Peripheral protein biomarkers for Parkinson's disease and synucleinopathies

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Synucleinopathies such as Parkinson's disease (PD), dementia with Lewy bodies (DLB) are characterized by the deposition of misfolded protein aggregates consisted of alpha-synuclein in the central nervous system (CNS). Previous efforts have focused on the development of CNS-proximal clinical biomarkers, including cerebrospinal fluid measures of alpha-synuclein, and tau. However, these diagnostic techniques are often used in clinical studies on patients with advanced disease state, and are invasive. Therefore, there remains an urgent need for reliable, inexpensive and minimally invasive peripheral biomarkers. Recent studies have revealed widespread peripheral involvement of Lewy body-like pathology, often prior to clinical manifestations of the diseases. Indeed, alpha-synuclein deposits have been observed in peripheral tissues in PD and DLB. A formidable challenge is that the levels of the amyloidogenic protein aggregates in peripheral tissues are extremely low and thus only variably detectable using immunological methods. Therefore, highly sensitive analytical platforms are required as the new generation of biomarker assays specific for protein aggregates and amyloid fibrils. The real-time quaking induced conversion (RT-QuIC) has emerged as a robust, rapid and ultrasensitive technology for template-assisted amplification of misfolded protein aggregates in neurodegenerative diseases. Using the RT-QuIC technique, our recent studies have shown that disease-associated protein aggregates are readily detectable in peripheral tissues of patients affected by PD, and dementia with Lewy bodies. Validation of peripheral protein biomarkers will enable sensitive premortem diagnostic tests for PD, DLB, and other related disorders, and accelerate clinical trials for disease-modifying therapies.

Biography

Shu G Chen has received his PhD in 1992 from the State University of New York at Buffalo, New York, USA. He is an associate professor of Pathology and Neurology at Case Western Reserve University School of Medicine. His research centers on the pathogenesis of Parkinson's disease, Alzheimer's disease and other neurodegenerative disorders. He has published more than 80 papers in scientific journals.

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