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# Identification of Biomarkers for Rheumatoid Arthritis

Rheumatoid arthritis (RA) is a chronic autoimmune disease that affects about 1% of the world population and is characterized by synovial inflammation and joint destruction. Anti-citrullinated protein antibodies (ACPA) have been detected specifically in RA patients and may provide utility in RA risk assessment and diagnosis. ACPA levels correlate with RA disease activity, prognosticate erosive diseases and serve as surrogate markers for treatment efficacy. Currently, ACPA are assayed using cyclic citrullinated peptide, however this does not provide information about reactivity to disease-specific RA antigens. Further, only a few citrullinated antigens have been reported and validated in RA, so there is a need to identify more citrullinated antigens for improved performance of diagnostic tests.

Researchers at the Biodesign Institute of Arizona State University and their collaborators have identified six novel/previously-unknown citrullinated antigens that are associated with RA and could be used to help understand RA pathogenesis and to improve sensitivity of current commercial RA tests. Their Nucleic Acid-Programmable Protein Array (NAPPA) platform was used to detect disease-specific auto antibodies (AAB) in sera of patients with RA. Antibody responses were profiled to ~190 citrullinated proteins in 20 RA patients. Unique antibody reactivity patterns were observed in both clinical anticyclic citrullinated peptide assay positive (CCP+) and CCP- RA patients. A method to identify immunodominant epitopes and composition of immunodominant epitopes of citrullinated antigens associated with RA was developed as well.

These antigens may improve the sensitivity of current diagnostic and prognostic assays for RA. Further they may serve as a starting point and platform for identifying more individual antigens in RA, profiling ACPAs against antigens in the human proteome and mapping of their immunodominant epitopes to provide a more comprehensive picture of ACPA responses in RA.

Potential Applications

- RA diagnosis and risk assessment
- Understanding RA pathogenesis
- Monitoring RA treatment efficacy

- Method to identify immunodominant epitopes and composition of immunodominant epitopes of antigens associated with RA

Benefits and Advantages

- Between 42-82% sensitivity at 95% specificity for CPP+ RA samples
- Between 10-22% sensitivity at 95% specificity for CCP- RA samples
- High-throughput – can analyze large clinical sample sets
- Purified recombinant proteins do not need to be expressed, purified or modified individually

For more information about the inventor(s) and their research, please see Dr. LaBaer's directory webpage Dr. Qiu's directory webpageDr. Wiktor's directory webpage