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Memory Manipulation and Rehabilitation via Electron-Positron DNA Computing Integrated with an Artificial Intelligence Feedback System

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Abstract

Memory dysfunction, especially in disorders like post-traumatic stress disorder (PTSD), Alzheimer's disease, and chronic depression, remains one of the most elusive challenges in neuroscience. Here, we propose a novel architecture combining electron-positron-based DNA computing embedded in neural cells with an artificial intelligence (AI)-driven feedback system. The hybrid system is capable of detecting, modifying, and reconstructing aberrant memory traces via entangled feedback loops, leveraging both quantum and classical computation to facilitate neural rewiring and controlled memory erasure or enhancement. This study integrates bioinformatics, quantum biophysics, and AI neurotherapy to provide a non-invasive solution for memory manipulation and restoration.

<https://ut-toulouseinp.hal.science/hal-05603812v1>

Transhumanism: Towards a new Adam?

Introduction: Transhumanism is a movement that seeks to enhance human abilities, aiming for physical and cognitive augmentation, and even potential immortality.

This raises ethical concerns about human nature, dignity, and equality. Methods:

Only three main approaches are explored in this review. First, biological enhancement involves stem cell therapies and genetic modifications, such as CRISPR-Cas9, to improve human capacities. Second, bionic augmentation includes advanced prosthetics, sensory implants, and neural interfaces to restore or enhance functions. Third, neural and digital integration focuses on brain-computer interfaces, such as Neuralink, and the theoretical concept of mind uploading.

Results: Biological enhancement remains limited in clinical success and raises ethical concerns, particularly regarding genetic selection. Bionic augmentation allows individuals to regain or surpass natural abilities, challenging the boundary between humans and machines. Neural integration offers cognitive improvements but poses questions about free will and identity. Mind uploading, although speculative, fuels debates on consciousness and artificial life. Conclusion: While transhumanism presents groundbreaking advancements, it also challenges fundamental ethical and societal values. The increasing integration of technology with the human body raises questions about inequality, identity, and the potential transformation of humanity as we know it.

<https://pmc.ncbi.nlm.nih.gov/articles/PMC5177684/>

Virus-Based Nanoparticles as Versatile Nanomachines

Abstract

Nanoscale engineering is revolutionizing the way we prevent, detect, and treat diseases. Viruses have played a special role in these developments because they can function as prefabricated nanoscaffolds that have unique properties and are easily modified. The interiors of virus particles can encapsulate and protect

sensitive compounds, while the exteriors can be altered to display large and small molecules in precisely defined arrays. These properties of viruses, along with their innate biocompatibility, have led to their development as actively targeted drug delivery systems that expand on and improve current pharmaceutical options. Viruses are naturally immunogenic, and antigens displayed on their surface have been used to create vaccines against pathogens and to break self-tolerance to initiate an immune response to dysfunctional proteins. Densely and specifically aligned imaging agents on viruses have allowed for high-resolution and noninvasive visualization tools to detect and treat diseases earlier than previously possible. These and future applications of viruses have created an exciting new field within the disciplines of both nanotechnology and medicine.

<https://pmc.ncbi.nlm.nih.gov/articles/PMC3654487/>

Virus-based Photo-Responsive Nanowires Formed By Linking Site-Directed Mutagenesis and Chemical Reaction

Abstract

Owing to the genetic flexibility and error-free bulk production, bio-nanostructures such as filamentous phage showed great potential in materials synthesis, however, their photo-responsive behaviour is neither explored nor unveiled. Here we show M13 phage genetically engineered with tyrosine residues precisely fused to the major coat protein is converted into a photo-responsive organic nanowire by a site-specific chemical reaction with an aromatic amine to form an azo dye structure on the surface. The resulting azo-M13-phage nanowire exhibits reversible photo-responsive properties due to the photo-switchable cis-trans isomerisation of the azo unit formed on the phage. This result shows that site-specific display of a peptide on bio-nanostructures through site-directed genetic mutagenesis can be translated into site-directed chemical reaction for developing advanced materials. The photo-responsive properties of the azo-M13-phage nanowires may open the door for the

development of light controllable smart devices for use in non-linear optics, holography data storage, molecular antenna, and actuators.

<https://pmc.ncbi.nlm.nih.gov/articles/PMC11054665/>

Design of Bio-Optical Transceiver for In Vivo Biomedical Sensor Applications

Abstract

This paper presents an enhanced version of our previously developed bio-optical transceiver, presenting a significant advancement in nanosensor technology. Using self-assembled polymers, this nanodevice is capable of electron detection while maintaining biocompatibility, an essential feature for in vivo medical biosensors. This enhancement finds significance in the field of infectious disease control, particularly in the early detection of respiratory viruses, including high-threat pathogens such as SARS-CoV-2. The proposed system harnesses bioluminescence by converting electric signaling to visible blue light, effectively opening the path of linking nano-sized mechanisms to larger-scale systems, thereby pushing the boundaries of in vivo biomedical sensing. The performance evaluation of our technology is analytical and is based on the use of Markov chains, through which we assess the bit error probability. The calculated improvements indicate that this technology qualifies as a forerunner in terms of supporting the communication needs of smaller, safer, and more efficient manufactured sensor technologies for in vivo medical applications.