Construction, expression and characterization of a cancer-specific fusion protein targeting CD22 in B-cell malignancies

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Dual-function proteins are a new class of therapeutics that composed of an antibody or antibody fragment linked to a cytotoxic molecule to facilitate the targeted delivery and destruction of malignant cells. CD22 is a highly internalizing B-cell specific surface antigen which overexpressed in 60-80% of different types of B-cell malignancies. Therefore, anti-CD22 antibodies are ideal candidates for targeted intracellular delivery of antitumor agents. Apoptin is a small 13 kDa protein which can induce apoptosis in tumor and transformed cells but not in normal cells. Hence, the apoptin protein can be used as a toxic moiety in development of cancer specific fusion proteins. In this study, we generated a novel dual function protein by fusing apoptin to the C-terminus of a humanized anti-CD22 scFv; the anti-CD22 scFv portion of the protein targets the whole molecule to the tumors, while apoptin executes specific killing functions. Using the routine molecular methods, the recombinant anti-CD22 scFv-apoptin protein was expressed in E. coli and then purified. The in vitro binding analyses by immunofluorescence and flowcytometry demonstrated that the anti-CD22 scFv specifically bind to Rajii CD22 positive cells and almost not to Jurkat CD22 negative cells. Evaluation of apoptotic property of anti-CD22 scFv-apoptin using flow cytometry showed that following specific binding of anti-CD22 scFv-apoptin, the protein induced apoptosis significantly in Raji cells (p<0.05). In conclusion, we have successfully produced functional anti-CD22 scFv-apoptin in E. coli. This recombinant protein may offer a new opportunity for the treatment of CD22+ B-cell malignancies.

Biography

Solmaz Agha Amiri is currently a PhD student in the field of Pharmaceutical Biotechnology in Shahid Beheshti University of Iran. She has published about 5 papers in reputed journals.

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