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Multiple Sclerosis Diagnosis by Flow Cytometry

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Commentary

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Commentary

Introduction

Multiple sclerosis (MS) is the prototypic neuroinflammatory disease, defined by neuroinflammation within the central nervous system (CNS) accompanied by demyelination and axonal disruption [1-3]. Here, the diagnostic tool "Flow Cytometry" is used to analyze the physical and chemical characteristics disorders in MS. Flow cytometry is a widely used high-throughput measurement technology in basic research and diagnostics [3-6].

Multiple Sclerosis (MS) is an inflammatory disease of nervous system where it disrupts the insulating cover of nerves in brain and spinal cord resulting disability of the parts of the nervous system to communicate [7-10]. Any imbalance results physical, mental and sometimes psychological problems may also occur. The mysterious nature of disease provides wide-ranging scope for research. Coming to diagnostic challenges, neuroimaging advent, therapeutic options, and pathobiological research advancement in multiple sclerosis patients have been informed by many new insights from past few years [11-15].

This neuroinflammatory malady that influences myelin, a substance that makes up the film (called the myelin sheath) that wraps around nerve strands (axons). Myelinated axons are ordinarily called white matter. Scientists have discovered that MS additionally harms the nerve cell bodies, which are found in the cerebrum's dark matter, and also the axons themselves in the mind, spinal line, and optic nerve (the nerve that transmits visual data from the eye to the cerebrum). As the infection advances, the cerebrum's cortex contracts (cortical decay) [16-21].

The term Multiple sclerosis alludes to the particular regions of scar tissue (sclerosis or plaques) that are obvious in the white matter of individuals who have MS. Plaques can be as little as a pinhead or as extensive as the extent of a golf ball. Specialists can see these zones by inspecting the mind and spinal string utilizing a sort of cerebrum output called attractive reverberation imaging (MRI) [22-24]. While MS in some cases causes extreme disability, it is just seldom deadly and the vast majority with MS has a typical future [25-26].

MS is the most common neurological condition among young adults diagnosed usually between the ages of 20-24. This is at a stage in life when people are starting their journey in the world of employment, a time of seeking

independence. Being diagnosed with MS produces a myriad of challenges not least of which is 'can one continue to work?'[27-35]

MS Diagnosis?

There is no single test used to analyze MS. Specialists utilize various tests to discount or affirm the conclusion. There are numerous different issues that can copy MS. Some of this different issue can be cured, while others require diverse medications than those utilized for MS. Along these lines it is critical to perform an intensive examination before making a finding [36-39].

Notwithstanding a complete therapeutic history, physical examination, and a definite neurological examination, a specialist will arrange a MRI sweep of the head and spine to search for the trademark injuries of MS. X-ray is utilized to produce pictures of the cerebrum and/or spinal line. At that point an exceptional color or complexity operators is infused into a vein and the MRI is rehashed. In districts with dynamic aggravation in MS, there is interruption of the blood-cerebrum obstruction and the color will spill into the dynamic MS sore [40-45].

We know that diseases of cranial nerves are difficult to diagnose and treat. Some of the pathologies presenting clinically with symptoms, referable to cranial nerves, mostly involve them, while most others cause extraneous compression of these fine structures that traverse through a unique environment of meninges [46-49].

There are several neurological examinations performed in general to detect this syndrome. The clinical and neurological tests includes: Flow Cytometry, MRI, spinal tap, evoked potentials etc.

In recent studies the amount of data generated from Flow Cytometry experiments has been increasing, both in sample numbers and the number of parameters measured per cell. These greatly multivariate datasets have become too large for use with tools depending mainly on manual analysis [50-54].

Flow Cytometry technology can be used for studying both the phenotype and function of immune cells by using this technique it is used in development of a diagnostic laboratory test for the immunologic monitoring of this disease [55-59]. Cell components are fluorescently labeled and then excited by the laser to emit light at varying wavelengths. Pathological research is an attempt to identity its type in MS patients using flow cytometry. In this study investigation the possible prognostic value of ploidy in humans and the disruptions occurring inside the cell cycle with flow cytometry is used as a diagnostic tool. Flow cytometry enables speedy quantification of DNA content of individual cells, and the cellular DNA content provides useful evidence about the ploidy, saying the modal DNA value, and the proliferative activity in a tissue. The ability of flow cytometry to estimate cellular DNA content is based on the measurement of fluorescence from dyes which bind in a stoichiometric manner to DNA. Using flow cytometry for DNA analysis between family members with genetically linked diseases provides fast results, permits multiparameter analysis correlating DNA content with antigen expression, and also provides sensitivity for detecting near-diploid aneuploid peaks [60-65].

In recent studies on flow Cytometry provided evidence of the expression levels of the CB2R expression levels of the CB2R in different immune cell subsets. Higher levels of CB2R were detected in NK cells, B-lymphocytes and monocytes than in CD4+ or CD8+ T-lymphocytes, whereas neutrophils expressed a low level of CB2R. Furthermore, taking advantage of a sensitive technique like flow cytometry, it was observed that CB2R are present on resting T-lymphocytes at low abundance in some healthy subjects. [66]

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As a diagnostic tool it is used to investigate the possible prognostic value of ploidy in humans and the disruptions occurring inside the cell cycle [68]. Flow Cytometry enables rapid quantification of DNA content of individual cells, and the cellular DNA content provides helpful data roughly the ploidy, expressing the modal DNA value, and the proliferative action in a tissue. The ability of flow cytometry to evaluation cellular DNA content is based on the measurement of fluorescence from dyes which bind in a stoichiometric manner to DNA. As an analysis method it is used for the genetic analysis and the progress of the disease [69].

Flow cytometry becomes a crucial tool to monitor the immunologic effects of the drugs in MS patients. Prominently these changes might eventually be predictive of the clinical effects and the therapy outcome in MS patients [70]

White blood cell (WBC) counts in cerebrospinal fluid (CSF) are vital for the diagnosis of many neurological disorders. WBC counting and differential can be performed by microscopy, hematology analyzers, or flow cytometry. Flow cytometry of CSF is progressively being well-thought-out as the method of choice in patients suspected of leptomeningeal localization of hematological malignancies [71-74].

Technically, the low cellularity of CSF samples, joint with the rapidly declining WBC viability, makes CSF flow cytometry challenging Intracellular cytokines in peripheral blood mononuclear cells (PBMC) of MS patients by flow cytometry (cytokine flow cytometry). Flow cytometry and cytokine assay is employed to study the functional responses of the NKR^+ T cells to stimulation with α-GalCer [75].

MS clinical phase changes remains an open question, and flow cytometry will be an indispensable tool for addressing this critical knowledge in MS.

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