

MEDIPOST

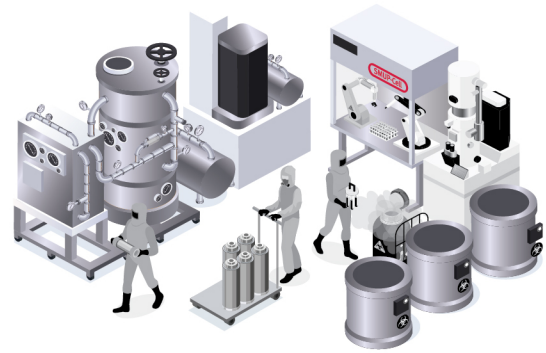
The Best Stem Cell Everyone Wants

SMUP-Cell

Next-generation stem cell technology platform

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Next-generation stem cell platform overcoming existing limitations



SMUP-Cell

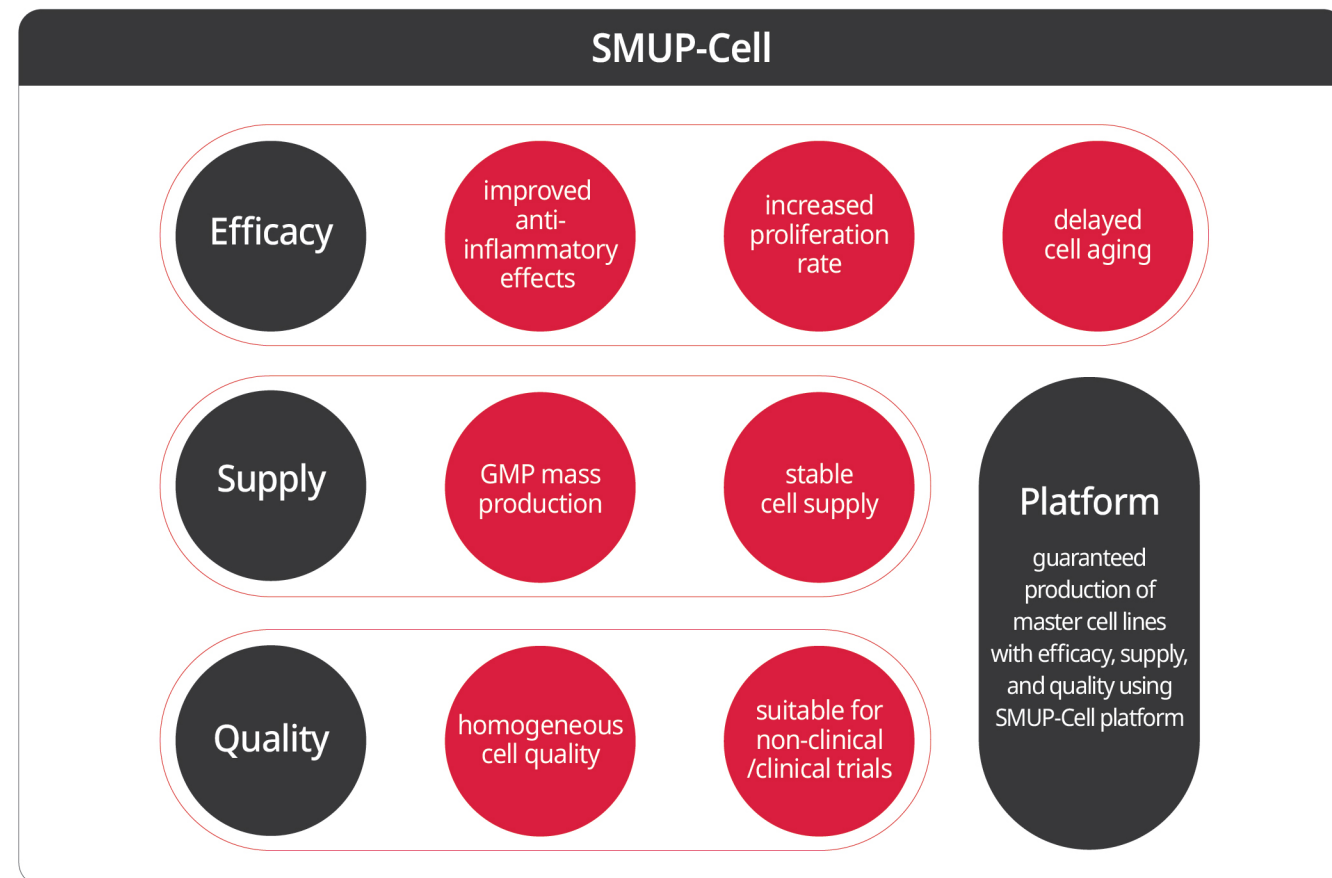
(Next-generation stem cell platform)

Technology for the selection of best cells (**S**Small cell) + Maintenance of stem cell properties during repeated subcultures (**U**ltra **P**otent) + Establishment of conditions for a commercial mass stem-cell production technology (Scale **U**P)

Establishment of a **high-efficiency and low-cost cell culture platform to overcome the limitations associated with commercialization and increase competitiveness in global market**

- Selection of small-sized, highly potent stem cells
- Application of culture methods to maintain stem cell characteristics
- Reduced production costs and improved quality control by using bioreactors and downstream process equipment
- Developed as a frozen form by using a xeno-free freezing reagent for convenient transportation and storage

Why do we highly recommend SMUP-Cell?



High utility with applicability for various purposes

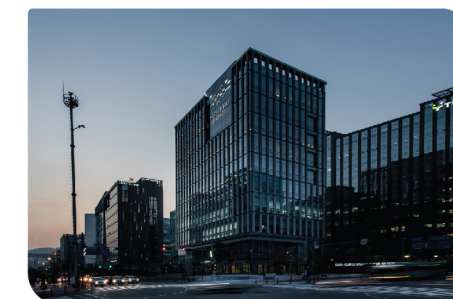
Applications and values of SMUP-Cell

Applications	Values
Stem cell therapeutics platform	<ul style="list-style-type: none"> · Production of cells with high-quality and high-potency for clinical trials · Reduced time and economic costs through consignment production · Acceleration of clinical progress through GMP cell production · Safety and reliability of cell therapy products established through in-house development experience and clinical trials
Gene modified cell therapeutics	<ul style="list-style-type: none"> · Stable supply of homogeneous cells · Cost reduction by using cells with excellent proliferative capacity · Enhanced effects by using cells with excellent anti-inflammatory ability · Platform loaded with disease-specific efficacy factors
Exosome therapeutics/ quasi-drugs	<ul style="list-style-type: none"> · Stable supply of homogeneous cells and culture medium · Cost reduction by using cells with excellent proliferative ability · Isolation of high-quality, high-purity, and high-efficiency exosomes · Platform for delivery of therapeutic drugs
Diagnostics	<ul style="list-style-type: none"> · Establishment and evaluation of in vitro environments mimicking diseases · Stable supply of homogeneous cells · Improved reliability of results by using homogeneous cells



We recommend SMUP-Cell to researchers and developers who wish to

- Secure source stem cells with high potency and efficiency
- Conduct joint research using SMUP-Cell (e.g. genes, exosomes)
- Produce cells using SMUP-Cell platform
- Have a stable supply of stem cells that meet the standards for use in clinical trials
- Support clinical research for advanced regenerative medicine
- Use homogeneous stem cells without cell-to-cell variations
- Evaluate the use of SMUP-Cell with creative ideas



Life-Changing INNOVATIONS

We are waiting for creative partners to work with MEDIPOST

Biotechnology Research Institute
Innovation Research Team

· E-mail : innovation@medi-post.co.kr

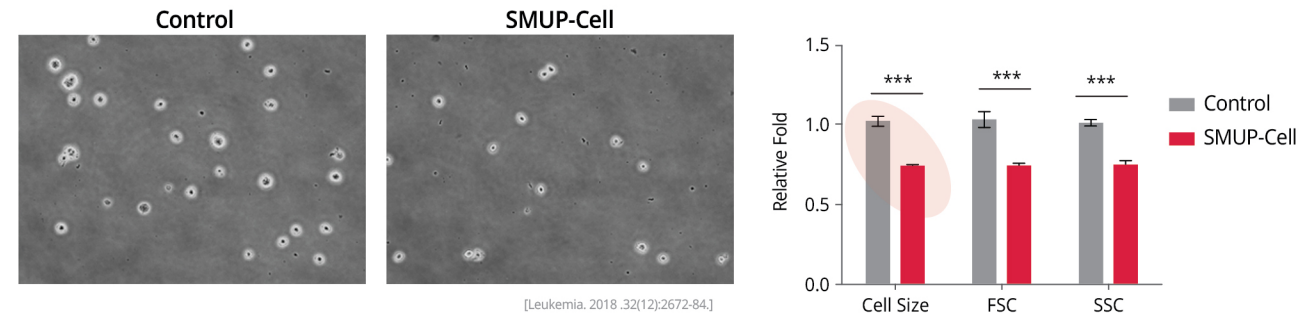


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Distinguished stem cells with high efficacy

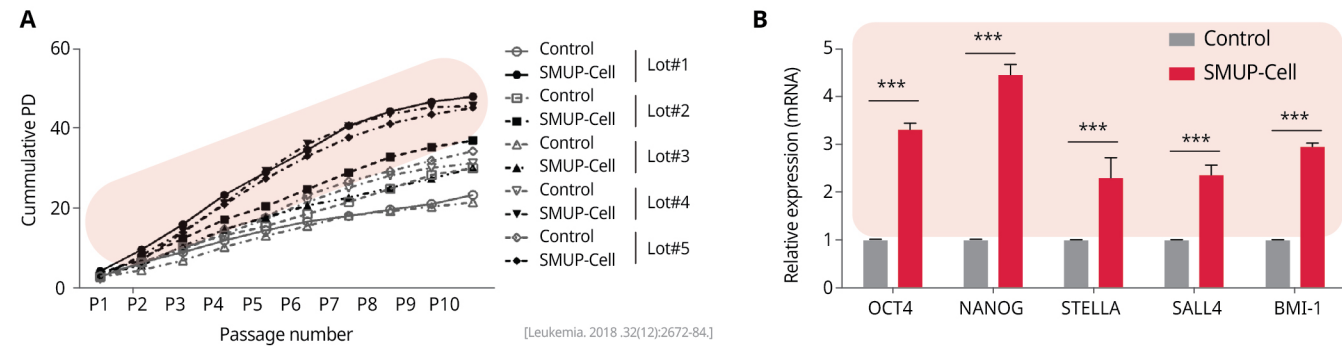
Result 1 Selection/Maintenance of small-sized cells in SMUP-Cell

· Compared to MSC on general culture condition, SMUP-Cell selected with small-sized cells more successfully maintained the cell size significantly (***) $p < 0.001$.



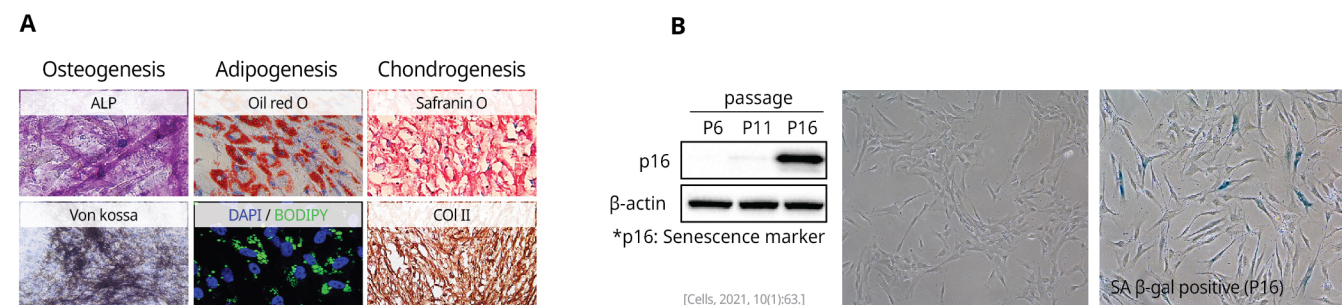
Result 2 Enhancement in the growth rate of SMUP-Cell

· Compared to MSC on general culture condition, SMUP-Cell showed higher cell proliferation capacity with maintaining stable stem cell characteristics (A) and significantly increased expression levels related to stem cell properties, such as OCT4, NANOG, STELLA, SALL4, and BMI-1 (B) (***) $p < 0.001$.



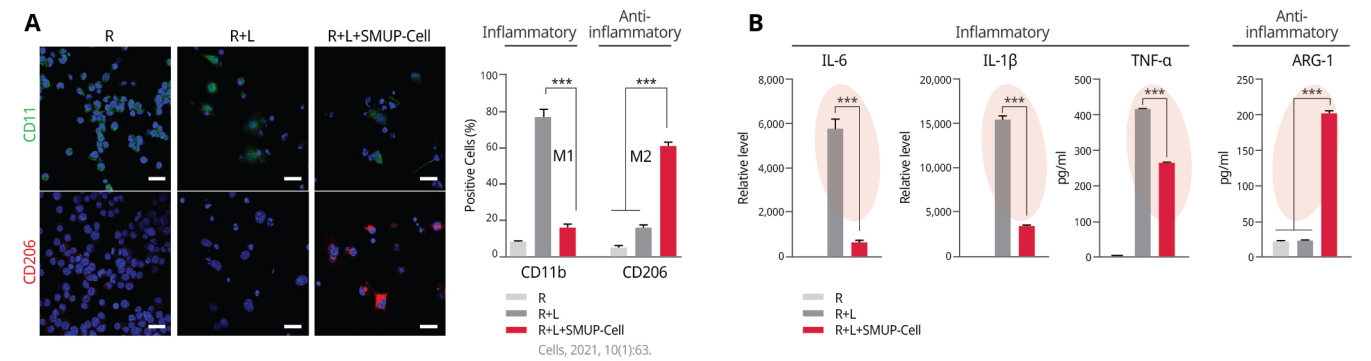
Result 3 Maintenance of stem cell characteristics and delayed cell aging in SMUP-Cell

· SMUP-Cell maintained stem cell properties (differentiation potential) (A) and delayed aging of cells until late passage (B).



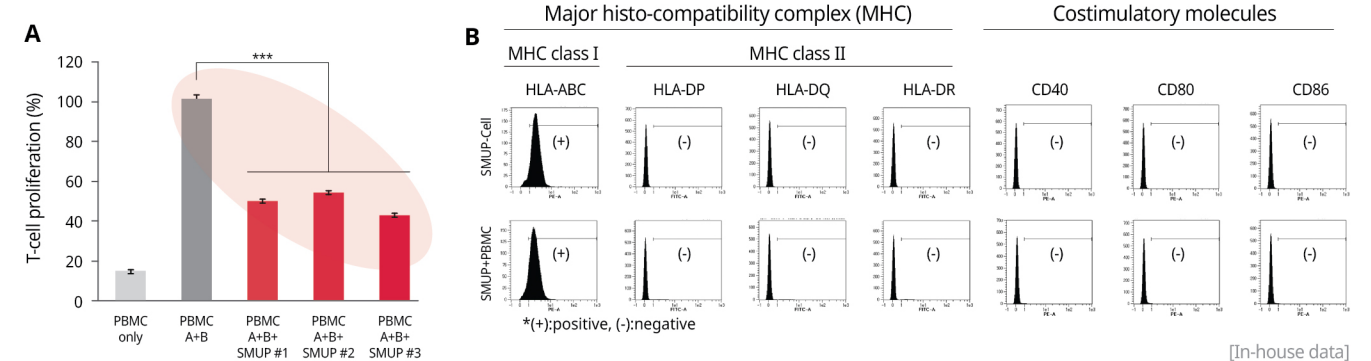
Result 4 Anti-inflammatory effects of SMUP-Cell

· SMUP-Cell significantly reduced the expression levels of inflammatory M1 markers (CD11b) and cytokines (IL-6, IL-1 β , TNF- α), the levels of which increased in the lung macrophages of rats with inflammation. In contrast, the expression of anti-inflammatory M2 markers (CD206) and cytokines (ARG-1) increased significantly (***) $p < 0.001$.



Result 5 Inhibition of immune cell activity by SMUP-Cell

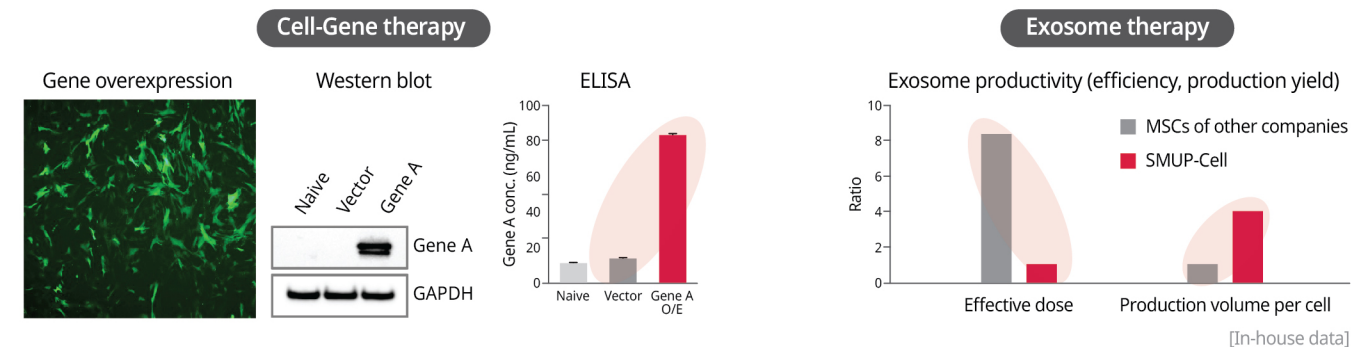
· SMUP-Cell inhibited immune cell activity via modulating the immune response (A: MLR response, B: cell surface antigen expression) (***) $p < 0.001$.



Result 6 Excellence of SMUP-Cell as a stem cell platform

· Loading of a specific gene onto SMUP-Cell leads to excellent overexpression efficiency.

· SMUP-Cell leads to higher exosome productivity (efficiency, production yield) than the case for exosomes produced from MSCs of other companies



Scientifically proven cellular excellence

Patent registration for SMUP-Cell

Title of invention	Country of registration
Method for culturing mesenchymal stem cells	Rep. of Korea
	USA, China, Japan, India, Europe, Canada Australia
Method for culturing mesenchymal stem cells according to cell size	Rep. of Korea
	USA, China, Japan, India, Europe, Canada, Australia
Pharmaceutical composition for the prevention or treatment of a lung disease comprising mesenchymal stem cells having improved proliferation and differentiation capacity	Rep. of Korea
	USA
PHARMACEUTICAL COMPOSITION COMPRISING MESENCHYMAL STEM CELLS EXPRESSING PTX-3, TIMP1 AND BDNF FOR PREVENTION OR TREATMENT OF INFLAMMATORY DISEASE OR PAIN	Rep. of Korea

Published Papers for SMUP-Cell



- Choi W et al, Optimization of culture conditions for rapid clinical-scale expansion of human umbilical cord blood-derived mesenchymal stem cells. Clin Trans Med, 2017, 6(1):38.
- Jin HJ et al, Small hypoxia-primed mesenchymal stem cells attenuate graft-versus-host disease. Leukemia, 2018, 32(12):2672-2684.
- Kim M et al, A Small-Sized Population of Human Umbilical Cord Blood-Derived Mesenchymal Stem Cells Shows High Stemness Properties and Therapeutic Benefit. Stem Cells Int, 2020, 2020:5924983.
- Kwon JH et al, Senescence-Associated Secretory Phenotype Suppression Mediated by Small-Sized Mesenchymal Stem Cells Delays Cellular Senescence through TLR2 and TLR5 Signaling. Cells, 2021, 10(1):63.
- Lee M et al, PTX-3 Secreted by Intra-Articular-Injected SMUP-Cells Reduces Pain in an Osteoarthritis Rat Model. Cells. 2021, 10(9):2420

Optimized cells for research and non-clinical/clinical trials

SMUP-Cell production at a GMP cell therapy facility

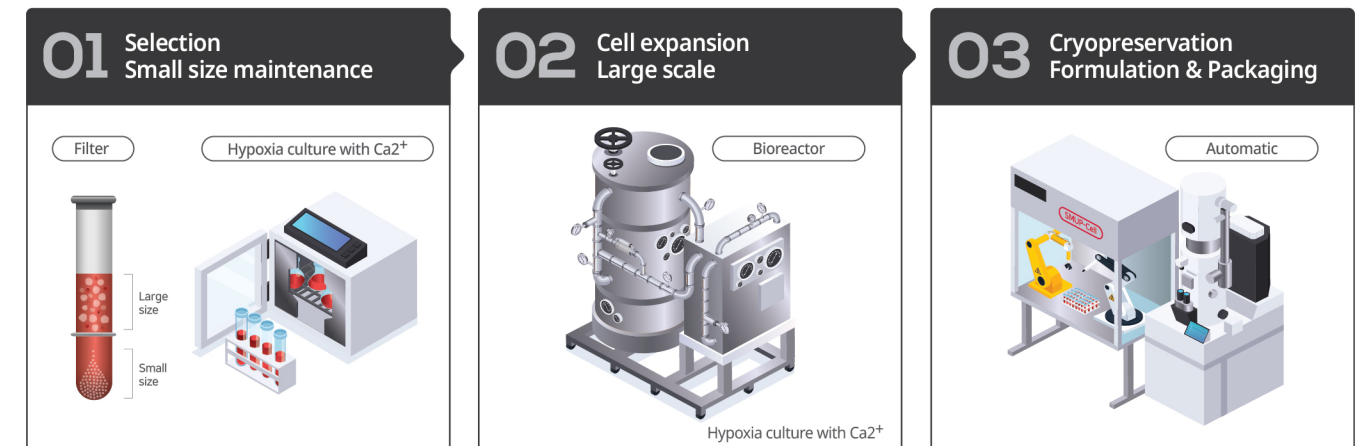


Cell therapy facility with GMP standards and large-scale production capability

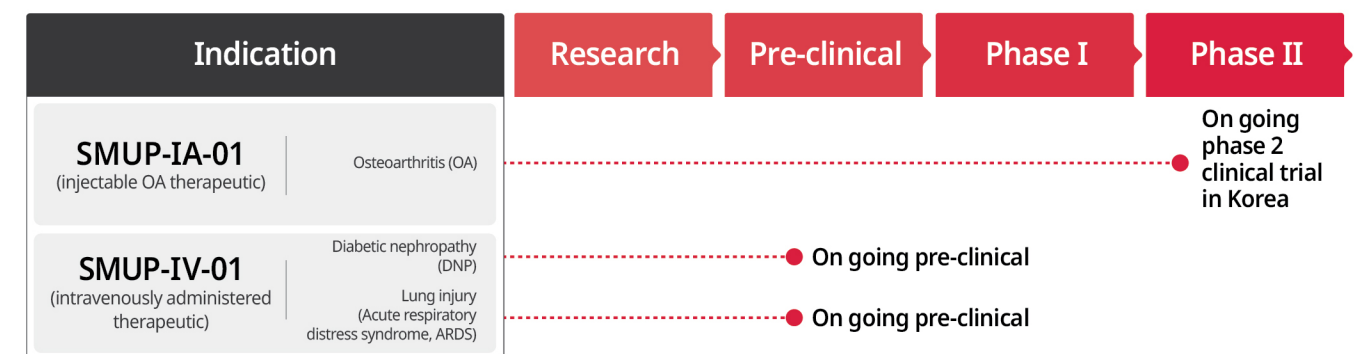
Production of cells through systematic management in a pharmaceutical manufacturing facility that meets the GMP standards of the Ministry of Food and Drug Safety and Pharmaceutical Inspection Co-operation Scheme



Production through SMUP-Cell platform manufacturing process



Applied to MEDIPOST's stem cell therapeutic pipeline



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