# ENGINEERING BIOMATERIALS AND BIO-INTERFACES

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The implementation of the personalised therapy together a less invasive surgery for the restoration of human tissues is becoming an appropriate strategy to mitigate costs and quality of the modern health care.

For bone repair/regeneration, efforts have been paid to optimize injectable calcium phosphate (CaP) cements for its unique combination of osteoconductivity, biocompatibility and mouldability. Different strategies are implemented for engineering bioactive and osteoinductive injectable CaP with different biomolecules to optimize their interfaces with cells and bone tissue environments. Calcium phosphate obtained by sol-gel synthesis combines hydroxyapatite (HA) with other calcium phosphate phases such as dicalcium phosphate (DCP), a precursor of natural HA in bone. Here, a bioactive and osteo-inductive injectable calcium phosphates is prepared by modification of hydroxyapatite with Strontium (Sr) and to incorporate bioactive molecules such as phosphoserine-tethered poly(ε-lysine) dendrons to obtain dual mode of action, simultaneously increasing bone formation while decreasing bone resorption [1]. Personalised approach is also used to design and preparation of tissue analogues by bioprinting. In this context a proper bioink is necessary to: i) confer a shear thinning behavior for the extrusion-based process and ii) improve the mechanical properties, (iii) controlling the biosensing properties. Within this aims innovative natural polymer-based double network hydrogels (DNs) were developed by a two-step network-formation procedure to obtain photocrosslinkable methacrylated hyaluronic acid (HAMA) and maleated hyaluronic acid (MAHA) while controlling viability/proliferation of human mesenchymal stem cells [2].

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