

Rabbit cranial defect model

The [rabbit](#) cranial defect model is a type of [animal model](#) used in preclinical research to study [bone regeneration](#) and healing. In this model, a defect is created in the rabbit's skull and various treatments or interventions are tested to assess their effectiveness in promoting bone regeneration and healing. The rabbit is a commonly used animal model due to its relatively large size and similarity to humans in terms of bone physiology and healing mechanisms.

Integrating a [biomimetic extracellular matrix](#) to improve the [microenvironment](#) of [3D printing](#) scaffolds is an emerging strategy for [bone substitute](#) design. Here, a “soft-hard” bone implant (BM-g-DPCL) consisting of a [bioactive matrix](#) chemically integrated on a polydopamine (PDA)-coated porous gradient scaffold by polyphenol groups is constructed. The PDA-coated “hard” scaffolds promoted Ca²⁺ chelation and mineral deposition; the “soft” bioactive matrix is beneficial to the migration, proliferation, and osteogenic differentiation of stem cells in vitro, accelerated endogenous stem cell recruitment and initiated rapid angiogenesis in vivo. The results of the [rabbit cranial defect model](#) ($\Phi = 10$ mm) confirmed that BM-g-DPCL promoted the integration between bone tissue and implant and induced the deposition of bone matrix. Proteomics confirmed that cytokine adhesion, biomineralization, rapid vascularization, and extracellular matrix formation are major factors that accelerate [bone defect healing](#). This strategy of highly chemically bonded soft-hard components guided the construction of the bioactive regenerative scaffold ¹⁾.

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Liu Q, Chen M, Gu P, Tong L, Wang P, Zhu J, Xu Y, Lu G, Luo E, Liang J, Fan Y, Zhang X, Sun Y. Covalently Grafted Biomimetic Matrix Reconstructs the Regenerative Microenvironment of the Porous Gradient Polycaprolactone Scaffold to Accelerate Bone Remodeling. *Small*. 2023 Feb 11:e2206960. doi: 10.1002/sml.202206960. Epub ahead of print. PMID: 36772909.

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