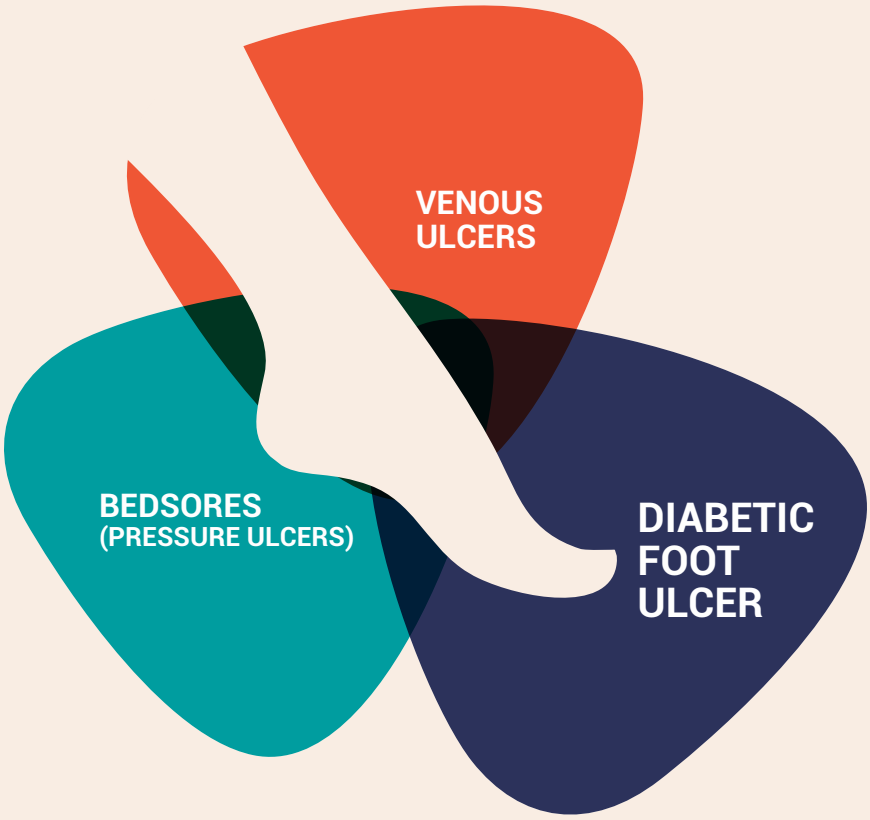
REGEN-D® 150

Recombinant Human Epidermal Growth Factor 150 µg/g Gel

QUICK & SCARLESS HEALING



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REGEN-D® 150 | recombinant human Epidermal Growth Factor (rhEGF)- A Regeneration Therapy For Faster Wound Healing

EPIDEMIOLOGY - GLOBAL & INDIAN SCENARIO

GLOBAL

1. Diabetes Foot Ulcer (DFU)

424.9 M (2017) → 628.6 M (2045)

M=millions

15-25% Diabetes patients develop DFUs[2]

Every **20** seconds, a lower limb is amputated due to diabetes[3]

2. Pressure Ulcers

Prevalence rates: **8.8%** to **53.2%**[5]

3. Venous Leg Ulcer

Prevalence: **0.18%** to **1%** (up to 4% over the age of 65)[7]

INDIA

2nd Largest Adult Diabetes Populated Country[1]

72.9 M (2017) → 134.3 M (2045)

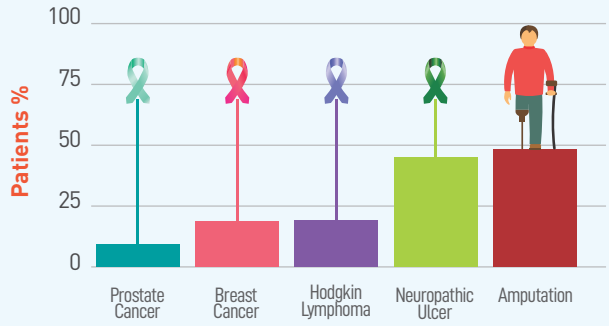
25% Diabetes patients develop DFUs[4]

20% Amputation[4]

Prevalence: **26.75%**[6]

Prevalence: **~11%**[8]

5-YEAR MORTALITY RATES OF DFU OR DFU RELATED AMPUTATIONS COMPARED TO OTHER DISEASES[9]



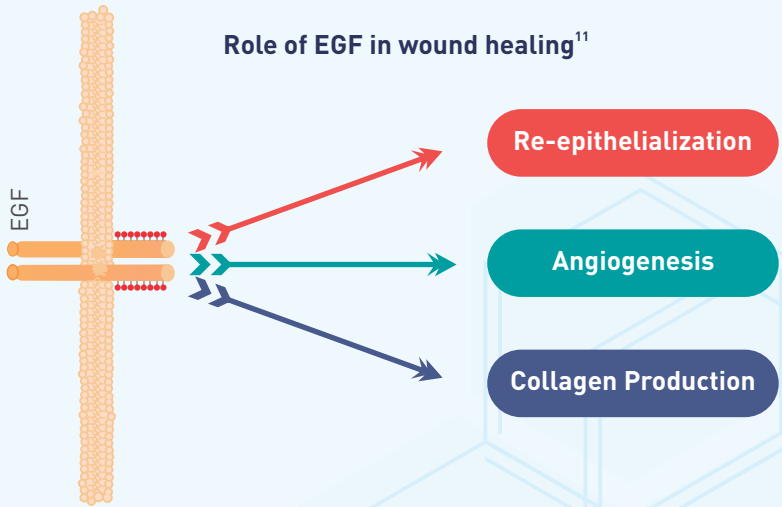
Adapted from Almekinder E, 2018.

Amputation largely impacts **Quality of Life & Life Expectancy**[10]

Epidermal Growth Factor (EGF) - Mechanism of Action

- EGF facilitates diverse array of cellular pathways to promote wound healing & tissue recovery.[11]
- EGF promotes migration, proliferation, cytoprotection, cellular differentiation, collagen synthesis and inhibition of apoptosis.[11]
- Matrix metalloproteinases (MMPs) are enzymes responsible for collagen & other protein degradation in extracellular matrix (ECM) that is essential for wound re-epithelialization.[12]

Role of EGF in wound healing[11]



Indications of REGEN-D®150:

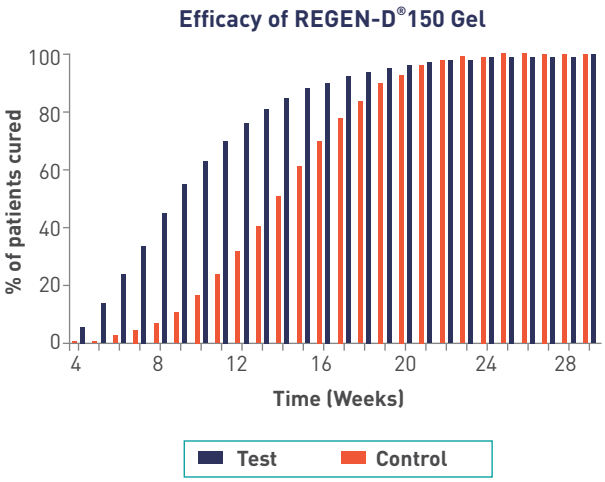
- Diabetic Foot Ulcers
- Pressure Ulcers Including Bedsores
- Venous Leg Ulcers

Established Efficacy & Safety of REGEN-D®150 in Several Clinical Trials

DFU - Phase III Study

Average healing time[13]

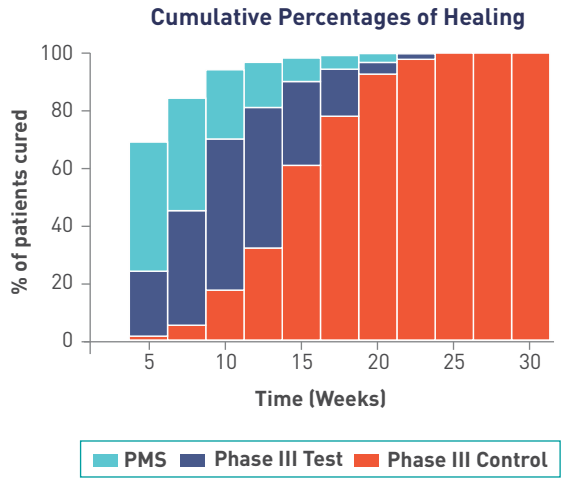
- Test group (REGEN-D®150) : 9 weeks.
- Control group (placebo) : 15 weeks.



Adapted from Viswanathan V, 2006.

DFU - Post-marketing Surveillance (PMS) Study & Phase III Trial

- The average wound healing in patients was 86% & the average wound healing time was 4.8 weeks in the PMS study.
- No adverse events were reported in patients during the PMS study.[14]



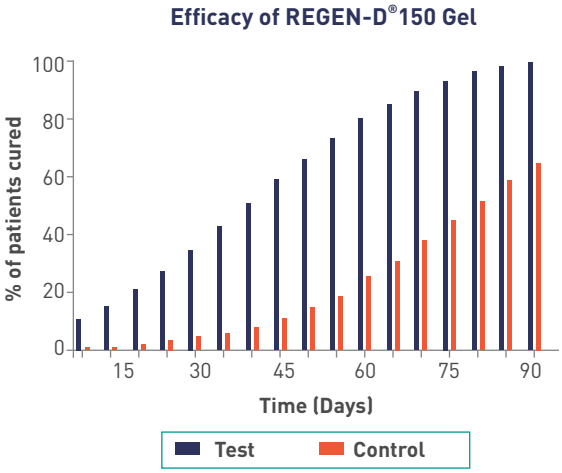
Adapted from Mohan VK, 2007.

The proportion of patients cured by week 10 was ~ 92%, ~ 69% and ~ 21% in the PMS study, Phase III (Test Group) and Phase III (Control Group), respectively.[14]

Bedsores (Pressure Ulcers) - Phase III Study

Average time to complete healing

- Test group REGEN-D®150 : ~40days.
- Control group : ~79days.

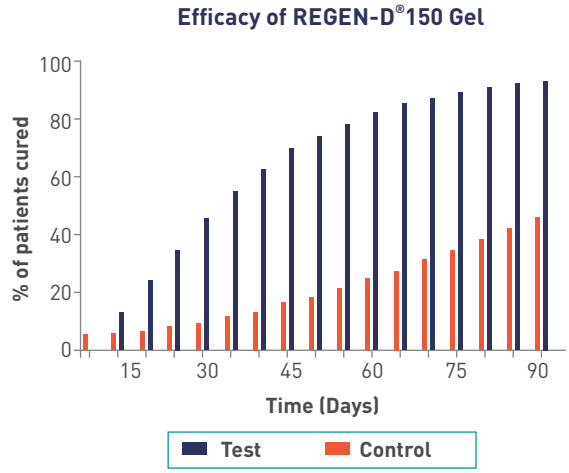


Adapted from Phase III Clinical Trial Report in Bed sores.

Venous Leg Ulcers - Phase III Study

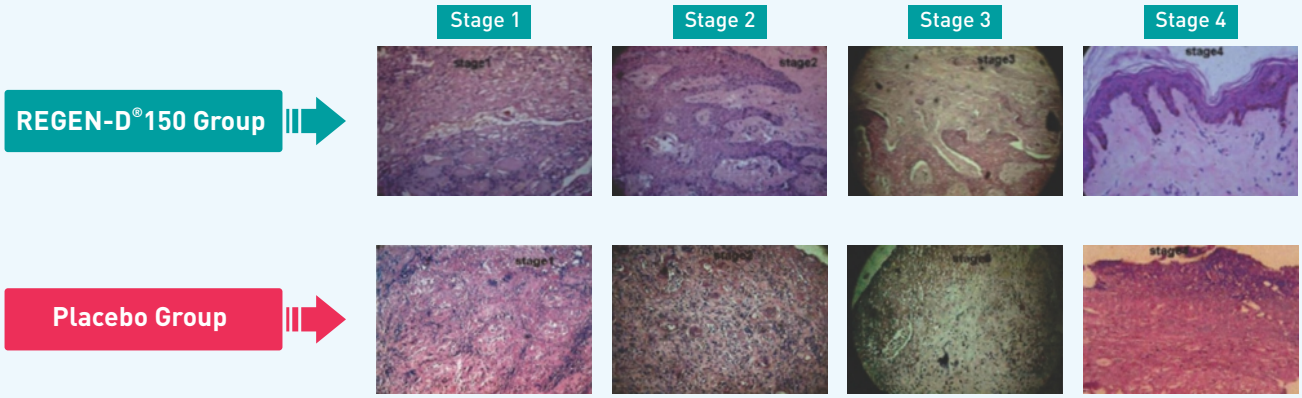
Average time to complete healing

- Test group (REGEN-D®150) : ~40days.
- Control group : ~95days.



Adapted from Phase III Clinical Trial in Chronic Leg Ulcer.

Efficacy of REGEN-D®150 in Healing of DFU at Biochemical & Molecular Levels[14,15]



Punch biopsy and histological analyses* revealed the role of REGEN-D®150 in healing of diabetic foot ulcers Vs placebo.

REGEN-D®150 group has shown significant increase in

- Collagen content (3.6 fold ↑ compared to 2.6 fold ↑ in placebo).
- The number of fibroblast seen in the matrix.
- Prominent angiogenesis.

REGEN-D®150 group has shown decrease in

- MMP-9 (Matrix metalloproteinase) expression.
- Healing time (~50% ↓ compared to placebo).

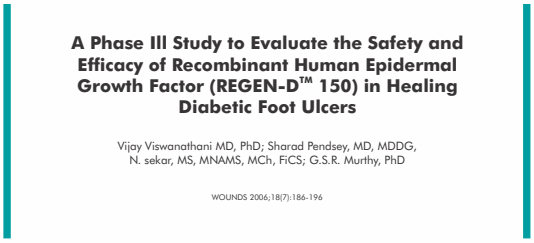
*There was no evidence of any premalignant or carcinogenic changes in the histological evaluation of the wound lesion.

Photographs Depicting Quick Healing After Application of REGEN-D®150

Long-term Surveillance Study for Safety

- A 2-year follow-up study was conducted to assess the long-term safety of REGEN-D®150 in all subjects enrolled in this Phase III clinical trial.[13, 14]
- No incidents of recurrence of ulcers from the subjects using REGEN-D®150 post-study period.[14]
- None of the subjects observed a detection of premalignant or malignant lesion.
- The surveillance established no complaints from the subjects regarding the use of REGEN-D®150 proving its clinical safety & efficacy in accelerating healing of DFUs.[14]

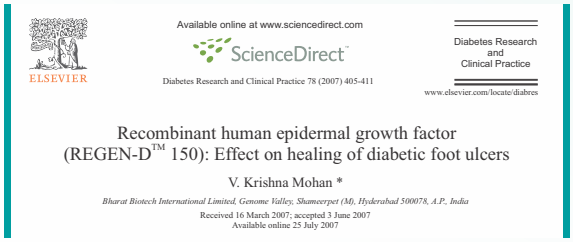
Publications



A Phase III Study to Evaluate the Safety and Efficacy of Recombinant Human Epidermal Growth Factor (REGEN-D™ 150) in Healing Diabetic Foot Ulcers

Vijay Viswanathani MD, PhD; Sharad Pendsey, MD, MDDG, N. sekar, MS, MNAMS, MCh, FiCS; G.S.R. Murthy, PhD

WOUNDS 2006;18(7):186-196



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Diabetes Research and Clinical Practice 78 (2007) 405-411

Diabetes Research and Clinical Practice

www.elsevier.com/locate/diabres

Recombinant human epidermal growth factor (REGEN-D™ 150): Effect on healing of diabetic foot ulcers

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Original Article

Efficacy of Recombinant Human Epidermal Growth Factor (Regen-D 150) in Healing Diabetic Foot Ulcers: A Hospital-Based Randomized Controlled Trial

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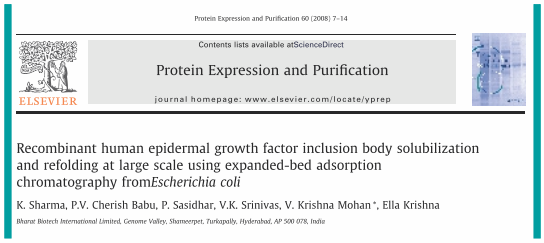
Vijay Viswanathan, MD, PhD, FRCP, FICP[1], Udyama Juttada, MSc, PhD[1], and Mary Babu, PhD[2]



Protein Expression and Purification 60 (2008) 7–14

Contents lists available at ScienceDirect

Protein Expression and Purification

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ELSEVIER

Recombinant human epidermal growth factor inclusion body solubilization and refolding at large scale using expanded-bed adsorption chromatography from *Escherichia coli*

K. Sharma, P.V. Cherish Babu, P. Sasidhar, V.K. Srinivas, V. Krishna Mohan *, Ella Krishna

Bharat Biotech International Limited, Genome Valley, Shameerpet, Turkapally, Hyderabad, AP 500 078, India

Elmer Press

Original Article

Gastroenterology Research • 2010;3(3):125-133

Recombinant Human Epidermal Growth Factor Alleviates Gastric Antral Ulcer Induced by Naproxen: A Non-steroidal Anti-Inflammatory Drug

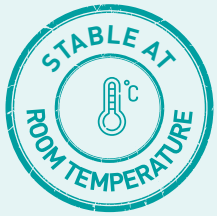
Ashok Raja Chairmandurai[a], Srinivas Vellimedu Kanappa[a], Krishna Mohan Vadrevu[a], Uday Kumar Putcha[a], Vijayalakshmi Venkatesan[a, d]

References

1. IDF Diabetes Atlas. 8th Edition 2017.
2. Yazdanpanah L. Incidence and risk factors of diabetic foot ulcer: A population-based diabetic foot cohort (ADFC Study)-two-year follow-up study. Int J Endocrinol. 2018;7631659.
3. International working group on the diabetic foot - Guidelines. https://iwgdfguidelines.org/introduction/. Accessed 23rd September, 2019.
4. Gosh P. Burden of diabetic foot ulcers in India: Evidence landscape from published literature. 2017;20(9):A485.
5. Moore Z. A review of PU prevalence and incidence across Scandinavia, Iceland and Ireland (Part I). J Wound Care. 2013;22(7),361–368.
6. Dhanda MS. Prevalence and clinical evaluation of pressure ulcers using Braden scale from Orthopedics wards of a tertiary care teaching hospital. IAIM, 2015;2(3):21-7.
7. Vasudevan B. Venous leg ulcers: Pathophysiology and classification. Indian Dermatol Online J. 2014;5(3):366–370.
8. Saraf SK. A clinico-epidemiological profile of non-healing wounds in an Indian hospital. J Wound Care. 2000;9(5):247–50.
9. Almekinder E. Diabetes and amputation: Everything you need to know to avoid amputation. TheDiabetesCouncil Article. 2018.
10. Meijer JW. Quality of life in patients with diabetic foot ulcers. Disabil Rehabil. 2001;23(8):336-40.
11. Data on file. SLVRGEN post marketing study report. 2012.
12. Caley MP. Metalloproteinases and wound healing. Adv Wound Care (New Rochelle). 2015;4(4):225–234.
13. Viswanathan V. A phase III study to evaluate the safety and efficacy of recombinant human epidermal growth factor (Regen-D 150) in healing diabetic foot ulcers. WOUNDS. 2006;18(7):186–196.
14. Mohan VK. Recombinant human epidermal growth factor (REGEN-D™ 150): Effect on healing of diabetic foot ulcers. Diabetes Res Clin Pract. 2007;78(3):405-411.
15. Viswanathan V. Efficacy of recombinant human epidermal growth factor (Regen-D 150) in healing diabetic foot ulcers: A hospital-based randomized controlled trial. Int J Low Extrem Wounds. 2019:1534734619892791.

REGEN-D® 150

Recombinant Human Epidermal Growth Factor 150 µg/g Gel



PATENT
Patent No. PCT/IN 2006/000168
(**Publication Number:** 2006/126212 A2)

Abridged Prescribing Information

Composition: Each gram of gel contains Recombinant Human Epidermal Growth Factor 150 µg. **Indications:** REGEN-D®150 is indicated for the use of 1. Diabetic Foot Ulcers, 2.Bedsores, 3. Chronic Venous Ulcer. **Contraindications:** REGEN-D®150 is generally well tolerated. However, the product should not be repeatedly given to persons known to be hypersensitive to any of the components of the product. The product is contraindicated with immunosuppressive or immune-stimulant therapy. **Dosage & administration:** After cleaning the ulcer area, apply the gel so as to cover the entire ulcer area. Dosage of the gel depends on the specific size of the ulcer & it should as per physician's advice. REGEN-D®150 is in the form of a gel. It is to be spread evenly (topical application) on the affected part with a sterile cotton swab, twice a day, until the ulcer heals completely. **Precautions:** It is suggested that the medical practitioners ascertain the hypersensitivity status of the subject. REG EN-D®150 therapy should be continued up to a period of 15 to 20 weeks. The continuation of the therapy is at the discretion of the physician. **Adverse reactions:** REGEN-D®150 has proven low reactogenicity & is well tolerated in humans. Clinical trials so far, have not shown any adverse reactions to human subjects. **Clinical data:** A Phase III, double blind, randomized, placebo controlled, parallel study was conducted to evaluate the safety & efficacy of REGEN-D®150 in diabetic foot ulcers, chronic leg ulcers (venous ulcers) & bed sores (Pressure ulcers). In all of the conditions mentioned, the healing time was less in REGEN-D®150 group compared to the placebo. A Phase IV, double blind, randomized, placebo controlled, parallel study was conducted to evaluate safety & efficacy of REGEN-D®150 in diabetic foot ulcers compared to reference group & the results found REGEN-D®150 to be safe & tolerable. **Pharmacodynamic properties:** Activation of EGFR leads to a number of biological responses, including migration, proliferation, cryoprotection, cellular differentiation, & apoptosis.[1] In wound healing EGFR plays an important role in re-epithelialization & dermal maturation.[2] Topical use of recombinant human EGF has been shown to increase re-epithelialization & enhance wound healing. **Storage & stability:** Store at room temperature (25°C). **1.** Bodnar RJ. Epidermal growth factor & epidermal growth factor receptor: The yin & yang in the treatment of cutaneous wounds & cancer. Adv Wound Care (New Rochelle). 2013;2(1):24–29. **2.** Tokumaru S. Ectodomain shedding of epidermal growth factor receptor ligands is required for keratinocyte migration in cutaneous wound healing. J Cell Biol. 2000;151(2):209-20.

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