Osteoconductive properties of poly(96L/4D-lactide)/beta-tricalcium phosphate in long term animal model

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Résumé en anglais	The objective of this study was to determine the effect of calcium phosphate mineral content on the bone in-growth at the expense of composite of co-polylactide polymer charged with 2 different ratios of β-TCP granules (10 and 24 w-% of β-TCP). The evaluation was realized in a long term rabbit bone model. After 24, 48 and 76 weeks, the implants were examined by micro CT, scanning electron microscopy (SEM) using backscattered electron (BSE) and light microscopy (polarized and blue light microscopy). No foreign body reaction was detected during the 76 weeks follow-up in any of the test samples. Polymer hydrolysis began at approximately 24 weeks, by 76 weeks, the pure polymer implant had begun to release P(96L/4D)LA particles and show signs of peripheral localized bone resorption. A decrease in the amount of CaP was noticed between 24 and 76 weeks in both 10 wt-% and 24 wt-% β-TCP/P(96L/4D)LA composites. The study showed that the highest bone in-growth was with 24 wt-% β-TCP/P(96L/4D)LA composite. Bone in-growth and mineralization were evident for the composites associated with specific peripheral bone architecture. Fluorescent labelling demonstrated high bone in-growth and remodeling at the interface, while for pure co-polymer no bone remodeling or bone activity was maintained after 48 weeks. The study demonstrated the positive effect of calcium phosphate content into P(96L/4D)LA. This kind of composite is a suitable resorbable osteoconductive matrix, which provides long term stability required for ligament fixation device.

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