

COMPARISON OF IN VITRO AND IN VIVO METHODS IN PARKINSON'S DISEASE

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Parkinson's disease (PD) that is the second most common neurodegenerative movement disorder is a long-term degenerative disorder of the central nervous system that mainly affects the motor system. The motor symptoms of the disease result from the death of cells in the substantia nigra, a region of the midbrain. This results in decreased levels of dopamine in these areas. The reason for this dopaminergic neuronal cell death is poorly understood, but involves the build-up of proteins called α -synuclein into Lewy bodies in the neurons. The cause of Parkinson's disease is generally unknown, but believed to involve both genetic and environmental factors. The study of pathological mechanism is dependent on ideal animal models, which should reproduce all the clinical and pathological characteristics of PD. Epidemiological studies have revealed that familial forms account for few of PD subjects, while the overwhelming majority are sporadic forms. Current animal models of PD can also be broadly divided into two categories: genetic and neurotoxic models, with the latter modelling sporadic PD. Various neurotoxin-based models of PD exhibiting notable degeneration of nigrostriatal dopaminergic neurons have been developed, such as 6-hydroxydopamine (6-OHDA), 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP), paraquat, and rotenone. Although animal models offer the possibility to study both physiological and behavioural mechanisms, (which most other alternatives do not) they do not always provide translatable results in pre-clinical drug screening for humans due to inter-species differences. Human post-mortem material also plays an important role for studying diseases, providing important patho-histological information. However, this material has limited availability, lacks important information such as cell function and behaviour due to tissue degeneration, and does not allow the observation of disease progression. Thus, in vitro models can be used in parallel with animal models and post-mortem material to study PD. These models can also provide a relatively inexpensive research tool and offer scientists the opportunity to observe disease progression in vitro, understand underlying mechanisms and identify new therapeutic targets.

Biography

Kopuz M had Bachelors' in Biochemistry in Ege University, Turkey. She received a Master's degree in Department of Medical Biochemistry in Karadeniz Technical University where she has worked for 7 years as a Researcher, took part in many projects and improved her skills and experience in laboratory. She has completed her PhD on Medical Biochemistry from Karadeniz Technical University and studied her PhD thesis experiments in Department of Biomedical and Neuromotor Sciences, University of Bologna, Italy. She continues her Post-doctoral studies in Yeditepe University, Turkey.

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