



EDITORIAL

Generation of Cancer Fighting Cells (CFCs): A Cell Engineering Approach

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SUMMARY

Engineering cells is a novel approach to enhance efficacy of cell therapy in which therapeutic cells like mesenchymal stem cells (MSCs), T-Cells etc are engineered to enhance their specific therapeutic features. These cells because of their specific therapeutic features, can also be termed as cancer fighting cells (CFCs). For example, tumour-directed migration capabilities of MSCs have been enhanced by engineering MSCs for targeted cancer therapy. MSCs have also been engineered to express anti-proliferative, pro-apoptotic, anti-angiogenic agents. A number of T cells have also been engineered to express TCRs (T-cell receptors) or CAR (chimeric antigen receptors) and have shown promising results in clinical trials. A number of diseases such as leukaemia have been treated using engineered cells, successfully. Further clinical trials are required to justify the hypothesis and to improve engineering approaches for regular clinical practices.

Keywords: Mesenchymal Stem Cells, T-Cells, Engineering Cells, Targeted Cancer Therapy, Cell Therapy

Cell therapy is a decades old practice which has revolutionized the ways to treat diseases (1, 2). A number of diseases have been treated successfully using different types of cells. According to the registered data, more than 28000 studies are registered in the US registry of clinical trials (www.clinicaltrials.gov) and cancer is ranked top diseases being treated by cell therapy. Engineering cells is a valuable novel approach where a number of cells like MSCs, T-Cells have been engineered resulting in

very promising response especially targeting cancer (3-5). As these cells have been engineered to fight cancer, such cells can be named as cancer fighting cells (CFCs). MSCs have been engineered to enhance their tumour-directed migration capability, to express anti-proliferative, pro-apoptotic, anti-angiogenic agents to introduce MSC-mediated anticancer strategy as MSCs have been considered as an ideal carriers to deliver anticancer agents (4). Engineering approaches have also been applied on T-cells to enhance their cancer cell

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identification capabilities via modifying transgenes in T-cells to encoding TCRs (T-cell receptors) or CAR (chimeric antigen receptors) to enhance T-cells functioning (6). These engineering approaches are viral based techniques which is facing a number of challenges and hurdles in becoming their approved clinical agents. Successful engineering without having unwanted mutations, is a hope for cancer patients in near future.

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