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Rheumatoid arthritis drug for the patient in companion diagnostics

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DESCRIPTION

Despite the increasing availability of biologic and inhibitor therapeutic medicines for the treatment of many systemic autoimmune diseases, the lack of a validated companion diagnostic. Many patients are treated for years with expensive, useless or harmful medications because it is impossible to correctly estimate drug responsiveness for an individual (Benucci, et al., 2015). This will concentrate mostly on Rheumatoid Arthritis (RA) therapies, where the need is greatest due to poor patient outcomes if the best medicine is not used as soon as possible will cover tissue sampling for suspected CDx and evaluate preliminary findings from research evaluating drug responsiveness using advanced technologies such as multiplexed screening of responses and protein, antibody response profiling, genomic analysis, proteomics, miRNA analysis and metabolomics (Blaschke, et al., 2015). Despite significant therapeutic breakthroughs in Rheumatoid Arthritis (RA) treatments over the last two decades due to biologics and small molecule pathway inhibitors, most patients fail to achieve remission despite indications that earlier and more aggressive pharmacologic therapy improves outcomes. Precision medicine has transformed oncology, with successful personalized targeted pharmacological treatments being accessible for certain types of tumors based on tumor-specific indicators or gene rearrangements.

Improved RA disease control with small molecule drugs has resulted in significant health-care cost savings due to fewer total joint arthroplasties, staying productive in the workforce for longer periods of time and a lower likelihood of long-term care and confinement when mobility and independence are no longer possible as well as an increasing number of biosimilars to achieve a one RA patient may take over a dozen different biologics or JAK inhibitors during a 3-month trial of each therapy (Hueber,et al., 2009). These frequent and costly medication adjustments will put RA patients at risk of drug toxicity and or irreparable joint damage caused by years of poorly controlled disease before the best therapy is found. It is also possible that the illness phenotype will evolve over time. The longer a RA patient has poorly managed disease activity and develops more resistant to treatment medications. This has also been noted when a successful treatment medication is discontinued due to co-morbid conditions such as hospitalization, infection or surgery with a subsequent disease flare the patient may no longer be receptive to that same agent when re-introduced (Garcês, et al., 2013).

The goal of this to identify the more promising laboratory-based platforms that may support a precision medicine approach in RA care, which is desperately needed to aid rheumatologists in picking the best drug for an individual patient at the outset of their disease. Many laboratory and imaging methods currently correlate with RA clinical disease activity. Wet biomarkers that are commonly employed include Erythrocyte Sedimentation Rate (ESR) and C Reactive Protein (CRP) levels, which are nonspecific measures of active inflammation and frequently correlate with active synovitis in many but not all RA patients. Serologic tests such as Rheumatoid Factor (RF) and the more specific Anti-Citrullinated Protein Antibodies (ACPA) are typically related with more aggressive disease presentations such as deformities, erosions, imaging and extra-articular disease signs. Rheumatologists have utilized blood-based biomarkers for years to identify patients at higher risk of medication toxicity (Mini et al., 2009). Among them have been glucose 6 phosphate (G6PD) levels measured prior to injection to prevent hemolytic anemia. Drug levels are also tested to assure compliance and pharmacogenomics testing can be used to identify patients with gene expression changes that can influence medication metabolism assisting in the identification of patients at higher risk of drug toxicity.

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