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MSCM-Multiple selective proteo nano cluster mesh coating CD's agonist/antagonist

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Cell surface molecules (CSM) like L selectin, VLA-4, LFA-1, CD2, CD4, TCR, CD44, CD45RA and CD45RO play a major role in cell interaction, signalling and function. CSM are in a "mosaic" of activated–inactivated states. These states determine cell behaviour. Cells are controlled by a "cocktail" of molecules that act on CSM modulating their states. Nano system was designed using computational methods like molecular dynamics, docking, ligand design, virtual screening and experimental methods like isothermal titration calorimetry (ITC) and single cell imaging techniques. The system is composed of nano polymers, graphene and fullerene patches on witch wild or synthetic "ligands"-amino acids or small peptide for CSM are incorporated. Physico chemical triggers were used to activate MSMC. Cellular meshing by MSCM allows controlling and guiding of cellular dynamic interaction with all the pathways involving the cell. MSMC by its nano polymer mesh can protect or stabilize a certain cell or tissue. MSMC was made cell specific by incorporating Ig motifs against different types of cells. Computational models of L-selectin, VLA-4, LFA-1, CD2, CD4, TCR, CD44, CD45RA and CD45RO were designed and incorporated into a nano polymer mesh. MSMC outer surface was coated with phosphatidilinositol, sphingnomielin and cholesterol mono layer. The system goal is to be administrated iv. In the first stage of development, the attention was focused on single cell manipulation. The viability of the cell (unintended cell death) and the lack of adverse effects like aggregation, hemolysis4, toxicity were tested. Each receptor was characterized individualy and a series of proteic motifs were developed for incorporation into MSMC. In conclusion, a bio-nano-device5 was designed to control a cell by stimulating/inhibiting the CD's. System was designed to be cell specific and tissue specific; device is "controlled" by physico-chemical stimuli. The ultimate goal of this system is to control large volumes of cells eventually tissues.

Biography

Lungu N Claudiu is a last year PhD in organic chemistry at "Babes-Bolyai" University, Cluj, Romania. He has a degree in medicine (MD) and in pharmacy. His areas of interest are: Computational chemistry, drug discovery and materials science. He wrote a number of papers regarding nano bio assemblies, polymers, bio nano interactions and quantitative structure activity relationship (QSAR). In the last time, his areas of interest are bioinformatics and bioactivity study. He delivered several oral presentations in: Berlin (Germany), Warsaw (Poland) and Bergen (Norway) regarding nano assemblies, as a part of an European research grant in the fiel of nanoscience.

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