## SCIENCES

# HUMAN CELL EXTRACT-INFUSED COLLAGEN HYDROGEL SHOWS **INCREASED WOUND HEALING AND UNREMARKABLE SAFETY IN A** PORCINE MODEL.

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## INTRODUCTION

Chronic wounds impose a significant and ongoing challenge for individuals and healthcare systems worldwide. In the United States alone, approximately 6.5 million people suffer from chronic non-healing wounds—impacting nearly one in every 38 adults annually. Furthermore, the economic toll is staggering, with treatment and management costs ranging from \$28.1 billion to \$96.8 billion each year. Among Medicare beneficiaries, chronic wounds affect roughly 15% (approximately 8.2 million patients), costing the program between \$28.1 billion and \$31.7 billion annually. Beyond the financial burden, the impact of these wounds on patients' quality of life is severe, compromising; physical, mental, and social well-being. It is clear that more effective and safer treatment alternatives are needed. Current wound care products fall short in fostering an environment conducive to native collagen deposition, resulting in slower healing, compromised safety, and patient discomfort—a gap that our human cell extractinfused collagen hydrogel\* (HCH) is uniquely poised to fill.

## **METHODOLOGY**

This study assessed the toxicity and efficacy of HCH for wound healing using Göttingen Minipigs over a 25-day period. The experimental design included three treatment groups: control (saline solution), reference product, and test item (HCH), with wounds monitored at short-term (7 days), mid-term (18 days), and long-term (25 days) intervals. Parameters evaluated included wound healing progression, blood biochemical and hematological profiles, animal welfare, and histopathological analysis of skin and internal organ tissues.



Figure 1: A) Animal scheme of wound distribution in the back of each animal. Saline solution (control) was applied in Group A, Reference Product in Group B, and HCH in Group C animals. **B)** Schematic of Human Cell Lysate-infused Collagen Hydrogel containing its individual components of specific human cellular extract infused into a collagen hydrogel.

#### BOOSTING HEALING, ENSURING SAFETY: HUMAN CELL EXTRACT COLLAGEN HYDROGEL



**Figure 2:** Full Thickness wounds were surgically inflicted on Göttingen Minipigs n=32, 4 wounds shown as representative. 1.5 CM<sup>2</sup> wounds were treated with Saline (A) Reference Product (R. Prod) (B) and HCH (C). Images were taken Day 0 Post application, Day 7 (Short-term), Day 18 (Medium-term) and Day 25 (Long-term) during the healing process.

#### FIGURE 3



**Figure 3:** Pertinent hemogram results including white blood cells, red blood cells, hemoglobin and hematocrit from A) females (n=4) and B) males pigs (n=4). The samples were collected on the 25th day post-application. Red dotted lines indicate higher and lower limit for the appropriate references range.



HCH demonstrated significant benefits in wound healing, with faster wound closure and reduced scab formation at mid- and long-term time points compared to controls. Minimal exudate and fewer signs of infection were observed in the HCH-treated wounds. Biochemical and hematological analyses indicated no adverse effects on renal or hepatic biomarkers. Welfare assessments showed that animals maintained good health, with only transient mild discomfort. Necropsy findings revealed no significant abnormalities in treated tissues or internal organs, and histopathological evaluations confirmed improved wound healing in HCH-treated wounds. These results support the safety and efficacy of HCH as a promising therapeutic for wound care and encourage further development toward clinical applications.

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**Figure 4:** Wound Area Measurement Time course. Wounds area were measured on Day 7, Day 11, Day 18, Day 25. Long-term healing progress (25 days) showed that wound areas treated with the HCH (Group C) were significantly smaller when compared to wounds treated with the R. Prod (Group B) or saline (Group A). Short-term wound healing (7 days) did not show significant differences across study groups. Results of mid-term wounds (18 days), Group C (HCH) demonstrated better healing outcomes compared to Group B (R. Prod) but did not achieve better results than Group A (saline).

### DISCUSSION

## Acknowledgements

