A Short Investigation on a Biomarker for Parkinson's disease found in Cerebrospinal fluid

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Abstract

Multiple system atrophy, progressive supranuclear palsy, corticobasal degeneration, and dementia with Lewy bodies are among the Parkinsonian disorders, which include idiopathic Parkinson's disease (PD) and atypical Parkinsonian disorders (APD), such as multiple system atrophy, progressive supranuclear palsy, corticobasal degeneration, and dementia with Lewy bodies. Although the exact cause of these illnesses is unknown, it is thought to be a combination of hereditary and environmental factors. The lack of biomarkers is one of the most significant barriers to creating effective disease-modifying therapy options. Early and precise diagnosis, measurement of disease progression, and response to therapy all require reliable biomarkers. Alpha-synuclein, which appears to be integrally involved in the aetiology of synucleinopathies and whose levels can be detected in the cerebrospinal fluid and plasma, is one of the most promising CSF biomarker possibilities. Tau protein build-up appears to have a role in the aetiology of tauopathies in a similar fashion. Urate, a powerful antioxidant, appears to be linked to the likelihood of developing PD and the course of the disease. In APD, levels of neurofilament light chains are higher than in PD and healthy individuals.

Keywords

Biomarker; CSF; Parkinson's disease

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1. Introduction

The parkinsonism, defined as the presence of some movement abnormalities such as hypokinesia, rest tremor, rigidity, loss of postural reflexes, flexed posture, and the freezing phenomenon, is present in all Parkinsonian illnesses to varying degrees. Each Parkinsonian condition is defined by a unique combination of non-motor symptoms, such as autonomic and neuropsychiatric problems, balance and ocular movement abnormalities, which occur at different stages of the disease and have substantial implications for morbidity, therapy, and prognosis. The term „biomarker" is extensively used, but it is not always utilised accurately [1]. „A trait objectively measured and analysed as a sign of normal biological processes, pathogenic processes, or pharmacologic reactions to a therapeutic intervention," according to the definition [2]. Surrogate endpoints are a type of biomarker that can be used as a substitute for the real thing. They serve as a stand-in for clinical outcomes, which are what we truly care about because they reflect how the patient is doing in the real world. The criteria for a biomarker to be used as a surrogate endpoint are stringent, and there are currently no surrogate endpoints for Parkinson's disease. Biomarkers are molecules that show whether a process in your body is normal or abnormal, and may suggest an underlying ailment or disease. Biomarkers can be any form of molecule that indicates something about your health, such as DNA (genes), proteins, or hormones. The few treatments for Parkinson's disease that are currently available are symptomatic and primarily work by boosting or imitating dopaminergic release along the nigrostriatal pathway. Many studies have looked into neuroprotective strategies aimed at reducing or preventing neuronal injury, malfunction, and eventual degeneration [3]. The lack of animal models that accurately represent the complexity of PD in humans, as well as subject selection based on clinical diagnosis rather than genetic markers such as LRRK2 or glucocerebrosidase mutations have resulted in neuroprotective trials with a high degree of population heterogeneity. Patients are recruited to trials after considerable neurodegeneration has already occurred, which is a critical issue. Neuroprotective medicines must be used early in the cycle of neuronal damage, initial compensation, and failure of repair mechanisms, dysfunction, and eventual degeneration to be effective. Biomarkers are required to aid in the clinical diagnosis of Parkinson's disease and to identify its symptoms; to objectively map the speed of its clinical progression; to predict its clinical course; and to signify the risk of developing PD. Biomarker research on body fluids has a lot of promise [4]. The cerebrospinal fluid (CSF), which is predominantly produced by the choroid plexus within the ventricles of the central nervous system, is most proximal to early degeneration in the central nervous system. CSF is a promising biological fluid for studying

central nervous system neurodegenerative illnesses, and it may be obtained with a simple lumbar puncture. It is well known that the majority of CSF proteins and other components come through peripheral blood filtration, while the remaining amount comes from central nervous system cells. The CSF is an appealing matrix for biomarker discovery of neurodegenerative CNS diseases because it contains a minimum fraction of brain-derived components. Because dopaminergic anomalies are so common in these illnesses, the first chemicals to be investigated were dopamine and other monoamines, as well as their metabolites [5]. Because the results could be altered by a variety of other factors, the search focused on substances that had already been identified and studied in other disorders, such as tau protein, beta-amyloid, and NFL. With the advancement of knowledge and technical capabilities, the hunt for specific targets based on theoretical considerations in patho-etiology, such as alpha-synuclein or inflammatory indicators, became more focused. Later, the „omics“ tools‘ newer and more far-reaching capabilities led to comprehensive searches of vast, nod-discriminate items like the genome or the proteome. The following summary does not promise to be thorough; rather, it concentrates on a few compounds that are considered to be more mature and/or promising in the future.

2. Conclusion

The primary goal of ‚omic‘ technologies is to detect genes (genomics), mRNA (transcriptomics), proteins (proteomics), and metabolites (metabolomics) in a biological sample. Omic technology can be used in a variety of ways. Despite technological advancements in numerous detection technologies such as high throughput sequencing, no biofluid biomarker for Parkinson‘s disease has yet to enter clinical practise. Better integration of these techniques should lead to a better knowledge of the pathogenesis of Parkinson‘s disease and other neurodegenerative illnesses, as well as new treatment options.

References

1. Tolosa E, Wenning G, Poewe W. The diagnosis of Parkinson‘s disease. Lancet Neurol. 2006; 5:75-86.
2. Moore DJ, West AB, Dawson VL, Dawson TM. Molecular pathophysiology of Parkinson’s disease. Annu. Rev. Neurosci. 2005; 28:57-87.
3. Mollenhauer B, Zhang J. Biochemical premotor biomarkers for Parkinson’s disease. Mov. Disord. 2012; 27:644-650.
4. Lewitt P. Recent advances in CSF biomarkers for Parkinson’s disease. Parkinsonism Relat Disord. 2012; 18:S49-S51.
5. Johar I, Mollenhauer B, Aarsland D. Cerebrospinal fluid biomarkers of cognitive decline in Parkinson‘s disease. Int Rev Neurobiol. 2017; 132:275-294.