Characterization of renal fibrosis by a combination of clearing agent and second harmonic generation microscopy for chronic kidney disease

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Chronic kidney disease (CKD) is a major worldwide healthy issue, with five stages including five stages based on the measurement of glomerular filtration rate. However, very little is known about the etiology and pathogenesis of CKD, and thus the current therapy for CKD is limited to only the use of corticosteroids or combined corticosteroids with other cytotoxic agents or immunomodulators such as cyclophosphamide, azathioprine or ciclosporin, although many of them are found to have severe side effects. In contrast, traditional Chinese herbs have been widely accepted for being used to treat various chronic disorders by for their immunomodulatory activities with no obvious side effect. The purpose of this study is to validate renoprotective compounds from traditional Chinese medicines and plants with CKD models and investigate the degree of fibrosis by a combination of clearing agent, Scaleview and second harmonic generation microscopy. Fibers in kidney tissues of a few mm thick can be imaged by second harmonic generation. By analyzing the volume of fibers formed in kidney tissue of CKD model mouse, several of renoprotective components were verified and they were shown capable of ameliorating proteinuria, hematuria, renal dysfunction, and severe renal lesions in the mouse models of CKD.