Biomaterial-Bound Insulin For Priming Mesenchymal Stem Cells (MSCs) For Wound Healing

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BRIEF DESCRIPTION

An innovative PEG hydrogel system covalently bound with insulin to safely and effectively prime mesenchymal stem cells (MSCs) and enhance their therapeutic potential in wound healing.

FULL DESCRIPTION

This technology involves covalently linking insulin to a hydrogel matrix that encapsulates and primes MSCs in situ. By eliminating the reliance on insulin-secreting insulinoma cells, the system safely primes MSCs to boost their regenerative capabilities. The hydrogel can be applied directly to wound sites or tissue repair areas, enhancing MSC viability, proliferation, and secretion of growth factors, thereby supporting faster and more effective healing. This approach offers improved stability, scalability, and clinical translatability compared to prior cell-based methods.

SUGGESTED USES

- Eliminates use of insulinoma cells, reducing clinical risks such as tumorigenicity and immune rejection.
- Provides controlled and sustained delivery of insulin via hydrogels.
- Offers a safer, chemically defined system that improves scalability and clinical translation.
- Maintains or improves MSC priming effectiveness comparable to free insulin.
- Versatile platform applicable to multiple regenerative medicine applications beyond wound healing.

ADVANTAGES

- Chronic wound healing therapies.
- Burn and acute injury treatment.
- Regenerative medicine including cartilage repair and bone regeneration.
- Cell therapy and tissue engineering platforms.

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OTHER INFORMATION

KEYWORDS

cell therapy, wound healing, regenerative medicine, tissue engineering

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Materials & Chemicals**
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  - Chemicals
  - Polymers
- **Medical**
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  - Disease: Dermatology

- Disease: Musculoskeletal Disorders
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