

Transcriptomic Insights Into rhEGF-mediated Ectopic Osteogenesis In Rat Heterotopic Model

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Introduction

Recombinant human epidermal growth factor (rhEGF) is widely recognized for its mitogenic and regenerative properties, yet its osteoinductive potential in non-orthotopic environments remains largely unexplored.

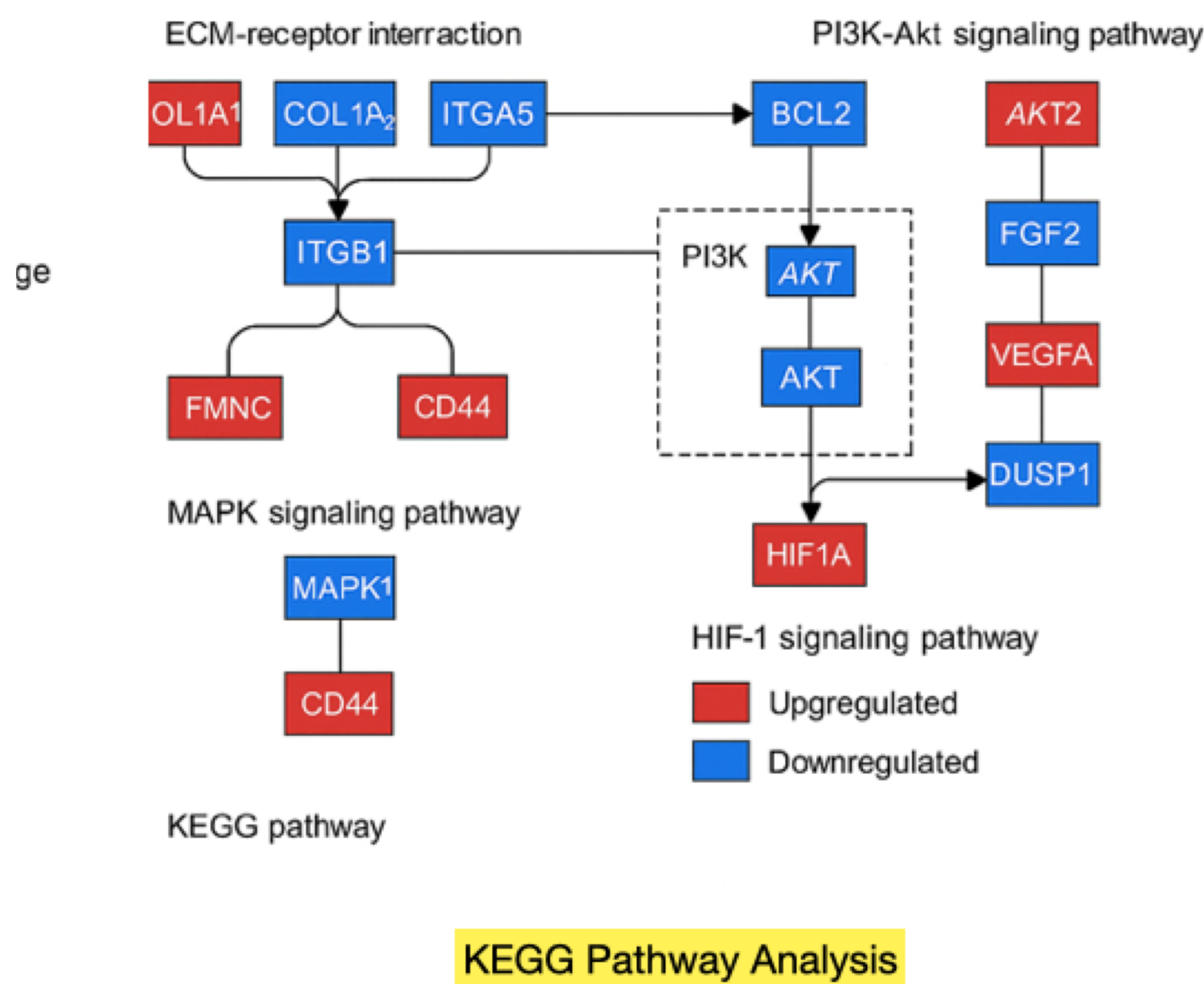
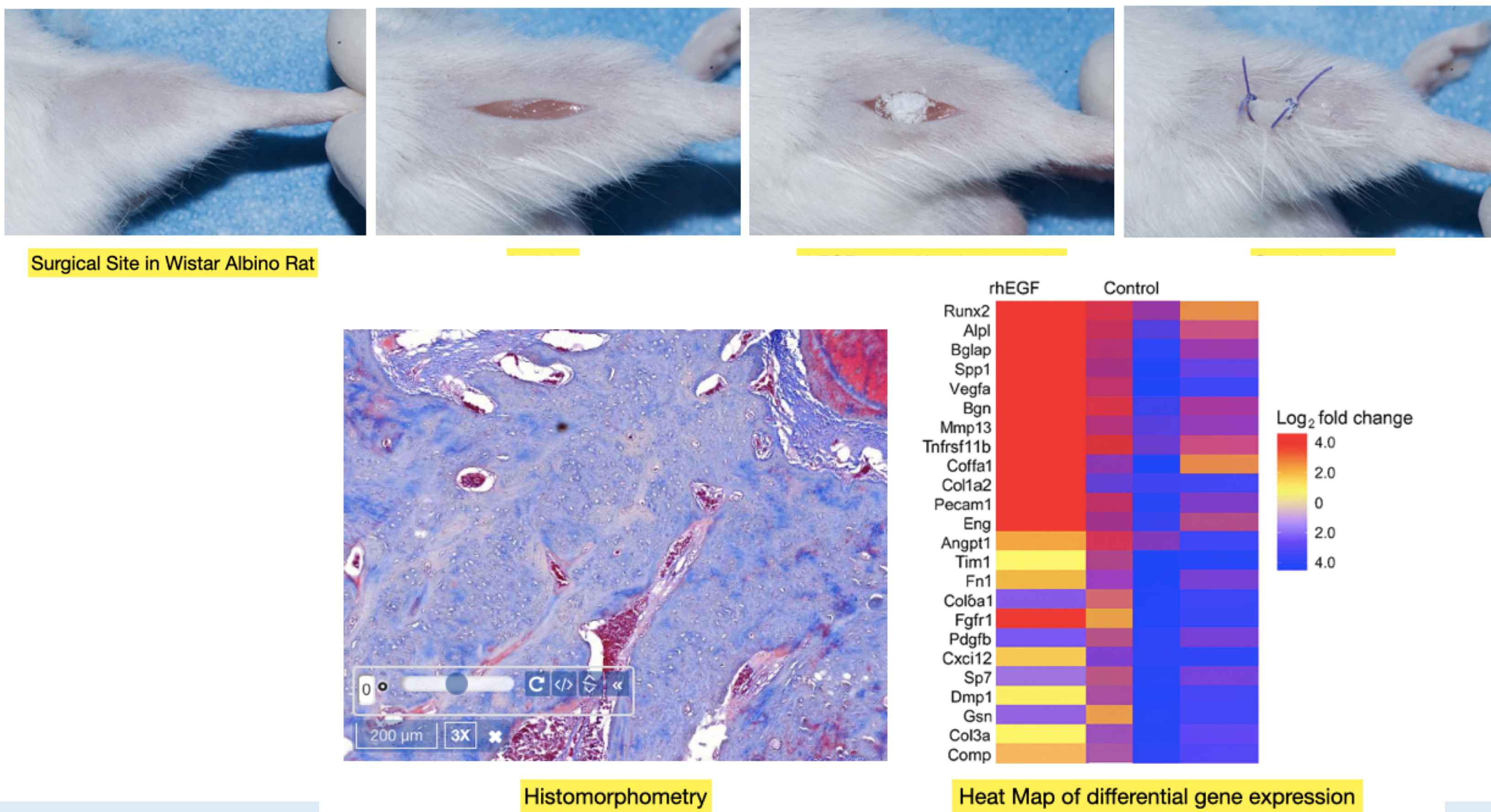
Aim

This study evaluated the ability of rhEGF to induce osseous tissue formation in heterotopic sites of Wistar albino rats using histological, histomorphometric, and transcriptomic (mRNA-seq) analyses.

Materials & Methods

Eighteen healthy Wistar albino rats (both sexes, 8–10 weeks) were divided into a test group (n = 12; rhEGF implant in calf muscle) and a control group (n = 6; vehicle only). After 18 weeks, muscle specimens were harvested for histology, histomorphometry, and bulk mRNA-sequencing (Illumina platform). Osseous tissue formation was assessed qualitatively by light microscopy, quantitatively by histomorphometric analysis, and differential gene-expression profiling with GO/KEGG pathway enrichment.

Experimental Results



Conclusion

Recombinant human epidermal growth factor induced ectopic bone formation accompanied by transcriptional activation of osteogenic and angiogenic genes, confirming its osteoinductive potential in heterotopic sites. The combined histological and mRNA-sequencing evidence positions rhEGF as a promising osteogenic biomolecule, warranting further validation in orthotopic and translational clinical models of bone regeneration.

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