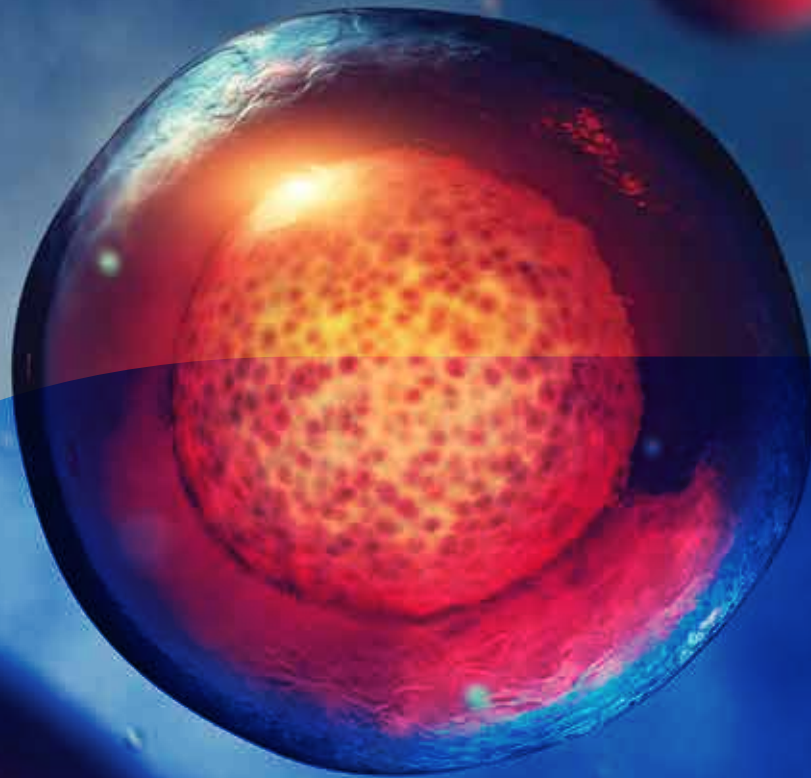




The Promising
'Stem Cell Technology'

SMART M-CELL

Bone Marrow and Blood **Stem Cell Collecting System**

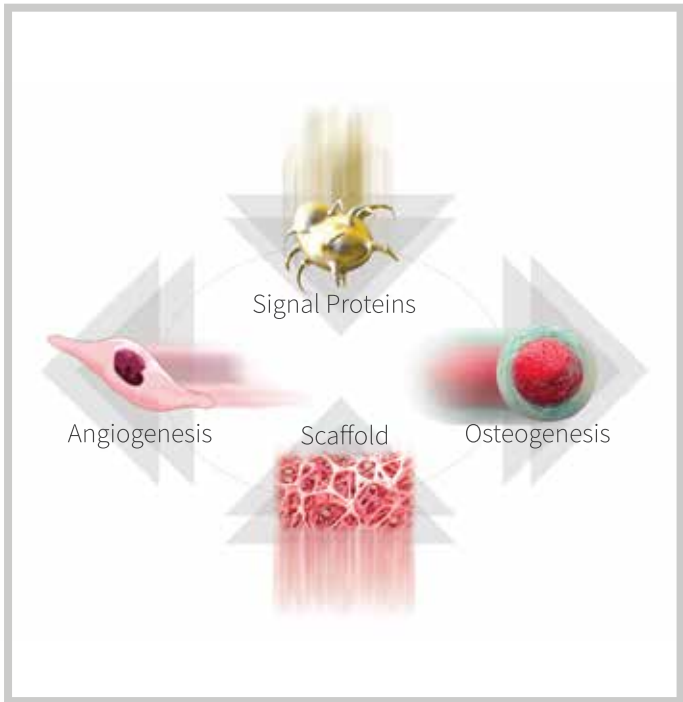


FDA / KFDA / CE



BONE MARROW STEM CELL

All bone formation is determined by endothelial cells, hematopoietic stem cells, mesenchymal stem cells, and their supporting accessory cells recruited at defective sites. Autologous bone marrow stem cells can be the best choice in bone grafting. Bone marrow extracted from the iliac crest is an optimal source of regenerative cells for angiogenesis, bone formation and healing.



Endothelial Progenitor Cells

Stimulate angiogenesis, release BP-2, and BP-6, and up-regulate the production of BP-2

Hematopoietic Stem Cells

Orchestrate bone formation and directly convert to stromal stem cells (CD34+)

Mesenchymal Stem Cells

Convert to osteoblasts in support of the new bone formation

Platelets

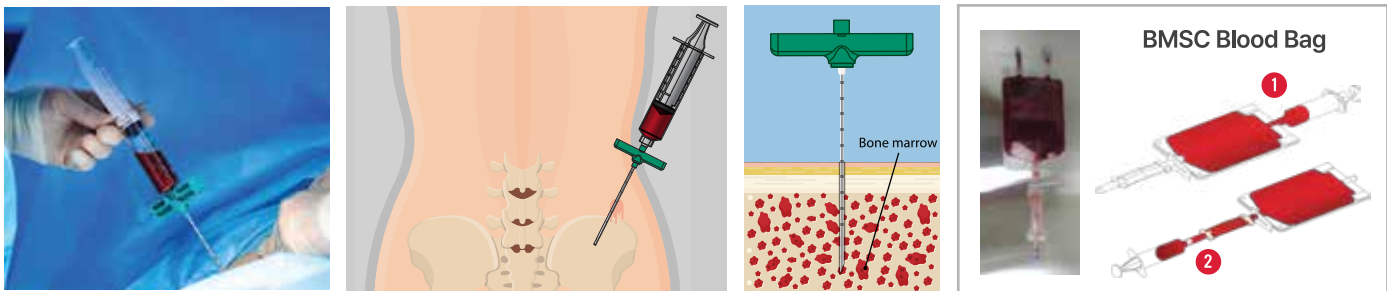
Mediate cell-to-cell adhesion through the release of various adhesion and growth factors such as SDF-1a

Lymphocytes

Support the migration and proliferation of Endothelial progenitor cells

Granulocytes

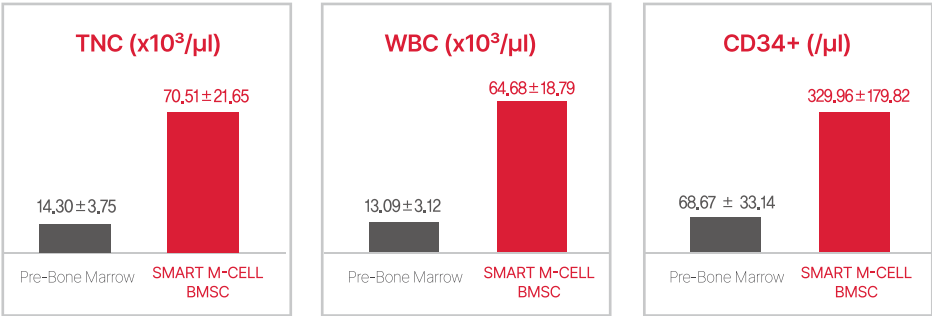
Release vascular endothelial growth factors in support of angiogenesis



Total Cell Analysis Comparison

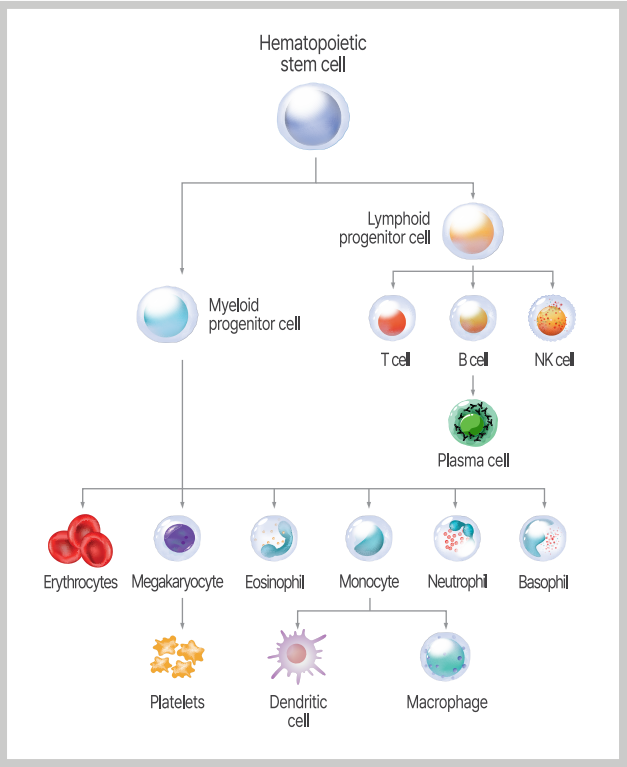
(N=10)

Division	Pre-Bone Marrow	SMART M-CELL BMSC
TNC (x10 ³ /μl)	14.30 ± 3.75	70.51 ± 21.65
WBC (x10 ³ /μl)	13.09 ± 3.12	64.68 ± 18.79
CD34+ (/μl)	68.67 ± 33.14	329.96 ± 179.82



BLOOD STEM CELL

Effective cell therapy requires support for cell migration, progenitor cells that can be converted to bone or soft tissue, and signaling proteins to regulate recovery and regeneration processes. SMART M-CELL provides cells optimized for tissue regeneration and key biological cells, a rich source of protein.



Stem cell

CD34+(Stem Cell Marker) must exist to be clinically effective.

WBC

Sufficient levels of white blood cells are essential for antibodies to prevent infection.

Unlike other devices, the patented separation technology of SMART M-CELL2 reduces granulated WBC and produces more mononuclear cell components. It reduces inflammatory responses and increases the proportion of stem cells relatively.

Growth Factors

Platelet-Derived Growth Factors (PDGF)

Chemo-attractive for stem cells and endothelial cells.

Epidermal Growth Factor (EGF)

Promote cell proliferation, skin graft, wound recovery.

Vascular Endothelial Growth Factors (VEGF)

Stimulates angiogenesis and chemoattractant for osteoblasts.

Platelet

Contains α-granules and responsible for hemostatic processes, stimulates stem cells, and has healing abilities.

Total Cell Analysis Comparison

(N=15)

Division	Blood	SMART M-CELL BSC
Viability (%)	99.5±0.4	99.5±0.2
TNC (x10 ³ /μl)	4.67±1.12	14.53±4.04
Platelets (x10 ³ /μl)	275.0±56.3	1,106.6±225.7
WBC (x10 ³ /μl)	5.3±1.2	15.6±4.6
Lymphocytes (x10 ³ /μl)	1.8±0.4	8.9±2.1
Mononuclear (%)	41.6±6.17	70.48±10.64
Granulocyte (%)	58.40±6.17	29.52±10.64
CD34+ (/μl)	1.84±0.9	11.22±4.7

Cytokine Analysis Comparison

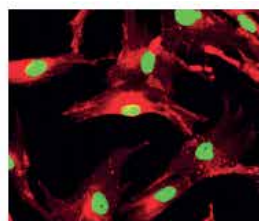
(N=15)

Division (pg/ml)	Blood	SMART M-CELL BSC
PDGF-AB	949±593	24,970±21,404
EGF	27.17±18.7	567.19±665.9
VEGF	26.35±18.08	425.51±499.71
IFN-gamma	47.98±11.14	628.15±300.71

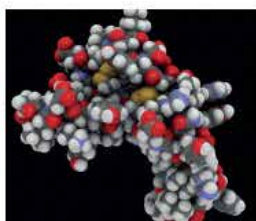
Miracell's Stem Cell Collecting Technology

Our body has a natural healing ability but the power of cells is necessary. If we can collect stem cells to be dispersed throughout the body and place them where healing is needed, the healing process will be shortened.

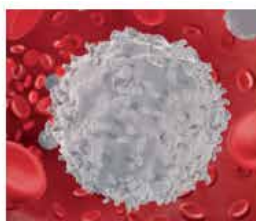
Our technology is to extract living stem cells and growth factors specialized for regeneration and offer the safest autologous stem cell therapy in the world.



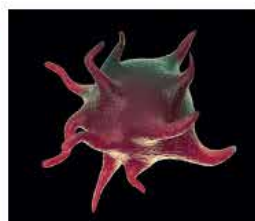
Stem Cell



Growth Factors



WBC

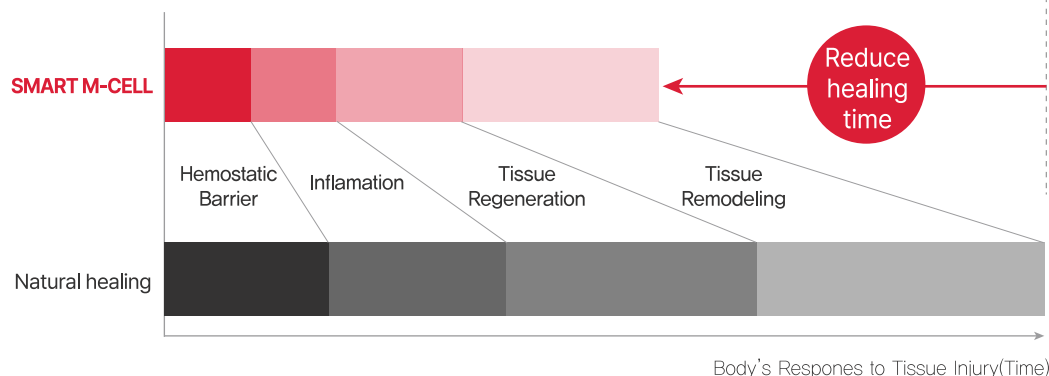


Platelet



SDF-1α

Stem cells reduce healing processes



| Clinical check points for Stem Cells

SDF-1α

SDF-1α plays an important role in angiogenesis by recruiting endothelial progenitor cells (EPCs) from the bone marrow.

P-selectin value

P-selectin plays an important role in the recruitment of leukocytes (white blood cells) and platelets to the site of injury. Thus, low p-selectin value (Inactivated) is important in treatment.

CD34+

CD34 is a common marker for identifying human hematopoietic stem cells. HSCs can be found in bone marrow, peripheral blood, and umbilical cord blood.

Coefficient of variation

CV shows the variability in relation to the mean of the population. Thus, it is important to have low, constant CV values for reliable treatment

WBC

White blood cells are the cells of the immune system that are involved in protecting the body against both infectious disease and foreign invaders. Unlike other centrifugal machines, Miracell's patented Smart M-Cell enhanced the therapeutic effects and lowered the inflammatory responses by decreasing the number of granulocytes and increasing the number of monocytes during centrifugation.

Know-how for Living Deactivated Cells

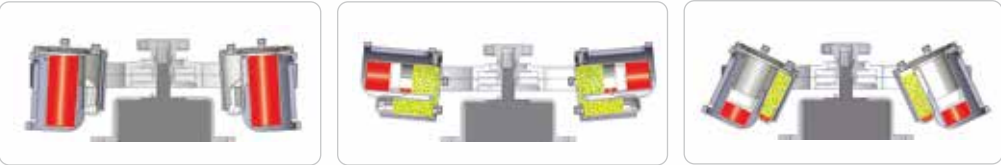
SMART M-CELL is designed to keep most of the cells alive.
The best cell quality gives the best treatment results.

1. Auto-Rotation

The spinning rotor and basket adjust RPM and angles automatically to provide precise isolation and concentration of cells.

2. Double Separate Rotation

First rotation separates RBCs first to prevent stem cell activity concentrates cells that are directly involved in tissue regeneration.



3. Touch Screen and Voice Guide

Intuitive and convenient touch screen and voice guide for the whole process.

4. LED Visible Light

Frequent/Multiple Choice Available



Type	Blue 460mn ~ 475mn	Green 525mn ~ 530mn	Yellow 585mn ~ 590mn	RED 660mn
Characteristic	•Natural purification effect	•Increased immune response	•Improves lymph and blood circulation	•Helps cell growth and collagen formation
Where to Use	•Circulatory system, anti-aging procedures •Inhibits skin acn proliferation	•Improves immunity, liver function •Inhibits skin pigment	•Circulatory system, anti-aging procedures	•Orthopedic procedures •Derma lifting procedures

* Provide option to choose or change the appropriate wavelength for treatment to increase the activity of cells and growth factors.

SMART M-CELL2



Know-how for Clinically Valid Total Cells



Specific Gravity and Time Control

SMART M-CELL is not only accelerating the stem cell migration to the wound but it's also promoting the proliferation in microenvironments by selective separated concentrated cells.

1. Isolation Valve

The patented isolation valve is designed to calculate the density of the cells in the blood and bone marrow to prevent damage caused by intercellular friction and to maintain inactivation before treatment.

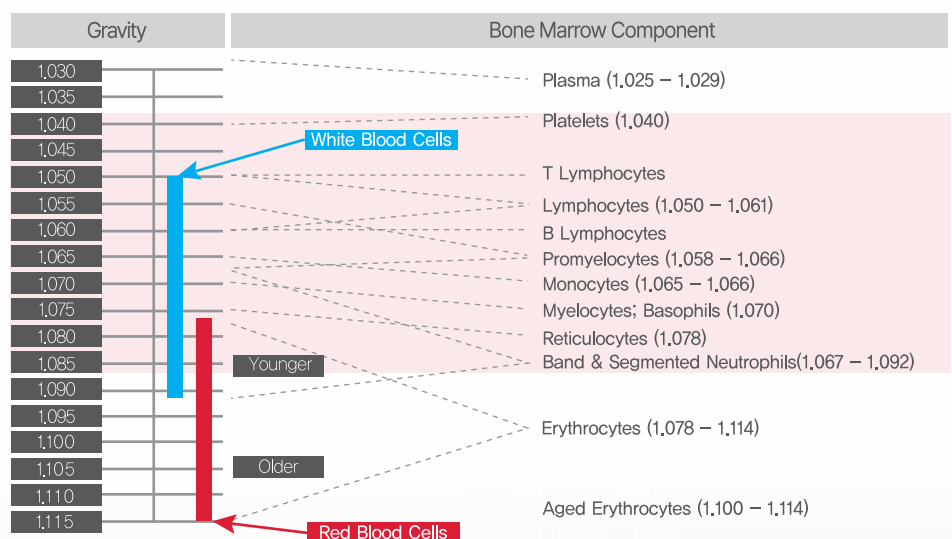
2. Separated Structure

Minimizes cell damage by dividing pre-separated red blood cells and stem cells into separate spaces.

3. Rounded Structure

The rounded structure is designed to eliminate the loss or waste of cell members to be used for treatment.

Due to the different density of nucleated cells in bone marrow and blood, the specially designed isolation valve for each type allows accurate separation and concentration of nucleated cells from bone marrow and blood.



SMART M-CELL4



Certification and Patent Status



21 technology patent applications in Korea

3 international patents (PCT) with 15 countries designated & EU



Disposable Kits Information

| BSC (Blood stem cell sterilized disposable kits)



BSC+30

Blood stem cell separate and concentrate kit
Provide 3.5ml from 30ml of whole blood



BSC+60

Blood stem cell separate and concentrate kit
Provide 10ml from 60ml of whole blood



BSC+120

Blood stem cell separate and concentrate kit
Provide 20ml from 120ml of whole blood



BSC+240

Blood stem cell separate and concentrate kit
Provide 40ml from 240ml of whole blood

| BmSC (Bone Marrow stem cell sterilized disposable kits)



BmSC+30

BmSC separate and concentrate kit
Provide 3.5ml from 30ml of Bone Marrow



BmSC+60

BmSC separate and concentrate kit
Provide 10ml from 60ml of Bone Marrow



BmSC+120

BmSC separate and concentrate kit
Provide 20ml from 120ml of Bone Marrow



BmSC+240

BmSC separate and concentrate kit
Provide 40ml from 240ml of Bone Marrow



MIRACELL Webpage



SMART M-CELL AD



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