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## A NOVEL NATURAL AND PATIENT-DERIVED BIOMATERIAL FABRICATED USING THE POLYPHENOL OLEUROPEIN AND THE AUTOLOGOUS BLOOD-DERIVED PLASMA FOR POTENTIAL APPLICATIONS IN BONE TISSUE ENGINEERING Francesco Paduano, Massimo Marrelli, Bruna Codispoti and Marco Tatullo

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**T** o provide a bioactive and biocompatible environment for new bone formation, several materials have been used to mimic the bone-forming components. In this context, we examined the feasibility of the natural polyphenol oleuropein as a crosslinking agent for fabricating a polymerizable biomaterial for potential applications in bone tissue engineering. Oleuropein is a natural-occurring iridoid glycoside especially found in the leaves and fruits of the olive tree (*Olea europaea*). It is well known for its antibacterial, antifungal, antiviral, antioxidant and anti-inflammatory activities. More importantly, it has also been shown that oleuropein is able to induce bone formation and inhibits bone resorption as well as bone tissue demineralization. Interestingly, the conversion of oleuropein glucoside to its aglycone by the enzyme  $\beta$ -glucosidase exhibits interesting cross-linking properties which make it a suitable cross-linking agent for biomedical applications. Here, the autologous patients' derived-plasma and aglycone oleuropein were used to fabricate a novel biomaterial. We invented a novel formulation in which autologous patients derived plasma is used as protein substrate that is able to polymerize when is mixed with the aglycone oleuropein. By using L929 mouse fibroblasts and dental pulp stem cells (DPSCs), we demonstrated that this biopolymer is nontoxic and biocompatible. Importantly, plasma-derived biomaterial contains biochemical signals necessary for tissue repair and regeneration and can be easily generated from patient's autologous blood without the potential risk of foreign body reaction or infection. Although this biomaterial shows interesting potentiality, several investigations are required to elucidate the potential of this novel biomaterial for bone tissue engineering applications.

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