

Neural networks: Using biomarkers to inform diagnosis, classification of disease and approach to therapy

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While renal biopsy is still the gold standard for the diagnosis of renal interstitial inflammation, some noninvasive diagnostic studies have been proposed to help categorize interstitial inflammation. Urine samples collected at the time of biopsy are tested to provide confirmatory evidence of interstitial inflammation, though the diagnostic value of these tests remains unclear. Because the pathogenesis of interstitial inflammation is extremely complex in nature, classical analytical models are limited in their ability to elucidate the nonlinear biomarkers interplay that underlies the interstitial inflammation. We propose to develop artificial neural networks to predict renal interstitial inflammation outcomes based on patient urine tests. The neural networks will be trained with patient data for which the interstitial inflammation was scored by a renal pathologist from renal biopsies. The neural networks can then be used to classify new patients. Furthermore, new patient data will be incorporated into older version of the model to refine predictions.