

Tumour homing stem cells to deliver anti-cancer drugs

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The parallel evolution of cancer cells and humans has left cancer researchers struggling relentlessly for years to invent a permanent cure. Numerous researches are being carried out in the field of drug development for the treatment of cancer. One such approach that has surfaced in a recent study is the delivery of anti-cancer drugs using specialised cells from our body called the mesenchymal stem cells (MSCs). These distinct cells have the ability to navigate towards tumour cells, hence theoretically these cells can be loaded with anti-cancer drugs and sent out to the target tumour cells to deliver the drug. However, a group of researchers from Japan led by Dr. Kodule Kusamori and Professor Makiya Nishikawa from Tokyo University of Science, had to face an obstacle while experimenting with the MSCs. It was observed that these MSCs had a certain limit to their anti-cancer drug-carrying capacity and in order to overcome this dilemma, they used a method to modify the MSCs where cellular lipid bags called liposomes were used to carry the anti-cancer drugs to the surface of the mesenchymal cells. This method is popularly known as the 'avidin-biotin complex' (ABC) method. The anti-cancer drug used in their experiment on lab-grown mice with colon cancer was 'Doxorubicin', hence the name 'DOX-Lips' was given to these lipid bags. This method proved effective as the modified MSCs now efficiently carried and delivered the drug to the cancer cells. They further went on to test the competency of the new MSCs with other organ cancers in mice, and researchers successfully confirmed that the modified MSCs could entirely suppress the tumour growth in other types of cancer cells as well. This method is faster than any formerly known methods as the attachment process of the cells to cancer cells is not hindered, thus ensuring maximum proficiency. Furthermore, it contradicts the prior observations of using only a standard size of lipid bags for drug delivery as the present observations demonstrated that the size of the bags did not influence the drug delivery in any way; therefore, ensuring maximum utilisation of lipid bags and MSCs to deliver anti-cancer drugs to targeted cancer cells. The group of researchers who worked on these MSCs guarantee that these modified stem cells have the ability to even migrate to brain tumours and minuscule cancer lesions and thus prove effective over incurable cancers. Hence, further studies and improvements would help in enhancing our understanding of this potential and hopeful leap in cancer research.

Keywords: Cancer cells, Anti-cancer, Drug delivery, Stem cells, Lipid bags, Liposomes

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