https://doi.org/10.17952/38EPS.2026.P058

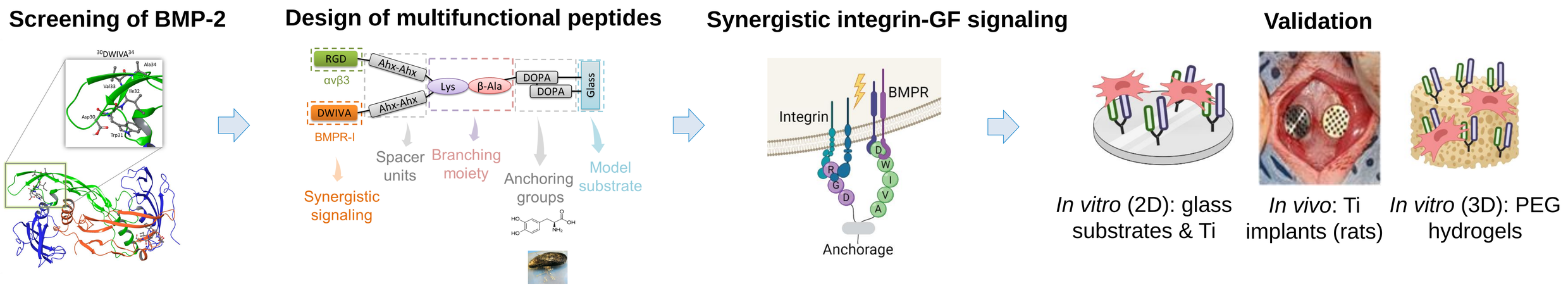
Modulating Integrin and Growth Factor Signaling with Synthetic Peptides: a New Paradigm in Regenerative Medicine

Carlos Mas-Moruno[1,2,3*]

[1]Biomaterials, Biomechanics and Tissue Engineering Group, Department of Materials Science and Engineering, and Institute for Research and Innovation in Health (IRIS), Universitat Politècnica de Catalunya (UPC), Barcelona, Spain; [2]Barcelona Research Center in Multiscale Science and Engineering, UPC, Barcelona, Spain; [3]Centro de Investigación Biomédica en Red, CIBER-BBN, Madrid, Spain

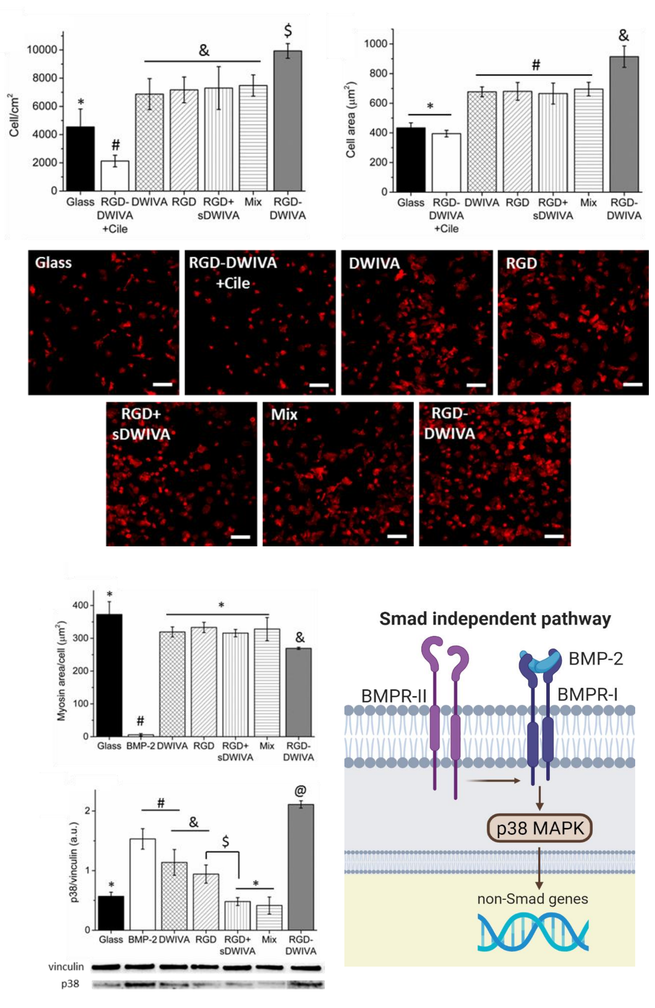
* email: carles.mas.moruno@upc.edu

Background & Aim: Recreating the cellular microenvironment that promotes integrin and growth factor (GF) signaling is a major goal to trigger bone regeneration.[1] However, the use of GFs, such as bone morphogenetic protein 2 (BMP-2), entails clinical risks. Thus, the aim of this study was to combine integrin-binding ligands together with osteogenic peptides derived from BMP-2 to recapitulate the healing microenvironment of bone and foster its regeneration.



Results & Discussion:

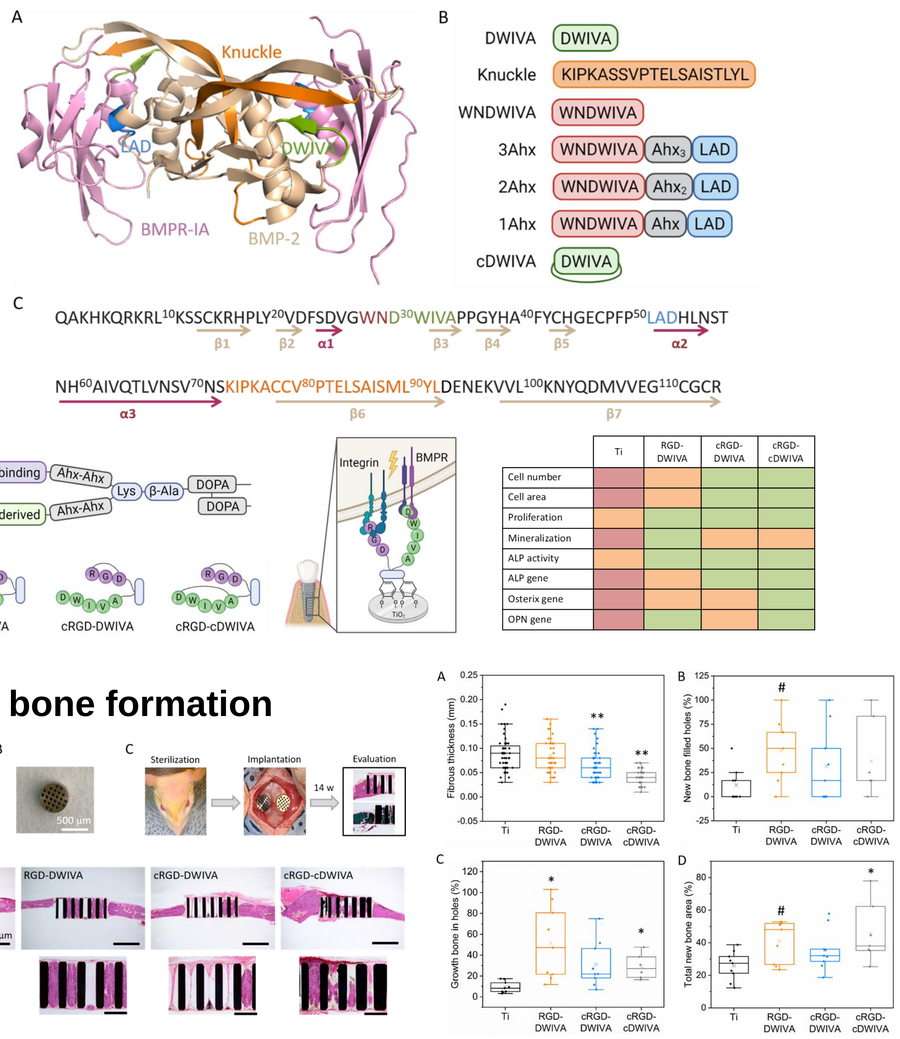
Model glass substrates (C2C12 cells)[2]



✓ **Synergistic signaling (geometry)**

✓ **αvβ3-mediated & P38-mediated**

Ti: *in vitro* (MSCs) & *in vivo* (rat calvarial defect)[3]

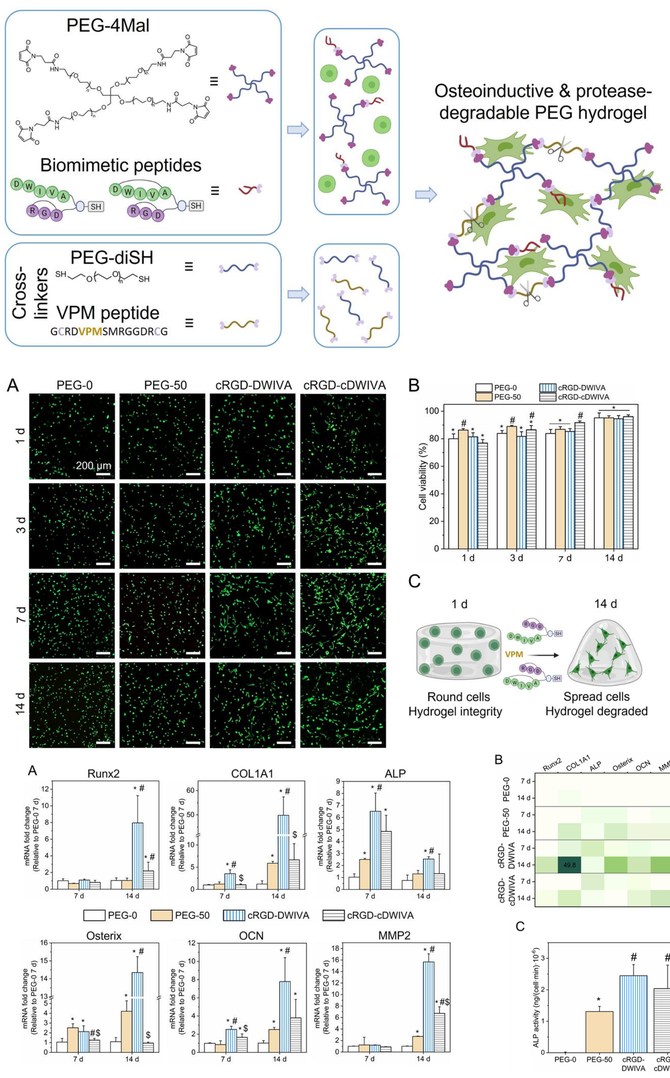


In vivo bone formation

✓ **Improved osteodifferentiation**

✓ **Enhanced new bone formation *in vivo***

Protease-degradable PEG hydrogels[4]



✓ **Improved cell adhesion & differentiation (stimuli-responsive)**

Conclusions: These results prove the biological potential of recreating the ECM and engaging in integrin and GF crosstalk via synthetic peptides. This biomimetic strategy holds promise in bone tissue engineering, without the need for exogenous GFs.

References:

[1] *Adv. Sci.* **2026**, 14782; [2] *Adv. Healthcare Mater.* **2021**, *10*, 2001757; [3] *Adv. Healthcare Mater.* **2022**, *11*, 2201339; [4] *Front. Bioeng. Biotechnol.* **2023**, *11*, 1192436.

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