

Review Article

PARK11 and Gut-microbiota in Parkinson's disease----- Is there a link?

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Abstract:

Parkinson's disease is a genetically heterogeneous, idiopathic and metacentric neurodegenerative disease of the nervous system characterized by progressive generalized slowing movements like bradykinesia, weakness, tremor, and rigidity, and postural instability in along with Parkinson's disease has been pondered to be a non-genetic distemper. A different way, features are associated such as sleep dysfunction, loss of smell, mood disorder, constipation, excessive salivation, and excessive periodic limb movements in sleep. Feudatory factors encompass head injury, pesticide exposure, and agriculture background. Results with development and assembling of α -synuclein in the central nervous system in the substantia nigra. A little while back, in North American, Parkinson's disease is a significant relationship indicated to 39.5cM of chromosome 2 (2q36-37; PARK11) portion on the deep arm. Immune-related disorder, notably Crohn's and leprosy diseases are also associated with Parkinson's disease, however around 15% persona with Parkinson's disease have primary level correlative who has the distemper in the genes including LRRK2, SNCA, last one GBA found as a keek part for sporadic Parkinson's disease.

Key words:Parkinson's disease, PARK11, gut-microbiota,leucine-rich repeat kinase 2.

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OVERVIEW:

Parkinson's disease is a long-term common prevalent multifactorial degeneration malady of the central nervous system (CNS) worldwide after Alzheimer's disease [1, 2], the principal motor systems are called "parkinsonism" [1,3]. That mainly affects the central nervous system of motor system [4], who most prevalent among older adults [1-6] and distinguish by bradykinesia, postural instability [7]. Stepwise expand motordeterioration reasoned by sedate and progressive collapse of dopaminergic neurones in the SNpc [5]. In 1817, an English doctor James Parkinson reported the main demonstration about the PD as a "shaking palsy" [8-9], his published his manuscript reporting six reasons of palsy agitans [10]. The shaking catalepsy estimated the characteristics abnormal posture, gait, palsy, resting tremor, abated muscle power and the disease progression over time [11-13]. Microscopic particles in affected brains according to the Frederic Lewy and later named "Lewy bodies" described in 1912 on this point [14-10]. Since 2016, globally exceeding six million people were diagnosed with PD, described of Dorsey et al. and this number is hoped to double by 2040 [9]. Investigated in 2013, about 5.3 million people have PD and resulted in about 103,000 deaths globally [15], that is over the age of 60 people are affected [2], PD increases with age until stabilizing at >80 years old [17]. Indeed females are less affected than male [16], i.e., males are affected four to one compared to females according to the Dorsey et al. [9]. In the United State America, PD prevalence rate in males per 100,000 person year

raises from 29.22 in the age group 50-59 to 391.87 in the age group >80 [17]. Investigated in 2013, about 5.3 million people have PD and resulted in about 103,000 deaths globally [15], that is over the age of 60 people are affected [2], PD increases with age until stabilizing at >80 years old [17]. Indeed females are less affected than male [16], i.e., males are affected four to one compared to females according to the Dorsey et al. [9]. In the United State America, PD prevalence rate in males per 100,000 person year raises from 29.22 in the age group 50-59 to 391.87 in the age group >80 [17]. Above all, PD is a largely and fastest growing multicentric neurodegenerative disorder in terms of worldwide prevalence, disability burden, and deaths [9, 14, 18, 19]. Parkinson's disease are the progressive inanition of catecholamine in the basal ganglia as a repercussion of the neuronal death in the SNpc,ventral tegmental area, in presence of abnormal proteins and LBSavings in several neuronal tissues [8]. Characterized the PD by motor and non-motor symptoms that prosperity different stages likes mild, moderate and severe [1]. Among the most widely used instruments for PD estimation is the scale formulated according to the Hoehn and Yahr (1967), the Hoehn and Yahr scale follows the temporal development of the pathology by classifying it into five severity stages [20]. There are two types of symptoms such as motor symptoms and non-motor symptoms, first motor symptoms construct postural instability, rigidity, resting tremor, and bradykinesia [1, 8], whereas the to a greater extent non-motor symptoms involve insomnia disorder, cognitive impairment, dejection, constipation,

drowsiness/fatigue and also hyposmia [8]. Identification is propagated using clinical proof, particularly the presence of motor alternations, and proved by mechanical evidence from neuroimaging examinations (MRI and PET) [1, 8]. Anyway, PD is treatable, the majority of the therapies objective to control symptoms and slow-moving progression [8, 21]. Pharmacological approaches, the accumulated evidence suggests also physical exercise programs [8], for example, MIRT comprising of 4 weeks of MIR protocol a psychological intervention is associated with significant physical prosperity gains in autonomy [22].

PARK11 LINK IN PARKINSON'S DISEASE

Up to now, six genes and diverse loci monogenically traditional forms of Parkinson's disease, that estimate only a tiny fracture of malady has recognized and identified, variation in parkin gene [23], PARK2 in PINK1 gene [24]. PARK6 in DJ-gene [25], early-onset Parkinsonism autosomal recessive causes by PARK7 [6], in that time, missense mutations in α -Synuclein gene [26] and now duplet and triplet of the feral-type alpha-synuclein locus [27-28], those founds in a miniature figure of families with autosomal dominate PD [6]. In a single German family has been reported the UCH-1 mutation PARK5 [29]. NR4A2/NURR1 mutations gene were found families with late-onset PD which is (MIM 601828) [30], furthermore, several chromosomal regions linkage detected by genetic studies that may contain susceptibility loci of PD: PARK3 [31], PARK9 [32] and PARK10 [33] and PARK10 [34]. PARK11 chromosome 2q36-37 identified in 160 families of sample in a wide-screen of genome [35]. This experiment was occurred by a subset of the preceding and prolonged sample that only covered in stemma along with a potent family background of PD; and analysis of 65 families a crowning LOD score is 5.1 at the marker D2S206 on chromosome 2q36-37 was found which use in ADM of disease transmission [36].

PARKINSON'S DISEASE LINKED WITH GUT-MICROBIOTA

BGA refers to monitoring of enteric nervous system by vagus nerve innervation [37-38]. PD intuition total parts of brain-bowel axel distinguishes α -synucleinopathy, neuropathological & clinical evidence, because of CNS impairment gastrointestinal symptoms are seems for why neurodegenerative changes in PD are accompanied [39]. Central nervous system and gastrointestinal tract bidirectional communication between them, the brain-bowel axel occurs in both normal and distemper condition [40]. Initial part of enteric nervous system show up by neurons of myenteric and submucosal plexi of enteric glial cells (EGCs) [41]; furthermore, second part of the prevertebral ganglia modulating vast peripheral visceral reflexes [42].

Third part is an autosomal NS in spinal cord (T5L2, S2-S4) and brain stem along nucleus tractus solitaries & dorsal motor nucleus of the vagus nerve. The DMN of vagus nerve dominance is the most eminent in topper gastrointestinal tract. Cholinergic myenteric neurons mediate vagal excitatory effect produced by upper GIT and VIP/NO neurons produced inhibitory reflexes [43-44].

Fourth part includes upper brain centers. Alpha-syn is extravagantly demonstrated in central nervous system, connected with pronouncement of neurotransmission. Deposited the α -syn plays an effective role in neuroinflammation by potentiating astrological, microglial activation [45-46]. EGCs describe as gastric tract counterpart for brain astrocytes might connected in bowel inflammation [46-47]. Neurological and aloof record show that neuro-degenerative alters accompanied by GI symptoms and follow the CNS impairment [48]. Enteric nervous system play a crucial part in pathophysiology of Parkinson's

disease. Besides, the collateralexpression of neuropathologies in enteric nervous system, central nervous system and enteric nervous system might allocate a more permeable goal of studies for neural function, histopathology in PD [48]. Enteric nervous system is another brain and thought as a window of first brain [49-50]. PD, it has many reasons such as progressive supranuclear palsy, multiple atrophy [51]. Analyzing of frequency in different GI symptoms around 98 patients with PD abnormal salvation, nausea and defecatory dysfunction were present in 70%, 52% of the subjects respectively. On contrary, alters in gut microbiota formation changing in gut barrier activity, bowelpenetrable, affecting the GI epithelial cells and immune system [52-53]. All proof demonstrated that the gut microbiota changing occur in the time of course PD [49]. Anyway, incidental association among microbiota alterations and pathogenesis of PD remains unsatisfied [54].

Here the GI dysfunction of PD includes:

- 1) PD is distinguished by several symptoms like abdominal discomfort, early satiety and vomiting [55-56], most important issue, important gastric voiding is a significant expression of PD.
- 2) Constipation the profuse eminent GI dysfunction is an early exposition of PD of malady process [57, 50].
- 3) DD is distinguished as an obsessive revealing; unfinished defecation is other morbid problem in Parkinson's disease [58].

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