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Pros and cons of protein manufacturing for cell therapy

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Proteins are key biomolecules for cell therapy; however, toxicity and side effects of manufactured proteins arise due to altered properties and factors derived from the complexity of their structures, cellular specificity of action, dynamic folding, and reactivity. They perform diverse functions in the cells and may play dual role, such as enzymatic activity coupled with genes activation, membranes traffic and rearrangements, molecular transport or transmission, among many others. Reactive amino acid residues on the proteins surface participate in their signal transduction pathways via cascades of reversible interactions and redox reactions. In isolated form, proteins lose the native environment, which keeps them in functional states in the cells. The replacement of the cellular compounds by appropriate bio and inorganic molecules is critical for protein production to keep them as close as possible to the wild type. In addition, the formation of homo-oligomers may inactivate proteins, triggering immune responses in the targeted cells. It is challenging to identify the multiple factors that affect the protein properties during the entire cycle of their production from cloning to manufacturing. The fast growth of bioinformatic tools and databases allow statistical evaluation of large variety of those critical factors and their contribution to the manufacturing process. By applying multidisciplinary and Design of Experiments approaches, a rapid decline of the variables is achievable and thus can bring about results that are more consistent to improve the success in clinical trials.

Biography

Anelia Atanassova received BSc in Chemistry, MSc in Biophysics and PhD in Biochemistry from Sofia University, Bulgaria. She was a Postdoctoral Fellow at the University of Toronto, Chemistry Department and Structural Genomics Consortium and Scientist in Faculty of Pharmacy, PharmaGen Ltd., Sofia and Center for Gene Research, Nagoya University, Japan. She is a founder of BioGlobaX Inc., a private service organization established in collaboration with research groups from the University of Toronto and across the globe. She is an author of numerous innovations and provides services as an editorial board member of scientific journals.

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