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ISSN: 2157-7633
Journal of
Stem Cell Research
& Therapy

Short Communication

# Aptamer-Based Stem Cell Sorting Technology in Regenerative Medicine

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## DESCRIPTION

Until now, regenerative medicine has focused mainly on the in-depth study of the pathological mechanism of diseases, the further development and application of new drugs, and tissue engineering technology strategies. The development of aptamers has enhanced tissue engineering technology's application components, added to the development processes and types of new pharmaceuticals, and given regenerative medicine a new lease on life. As a foundation for the design and use of aptamers in long-term transformation, the role and application status of aptamers screened in recent years in diverse tissue regeneration and repair are examined [1]. The opportunities and limitations of aptamer technology are also highlighted.

Recently, aptamers have been included into a number of regenerative medicine approaches, showing great promise for tissue regeneration and disease treatment.

The gathering and sorting of different stem cells is the main challenge in external stem cell transplantation. Flow cytometry, immunomagnetic bead sorting, and solid surface sorting strategies based on variations in cell adhesion are examples of traditional cell sorting techniques. The immunological concept of antibodies serves as the foundation for the first two techniques. Cell viability and biological features, however, are frequently impacted by antibody binding, fluid shear stress, therapy of associated enzymes, temperature variations, and electrical and chemical stimulation during sorting procedures. They finally start to tremble [2].

The development of SELEX technology, which is based on cell- or cell-specific markers, has made it possible to sort target cells using aptamers. It benefits from low production costs, good resistance to enzymatic hydrolysis, excellent purity, high effectiveness, and minimal cell-harming properties. Numerous aptamers with excellent affinity and specificity for distinct types of progenitor cells have been discovered over the past ten years. These include O-7 (binds human osteoblasts), G-8 (binds adult mesenchymal stem cells), aptamer 36 (for CD31-positive cells in pig peripheral blood), specific binding aptamers of purified human CD31 extracellular domain, specific RNA aptamers (L1-65, L2-2, and L3-3 binding to mouse embryonic stem cells (mESCs), and DNA aptamers ((Aptamer-74) for osteoblast progenitors present in human jaw membrane cell population) [3]. They have demonstrated the capacity to isolate and enrich corresponding stem cells from bone marrow, whole blood, and other cell suspensions, pointing to the possibility of using them to collect exogenous stem cells prior to transplantation and to modify the surface of biomaterials to aid in tissue regeneration [4]. Recently a scientist named de Melo used Adipose-Derived Stem Cells (ASCs) from human adipose tissue and fibroblasts from skin tissue as screening targets and used Cell-SELEX and quantitative PCR technology to screen and identify an aptamer named Apta99. The aptamer is anticipated to be an effective tool in ASC purification and therapeutic applications since it can distinguish ASCs from fibroblasts and exhibits a low affinity for fibroblasts [5].

## CONCLUSION

As a result, aptamers are used in stem cell techniques for regenerative medicine as a new cell sorting tool, cell chemoattractant, and cell trapping agent. Aptamers are easier to manipulate and connect with tissue engineering scaffolds than the standard application elements modelled by active protein molecules and have superior *in vivo* flexibility and cell sorting effectiveness. There are, however, no records of human experimentation.

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**Received:** 01-Sep-2022, Manuscript No. JSCRT-22-18179; **Editor assigned:** 05-Sep-2022, PreQC No. JSCRT-22-18179 (PQ); **Reviewed:** 20-Sep-2022, QC No. JSCRT-22-18179; **Revised:** 27-Sep-2022, Manuscript No. JSCRT-22-18179 (R); **Published:** 04-Oct-2022, DOI: 10.35248/2157-7633.22.12.555

**Citation:** Enricho B (2022) Aptamer-Based Stem Cell Sorting Technology in Regenerative Medicine. J Stem Cell Res Ther. 12:555.

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