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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 13KDa 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 CD-22 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 flow cytometry demonstrated that the anti-CD22 scFv specifically bind to Raji 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 pursuing her PhD in the field of Pharmaceutical Biotechnology at Shahid Beheshti University of Iran. She has published five papers in reputed journals.

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