

# AgeX

EXOSOMES DERIVED FROM  
MESENCHYMAL STEM CELLS



UMBILICAL CORD BLOOD, CELL,  
AND TISSUE CENTER

## WHAT ARE EXOSOMES

Exosomes are nano-sized vesicles, approximately 30–150 nanometers in diameter, about 1/1000 the size of a typical cell. These lipid-membrane-bound vesicles are secreted by all cell types and carry genetic information, growth factors, and proteins. Wikipedia Bioscience Institute+1 PubMed+1

They facilitate intercellular communication by transferring regulatory molecules between neighboring and distant cells. Exosomes hold significant potential in regenerative medicine for cellular repair and regeneration







## MECHANISM OF ACTION OF EXOSOMES

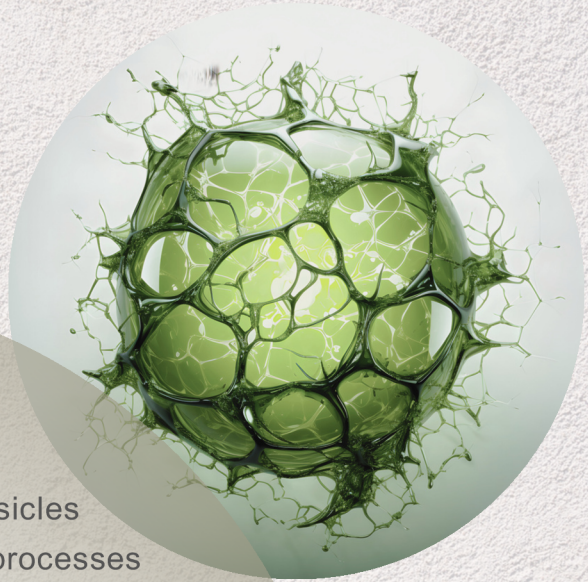
- Enhance intercellular communication by releasing signaling molecules in response to stimuli.
- Transfer genetic information, proteins, and receptors between cells, influencing cellular behavior.
- Exhibit anti-inflammatory effects by suppressing pro-inflammatory proteins and stimulating anti-inflammatory proteins.
- Promote proliferation and migration of fibroblasts, endothelial cells, keratinocytes, and stem cells to injured areas.
- Reduce apoptosis (programmed cell death) in damaged tissues and improve collagen structure for better tissue repair.

## ADVANTAGES OF EXOSOMES

- Lack human leukocyte antigens (HLA), minimizing the risk of immune rejection, making them suitable for allogeneic use.
- Smaller size compared to stem cells, allowing for direct injection without the need for surgery.
- Can be stored long-term under appropriate conditions without structural changes.
- Derived from neonatal umbilical cord tissue, offering higher quality and potential compared to autologous stem cells.
- Capable of being lyophilized (freeze-dried), packaged, and easily transported.
- Can be administered intravenously, intramuscularly, topically, or subcutaneously without the risk of accumulation.







## What Is ExoStem

ExoStem comprises protein vesicles extracted through specialized processes from the culture medium of mesenchymal stem cells (MSCs). This product can modulate cellular and biochemical events involved in skin rejuvenation and cellular regeneration. Bioscience Institute

The growth factors present in ExoStem can accelerate healing processes, reconstruct skin collagen, reduce inflammation, and stimulate hair growth.



## ExoStem Production Process

- Mesenchymal stem cells are cultured from neonatal umbilical cord tissue in specialized culture dishes.
- Dead cell residues are removed from the culture medium, and exosomes are extracted via centrifugation.
- Following quality control tests, the product is packaged in sterile vials and stored under appropriate conditions.





## CLINICAL APPLICATIONS OF EXOSTEM



Effects of MSC-Derived Exosomes on Skin:

Stimulate proliferation and migration of fibroblasts.

Enhance angiogenesis (formation of new blood vessels).

Strengthen the extracellular matrix and collagen storage.

Regulate inflammation and immune responses.

Facilitate tissue regeneration and remodeling.



### Skin Rejuvenation:

Restore skin elasticity and firmness.  
Reduce signs of aging due to impaired  
skin regeneration. Bioscience Institute



### Hair Loss Treatment:

Increase the number of hair follicles in  
the growth phase.  
Regenerate dermal papilla cells  
responsible for hair follicle formation.  
Stimulate hair regrowth in early stages  
of hair loss.  
Initial results appear within 1–2 months,  
with significant changes observed over  
6–12 months.

### Other Dermatological Applications:

Treatment of skin pigmentation disorders.  
Improvement of acne scars.  
Management of atopic dermatitis (eczema).  
Accelerated healing of wounds and burns.



## GROWTH FACTORS IN **EXOSTEM** AND THEIR EFFECTS



GDF15: Regulates inflammation, apoptosis, and cell growth.

GDNF: Enhances neuronal survival and function.

HGF: Facilitates tissue regeneration and wound healing.

IGF1: Stimulates cell growth.

EGF: Promotes cell proliferation and survival.

VEGF: Induces angiogenesis and supports tissue regeneration. ScienceDirect Bioscience Institute





## ExoStem Storage Conditions



24 months at  $-80^{\circ}\text{C}$ .  
6 months at  $-20^{\circ}\text{C}$  to  $-40^{\circ}\text{C}$ .  
1 week at  $+4^{\circ}\text{C}$ .

### Recommendations:

Avoid refreezing after thawing.

Use the thawed product immediately.

Thaw gradually at room temperature or  $+4^{\circ}\text{C}$ .

Each vial is intended for single-patient use only.





Each 5 mL vial contains 5 billion  
exosome particles suspended in a  
0.9% isotonic saline solution.







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