# Nanoneurobiophysics: The Leading Highway for Neurodegenerative Diseases Research

Opinion

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## Opinion

In view of the nanoneurobiophysic that is branch new term created to congregate nano and medical sciences, new perspectives to use technology towards the investigation of diseases have arisen [1]. Studies have indicated outstanding results from nano devices accomplishing biomolecular behavior for therapeutics [2,3]. However, in the case of neurodegenerative disorders, there is huge lack that needs to be fulfilled in order to understand their mechanisms. Literature reports assorted targeted diseases agents such as antibodies ou peptides as the main bio compounds participating on disease development and recognition [4]. Neuroscience incorporates brain entities that somehow are deteriorate by our immunologic system. In this scenario, there is a need to isolate body's targeted biomolecules to investigate its biological activities. The nanoneurobiophysic then gathers biomolecules investigation using nanostructured devices and the neuroimmunological approaches to perform a deep and highly sensitivity investigation in demyelinating neurodiseases.

A thunderous deep inside advancement in medicine science has impacted all fields in the last decades. Nanotechnology (Nt) has consolidated their progress in biology, physics, mathematics and chemistry. In human diseases, Nt introduces new perspectives to the investigation of the mechanisms pathways involved in neurodegenerative diseases, (e.g, multiple sclerosis, Parkinson's and Alzheimer's disease) [5,6]. Additionally, the development and characterization of nanostructured materials simplify disease investigation.

A further step in diagnostic methods in neuroscience accomplishes three main goals: 1-early identification of the disease; 2-treatment improvement; and 3- contribute to understand its biological implications. Thus, the nanoneurosciences, neurobiophysics, biomaterials, nanotechnology and nanobiophysics research lines and computational molecular modeling methods are all involved coined together.

The nanoneurobiophysics concept was introduced to synergically integrate all research lines in one. Based on this, the concatenation of scientific tools from different research areas can be unified to provide and to establish uniform thinking among researches worldwide. Playing with words, nanoscience = nano; + neuroscience = neuro; + biology = bio; + physics = physics, as a result, the sum is "nanoneurobiophysics". As a matter of the fact, one can say that there is no need to introduce such term to the scientific community. However, instead of highlighting many times the importance of the nanotechnology for the humanity in manuscript's introduction section, one can lift up in only one term all the benefits by combining the suffixes of different research areas in one word. Therefore, we believe that the simplification of concepts brings flowing of ideas to the writing process.

Nanodevices, such as Atomic Force Microscope (AFM) and Scanning Tunneling Microscope (STM) allow researchers to make nanomeasurements and nanocharacterizations on both organic and inorganic compounds. It contributes to the investigation of the chemical mechanisms involved in a target interaction. In the case of the AFM, it can be applied to scan nanosurfaces as well as to measure intermolecular forces due to its nanoresolution [7]. Complex sensors can be obtained by the improvement and functionality of the AFM by using the immobilization of biomolecules on the AFM tip and sample surface [8]. Therefore, the main goal of the nanoneurobiophysics research is to present state-of-the-art researching tools to investigate neurodegenerative diseases, such as the identification of molecular targets in multiple sclerosis [9,10] and unique molecules in neuromyelitis optica [11], directing to accurately differentiate the diseases using the nanotechnology available today.

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