Dementia in the elderly is described by symptoms of attentional deficits, memory impairments, executive dysfunction and cognitive decline. In several major neurodegenerative disorders is occurred dementia. Fronto-temporal dementia and hippocampal sclerosis of aging, Lewy body dementia, non-Alzheimer's form as vascular dementia and Alzheimer’s disease, which vary between brain regions like the hippocampus, entorhinal cortex, medial temporal lobe, inferior parietal cortex and frontal cortex, may explain a magnitude of deficits in different cognitive domains [1-5]. Preservation of cognitive function is important for maintenance of the quality of life of older adults.

Through support and maximizing personal strengths in partnership with the physicians, understanding as much as possible about dementia, medications, and non-drug therapies, the life will continue to have meaning and richness for affected by dementia people, who can participate in the health-care decisions that uniquely affect them.

The pathological hallmarks of dementia, like Lewy bodies and Parkinson disease dementia with neuronal loss in a substantia nigra, noradrenergic neurons in the locus ceruleus, serotonergic neurons in raphe nuclei, and cholinergic neurons in the basal nucleus of Meynert, are exhibited in approximately 15% of people older than 60 years. The quality of life is affected in patients with mild cognitive deficits because they have a higher risk of developing dementia. It is well known that dementia can occur at any time point in Parkinson disease, and parkinsonism at any time point in Lewy body dementia [1,5]. The progress of cognitive deficits may delay or even the development of dementia can prevent when the interventions are applied in early stages of cognitive decline.

With the support of a multidisciplinary training program on cognitive function, patients with mild cognitive deficits manage their daily life better and become more self-confident [1]. First symptoms are very mild and intermittent. Physical training activity improves cognitive functions of patients with cognitive problems. Their sports activity has social aspects because involves their partners and prevent the patient’s depression and the social isolation, which are closely associated with cognitive decline. Both motor and cognitive impairments in people with Lewy bodies and Parkinson disease dementia can be improved by long-term multimodal exercise programs which could have a broader impact on quality of life than specific exercise interventions. Thus, individuals, who are in the preclinical phase of dementia and have an urgent need for early treatment to slow down or stop the disease progression, are screening by new developing imaging modality for earlier diagnosis of the disease.

The first recognized functional imaging features distinguishing dementia with Lewy bodies from Alzheimer's disease are the occipital features, but the additional features are the posterior cingulate island sign and relative sparing of mesio-temporal lobe activity in dementia with Lewy bodies compared to Alzheimer's disease. The olfactory bulb, amygdala, hypothalamus, mesopontine tegmentum, and dorsal motor nucleus of the vagus are especially vulnerable to Lewy body pathology. Involvement of the allocortex and the anterior temporal neocortex is characteristic of dementia with Lewy bodies and Parkinson disease dementia. Clinical challenge is a determination of the contributions of multiple pathologies to the dementia syndrome, which needs from imaging biomarkers to detect the presence of related to the Lewy bodies and Alzheimer’s disease pathologies and following their progression [2-4].

In recent years, the early diagnosis relatedly to mild cognitive impairment and prodromal dementia are in the basis of the increasing attention of the scientists. The early diagnosis of the predementia stage of cognitive decline which culminates in Dementia with Lewy bodies includes the use of imaging biomarkers [5]. The time course temporal dynamics characterize the cognitive functions. The human cognition from simple event perception to higher cognitive functions, such as planning or decision making is influenced by the efficiency of time-related information processing. For the efficiency of human cognition is crucial the relationship between temporal information processing in a millisecond time domain and cognitive functions. A decline of the temporal information processing accompanies age-related deterioration of many cognitive functions. One potential biomarker modality which has previously been neglected in Dementia with Lewy bodies is that of electrophysiology, which includes approaches such as electroencephalography (EEG), magnetoencephalography [6-8]. A barrier to the use of electrophysiological techniques such as EEG in dementia studies for both clinical and research-wise has been their lack of diagnostic specificity and the tendency for the use of neuroimaging. Complex multimodal electrophysiological approaches may help to understand the pathoetiologi cal basis of dementia [8].

A convenient indicator of cortical dysfunction in dementia, which could be used to classify some idiopathic dementias,
oscillations [1,6]. Deviations of the auditory and visual cognitive processes in the central nervous system of patients with Parkinson disease dementia are brain event-related cognitive processes than the sensory ones. After high-tone stimulation. The age influences more the increases in fronto–parietal direction more expressed than during sensory processing. This age difference high-tone responses, while β1-activity is more widespread diminish with increasing age, except for frontal β2 and γ low-frequency activity (delta δ: 2–4, theta θ: 4.5–7, alpha α: 7.5–12 Hz) are more pronounced with progressive age, but β1-component (beta β1: 12.5–20 Hz) is less affected by age during sensory processing. The age difference with respect to scalp distribution is tone-independent for δ/θ, but β1-component (beta β1: 12.5–20 Hz) is less affected by age during auditory discrimination task [10,11]. The amplitudes of β2 (beta β2: 20.5–30 Hz), γ (gamma γ1: 30.5–49; γ2: 52–69 Hz) and low-frequency activity (delta δ: 2–4, theta θ: 4.5–7, alpha α: 7.5–12 Hz) are more pronounced with progressive age, but β1-component (beta β1: 12.5–20 Hz) is less affected by age during sensory processing. The age difference with respect to scalp distribution is tone-independent for δ/θ, but not for α-activity. Age- and tone-dependent α-changes are focused on frontal and sensorimotor areas. The low- and high-frequency amplitudes during cognitive processing diminish with increasing age, except for frontal β2 and γ high-tone responses, while β1-activity is more widespread than during sensory processing. This age difference increases in fronto–parietal direction more expressed after high-tone stimulation. The age influences more the cognitive processes than the sensory ones.

A useful tool for detecting subtle abnormalities of the cognitive processes in the central nervous system of patients with Parkinson disease dementia are brain event-related oscillations [1,6]. Deviations of the auditory and visual elicited brain oscillatory responses at specific frequencies are an evidence for disturbances in the temporal and regional integration of these frequency components and related to them relationships between cortical and the basal ganglia circuits in parkinsonism. It is likely that such biomarkers will be important in identifying and defining prodromal dementia.

**References**


**Correspondence to:**

Juliana Dushanova
Institute of Neurobiology
Bulgarian Academy of Sciences, Sofia
Bulgaria