CD.38 - Peptide and antibody phage display: a platform for antibody engineering
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Antibodies are important biopharmaceuticals due to their specificity and high affinity for targets. Nevertheless, one of the challenges to generate antibodies with clinical potential is the immune system itself, which avoids targeting highly conserved domains in proteins such as binding sites. Combinatorial techniques (i.e., antibody phage display) may help mitigating these difficulties but it still rely on the immune system to generate the repertoire of complementarity-determining regions (CDR) in order to produce high diversity antibody libraries. Our goal is to by-pass this limitation by combining peptide and antibody phage display technologies. Design and optimize a platform using peptide, antibody and yeast display to graft bioactive peptides into the CDR of human globulins to facilitate the discovery of high affinity antibodies with clinical potential. We have engineered plasmid vectors to build peptide libraries within the CDR of a human IgG1 to select scFv antibody fragments with specificity toward selected targets. To validate our platform, we have engineered an anti-Tie1 antibody. To increase affinity toward its target, we are now combining peptide grafting with yeast display to optimize the remaining CDRs. We have engineered the variable region of human IgG1 gene to carry restriction sites flanking the heavy and light chain CDR3.Using oligonucleotides encoding the sequence of a Tie1 binding peptide, we have built an artificial antibody phage display library and selected scFv that bind specifically to Tie1. Currently, a new scFv human library is being used to optimize the remaining CDRs to increase affinity towards Tie1. By combining combinatorial methodologies (phage and yeast display), one might overcome an important limitation in biopharmaceutical production, our own immune system. If successful, this work might generate a new anti-angiogenesis antibody and pave the way for a new platform for rational antibody discovery.
Keywords: Angiogenesis, Antibody Engineering, Phage Display
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CD.39 - Characterization of nonionic cubosomes in thepresence of model proteins: a structural approach
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One area of research that has gained much attention in recent years is nanomedicine, with particular attention to drug delivery systems. Among the various nanoparticles used for this purpose, we highlight the systems formed by lipids and polymers, such as liposomes and cubosomes. The main objective of this research project is to build nanostructured systems capable of acting as antimicrobial systems. These systems will be composed of cubosomes in the absence and presence of the enzyme and will be analyzed using several biophysical techniques such as: small angle X-ray scattering (SAXS) and dynamic light scattering (DLS), potential -ζ besides essays in vivo. This cubosomes will be obtein in a equipment, developed by our research group so that we could reproducibly obtain cubosomes. This equipment uses *Arduino* type electronics, made in a 3D printer, and our objective will be to characterize, in terms of size and polydispersion, the cubosomes formed using different injection speeds. The results obtained in this research project will be presented at national scientific events (such as the meetings of the Brazilian Biophysical Society) and published in international scientific journals with arbitration. Due to the progress of the research, there are no conclusions about what was initially proposed.
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