**ML 09-18 (27/02/2018)**

Artif Cells Nanomed Biotechnol. 2018 Feb 19:1-11. doi: 10.1080/21691401.2018.1434185. [Epub ahead of print]

# Nano-loaded human umbilical cord mesenchymal stem cells as targeted carriers of doxorubicin for breast cancer therapy.

Cao S[1], Guo J[1], He Y[2], Alahdal M[1], Tang S[1], Zhao Y[1], Yang Z[1], Gao H[1], Hu W[1], Jiang H[2], Qin L[3], Jin L[1].
Author information

**Abstract**

The main challenge of anticancer drugs is poor tumor targeting. Now cellular carriers are widely investigated to deliver anticancer agents. As an ideal cellular candidate, human umbilical cord derived mesenchymal stem cells (hUC-MSCs) possess inherent tropism potential to tumor. Here, we constructed hUC-MSCs carrying transferrin-inspired-nanoparticles that contain doxorubicin(hUC-MSCs-Tf-inspired-NPs) to achieve enhanced anti-tumor efficacy and made an evaluation. Results represented that hUC-MSCs-Tf-inspired-NPs not only exhibit the controlled-release property of Tf-inspired-NPs, but also integrate tumor tropism and penetrative abilities of MSCs. The tumor volume of nude mice bearing breast cancer MCF-7 treated with hUC-MSCs-Tf-inspired-NPs, was remarkably reduced compared to those treated with free drug or Tf-inspired-NPs. Thus, Tf-inspired-NPs loaded hUC-MSCs have a potential to deliver anticancer drugs.

Artif Cells Nanomed Biotechnol. 2018 Feb 19:1-11. doi: 10.1080/21691401.2018.1434185. [Epub ahead of print]

# Nano-loaded human umbilical cord mesenchymal stem cells as targeted carriers of doxorubicin for breast cancer therapy.

Cao S[1], Guo J[1], He Y[2], Alahdal M[1], Tang S[1], Zhao Y[1], Yang Z[1], Gao H[1], Hu W[1], Jiang H[2], Qin L[3], Jin L[1].
Author information

**Abstract**

The main challenge of anticancer drugs is poor tumor targeting. Now cellular carriers are widely investigated to deliver anticancer agents. As an ideal cellular candidate, human umbilical cord derived mesenchymal stem cells (hUC-MSCs) possess inherent tropism potential to tumor. Here, we constructed hUC-MSCs carrying transferrin-inspired-nanoparticles that contain doxorubicin(hUC-MSCs-Tf-inspired-NPs) to achieve enhanced anti-tumor efficacy and made an evaluation. Results represented that hUC-MSCs-Tf-inspired-NPs not only exhibit the controlled-release property of Tf-inspired-NPs, but also integrate tumor tropism and penetrative abilities of MSCs. The tumor volume of nude mice bearing breast cancer MCF-7 treated with hUC-MSCs-Tf-inspired-NPs, was remarkably reduced compared to

those treated with free drug or Tf-inspired-NPs. Thus, Tf-inspired-NPs loaded hUC-MSCs have a potential to deliver anticancer drugs.

Theranostics. 2018 Jan 1;8(4):906-920. doi: 10.7150/thno.20746. eCollection 2018.

# Mesenchymal Stromal/stem Cell-derived Extracellular Vesicles Promote Human Cartilage Regeneration In Vitro.

Vonk LA[1], van Dooremalen SFJ[2,3], Liv N[2], Klumperman J[2], Coffer PJ[2,3], Saris DBF[1,4,5], Lorenowicz MJ[2,3].

**Author information**

## Abstract

Osteoarthritis (OA) is a rheumatic disease leading to chronic pain and disability with no effective treatment available. Recently, allogeneic human mesenchymal stromal/stem cells (MSC) entered clinical trials as a novel therapy for OA. Increasing evidence suggests that therapeutic efficacy of MSC depends on paracrine signalling. Here we investigated the role of extracellular vesicles (EVs) secreted by human bone marrow derived MSC (BMMSC) in human OA cartilage repair.

*METHODS:*

To test the effect of BMMSC-EVs on OA cartilage inflammation, TNF-alpha-stimulated OA chondrocyte monolayer cultures were treated with BMMSC-EVs and pro-inflammatory gene expression was measured by qRT-PCR after 48 h. To assess the impact of BMMSC-EVs on cartilage regeneration, BMMSC-EVs were added to the regeneration cultures of human OA chondrocytes, which were analyzed after 4 weeks for glycosaminoglycan content by 1,9-dimethylmethylene blue (DMMB) assay. Furthermore, paraffin sections of the regenerated tissue were stained for proteoglycans (safranin-O) and type II collagen (immunostaining).

*RESULTS:*

We show that BMMSC-EVs inhibit the adverse effects of inflammatory mediators on cartilage homeostasis. When co-cultured with OA chondrocytes, BMMSC-EVs abrogated the TNF-alpha-mediated upregulation of COX2 and pro-inflammatory interleukins and inhibited TNF-alpha-induced collagenase activity. BMMSC-EVs also promoted cartilage regeneration *in vitro*. Addition of BMMSC-EVs to cultures of chondrocytes isolated from OA patients stimulated production of proteoglycans and type II collagen by these cells.

*CONCLUSION:*

Our data demonstrate that BMMSC-EVs can be important mediators of cartilage repair and hold great promise as a novel therapeutic for cartilage regeneration and osteoarthritis