

口腔顎顔面矯正学分野  
特別講演のお知らせ

『Tissue-Mimetic Bio-Blocks® Enhance MSC Extracellular Vesicle Potency and Drive Early Layer-Specific Wound Activation in a Stratified Porcine Model』

日時：2026年3月24日(火) 16:30~18:30

場所：歯学部2階 202講義室

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## Abstract

Mesenchymal stem cell (MSC) extracellular vesicles (EVs) show significant therapeutic promise, yet conventional 2D culture accelerates MSC senescence and reduces EV potency. Ronawk's tissue-mimetic Bio-Blocks® enable MSCs to self-organize within structured 3D micro-environments, supporting enhanced regenerative function. Using our stratified porcine wound model, we examined whether Bio-Block-derived EVs trigger stronger early wound activation than 2D-derived EVs.

Four adult Yucatan pigs received matched full-thickness wounds treated with vehicle, 2D EVs (2DEV), or Bio-Block EVs (3DEV). At 8 hours, wounds were separated into epidermal, dermal, and subcutaneous layers for RT-qPCR analysis, with histological validation ongoing.

3DEV produced the strongest early activation signatures across all layers. Epidermal responses included increased epithelial mobilization markers (HBEGF, TGFA, EGFR). Dermal tissues showed enhanced angiogenic and integrin-associated signaling (VEGFA, ANGPT1, ITGA2, ITGA5, ITGB6). ECM genes (COL14A1, FN1, TNC) also exhibited early upregulation. Cytokine responses demonstrated coordinated layer-specific modulation. These findings indicate that Bio-Block culture enhances EV potency and supports more effective early wound activation.

\*本セミナーは大学院医学研究科・口腔科学研究科・医科栄養学研究科の大学院講義を兼ねています。

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