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Bioinformatic tools for determination of high-affinity peptides as alternative to treatment of Obesity

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Opsonin C3b is an important part of the immune system, being able to trigger phagocytosis by binding to the complement receptors (CR1) of macrophages. The coating of cells with C3b positions them at risk of destruction. The AQP7 protein is highly specific in adipocytes, therefore they can be targets for the generation of the dual agonist of adipose cells and CR1, through hybrid peptides for the activation of the phagocytosis of the former. In this work, we will perform a bioinformatic analysis through the design of peptides, based on these sequences to trigger phagocytosis adipocytes as an alternative to obesity treatment. Materials and Methods: For the development of this work, we used UniProt, Ncbi Protein Blast, and PDBsum as databases, Patchdock and FireDock for the realization of the Docking and I-Tasser for the modeling of the AQP7 protein; All of them of free access. To analyze if there is a binding between peptides and AQP7 protein, it was used fibroblast 3T3-L1 cell line and differentiated into adipocytes. To analyze if peptides bind to the CR1 protein, it was used THP-1 monocytes cell line. Conclusions: From the interaction sites between C3b and CR1 it was possible to obtain four receptor agonist peptides. From the modeling and subsequent docking between AQP7 and other protein structures (IgG) were found six binding peptides. For the design of the hybrid peptides, a matrix was generated with 36 resulting peptides capable of binding to CR1 to AQP7. Of these peptides, two are capable to bind to AQP7 and two binds to CR1. The final matrix of 4 peptides needs to be proved by a co-culture of this two cell lines and demonstrate phagocytosis activation.

Biography

Ivonne Bartsch is a B.S. Pharmacist and PhD Biotechnology student at the Pontifical Catholic University of Valparaíso, Chile. From 2008 to 2013: founder and director of a private Quality Control Drugs laboratory (Bioeq). Diplomate in Pharmaceutical Management and a Post-title Care Pharmacy at the University of Valparaíso. Since 2013, Auxiliar Professor Quality Control, Medical School in Andrés Bello University, Vina del Mar, Chile. Presenter in XL annual meeting of the society of Biochemistry and Molecular Biology, Chile.

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