Egfr in the hct-116 line of human colorectal cancer cells.

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Abstract

Aquaporins, which are channel proteins that create pores in the membrane of biological cells to aid in the movement of water across epithelial and transcellular barriers, The function of aquaporins in the development of cancer has attracted attention. In this study, we sought to determine how the expression of the aquaporin 5 and EGFR genes in the HCT-116 tumour cell line was impacted by exosomes secreted by adipose-derived mesenchymal stem cells. Utilizing particular markers, the surface antigenic profile of Ad-MSCs was assessed. Exosomes were isolated from the Ad-MSc supernatant and then purified. Western blot and transmission electron microscopy (TEM) were used to evaluate the exosomes' quality and shape.For 48 hours, MSC-conditioned medium (MSC-CM) and/or 100 g/ml of MSC-derived exosomes were co-cultured with HCT-116 cells. To ascertain the expression of aquaporin5 and EGFR in HCT-116, real-time PCR was used. Utilizing, relative expression levels were computed. Our findings demonstrated that CM and/or exosome-treated HCT116 had significantly lower levels of AQP5 and EGFR mRNA than the control group. The current study demonstrated that two crucial molecules involved in the development of tumours could be inhibited by exosomes produced by MSCs. Therefore, it would seem that exosomes made from MSCs have a promising future as drug delivery systems and require more research.

Keywords: Cancer cell, EGFR mRNA, Tumor cell.

Introduction

In the world, colorectal cancer (CRC) is the second most lethal cancer for both men and women, and by 2030, it is predicted that the global burden of CRC will surpass the number of new cases and fatalities. According to studies, CRC development is influenced by a number of factors, including genetics, age, smoking, obesity, an unhealthy diet, and physical inactivity. Surgery and chemotherapy administered after the tumour has been completely removed is the standard treatment for CRC. However, the majority of CRC cases are discovered at an advanced stage with metastases to other organs, such as the liver, which makes surgical intervention challenging and ultimately leads to tumor-related deaths [1].

Additionally, after surgery and subsequent chemotherapy, patients eventually experience a recurrence of the tumour. Therefore, it appears essential for colorectal cancer therapy to identify the underlying molecular mechanisms of colorectal cancer metastasis. According to numerous studies, AQP dysregulation is a major factor in a number of pathophysiological conditions, including cancer. Indeed, in a variety of tumours, including colon, ovarian, brain, lung, and pancreatic cancers, expression is positively correlated with tumour types, grades, proliferation, migration, angiogenesis, etc. As a result, AQPs have emerged as an intriguing concept in cancer research, particularly as targets for diagnostic and therapeutic interventions in cancer therapy [2-3].

MSCs can also move to an inflammatory or tumour site and exhibit significant immune modulation. One of the basic immunomodulatory mechanisms used by MSCs is exosome release. Exosomes are membrane-bound Nano vesicles that are secreted by a variety of cell types. These tiny vesicles are referred to as intercellular communication vehicles because they transport proteins, lipids, nucleic acids, and other materials between cells. Although a number of studies have indicated that mesenchymal stem cells' exosomes may one day be used to treat cancer, there is currently little information available on the impact of MSCs' exosomes on the development of colorectal cancer. As a result, the current study examined how aquaporin 5 and EGFR expression were affected by MSCs-derived exosomes in human colon carcinoma cell lines [4].

Anti-human antibodies, such as anti-CD81 and anti-CD63 antibodies, were also used to label the purified exosomes for flow cytometric analysis (both antibodies were purchased from Bioscience). With the aid of a FACSCalibur flow cytometer, the analysis was completed. The exosomes were diluted in PBS and Tween to examine the size distribution of the exosomes. Zetasizer Nano's dynamic light scattering (DLS) technology was used to determine their size (Malvern Instruments, UK). More thorough studies are needed to

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examine the contents of these exosomes. The results of this study could be used to create new anti-cancer treatments for colorectal cancer in the future. It is necessary to conduct more research in order to establish a standard because the MSC's source and the culture environment may both influence the characteristics of the released exosomes isolation [5].

Conclusion

The current study concluded by demonstrating that two key molecules involved in tumour progression can be inhibited by exosomes produced by mesenchymal stem cells. As a result, it appears that MSCs-derived drug delivery systems have a promising future and merit further study.

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