

DNA Nanotechnology for Modulating the Growth and Development of Neurons

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Abstract

Late prenatal growth, early postnatal growth, and layering of the neocortical neurons (NC-Ns) play determining roles in the development of the cerebral cortex (CC). Here, we systematically explore the interactive role of neuronal surface receptors (NSRs) on cytoskeleton activation (CA) and the piconewton (pN) force generation (P-FG) and their influence on the proper development, growth, and functioning of neurons using a designed DNA nanomechanical device (DNA-NMD). This DNA-NMD, functioning as a molecular tension probe (MTP), can be used to selectively bind the different NSRs (β -NGFR, Reelin, and Integrin) to mono-, bi-, and trispecifically activate the receptors on the NC-Ns surface for imaging and calculating the P-FG involved in various processes. Measurements in vivo on the brain of newly born Institute of Cancer Research mice (early postnatal)

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Biography

Dr. Mirza Muhammad Faran Ashraf Baig is a registered Nanotechnology, Developmental Biology, Neuroscience, Nano-Pharmacist and currently a post-doctoral fellow at the Faculty of Dentistry, The University of Hong Kong under the supervision of Therapeutics, Bio-sensing, Bio-imaging, Diagnostics, Biotechnology, Biophysics, and Biochemistry. His current research Professor Chengfei Zhang. He received his Doctor of Pharmacy focus is designing DNA based novel functional & bio-active (PharmD) and MPhil (Pharmaceutical Chemistry) degrees from the Faculty of Pharmacy, Bahauddin Zakariya University (BZU), Multan, Pakistan, and a Ph.D.

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