) is a prevalent chronic disease that impacts 32.5 million US adults and hundreds of millions worldwide. Further, global incidence of OA is increasing due to rises in geriatric populations and other associated risk factors such as obesity. OA most commonly affects the joints in the knees, hands, feet, hips, and spine of individuals, which can lead to debilitating symptoms. Currently, demographics and baseline characteristics such as age, sex, body mass index, knee pain, general bone mineral content, and joint space width are poor predictors of OA progression. There is an urgent unmet need for improved methods for diagnosing and predicting progression of knee OA to better inform therapeutic or preventative interventions and to avoid false negative OA trials by enriching for individuals with high likelihood of experiencing OA progression during the 2-3 year course of a typical OA trial.

Technology

Duke inventors have developed a method for detecting and predicting OA progression by analysis of a blood sample. This is intended to be used as a highly sensitive and specific tool to identify individuals who are experiencing OA progression or who are at risk of progression and may benefit from therapeutic interventions. This is accomplished by measuring a panel of biomarkers found in various bodily fluids that have been shown to be predictive of OA. Specifically, a collection of 15 serum proteomic markers can be measured using various existing analytical techniques to determine the likelihood of OA diagnosis and/or prognosis by inputting biomarker concentrations into the predictive model developed by the inventors. Based

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Publication(s)

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External Link(s)

• From the lab of Dr. Virginia Kraus, MD, PhD

on the results, clinicians can develop individualized treatment plans for the patients or determine which patients would be the best fits for further OA trials. The predictive capability of the panel has been demonstrated in five patient cohorts consisting of 1,125 individuals where diagnostic and prognostic biomarkers were identified and validated.

Advantages

- Identified protein and peptide biomarkers to diagnose and predict progression of OA with high sensitivity and specificity
- Outperforms current industry standard biomarker, urinary CTXII
- Models validated using a thousand human clinical samples
- Results can be used to inform individualized therapeutic and preventative treatment plans
- Results can be used to reduce the likelihood of a false negative OA clinical trial by enriching enrollment with adequate numbers of individuals at risk of progression to observe a treatment effect