

Deng Y; Zhou P; Liu X; Wang L; Xiong X; Tang Z; Wei J; Wei S, Preparation, characterization, cellular response and in vivo osseointegration of polyetheretherketone/nano-hydroxyapatite/carbon fiber ternary biocomposite. *Colloids and surfaces. B, Biointerfaces*; VOL: 136; p. 64-73 /20150902/  
ABSTRACT: UNASSIGNED: As FDA-approved implantable material, polyetheretherketone (PEEK) is becoming a prime candidate to replace traditional surgical metallic implants made of titanium (Ti) and its alloys, since it has a lower elastic modulus than Ti. The bioinertness and defective osteointegration of PEEK, however, limit its clinical adoption as load-bearing dental/orthopedic material. The present work aimed at developing a PEEK bioactive ternary composite, polyetheretherketone/nano-hydroxyapatite/carbon fiber (PEEK/n-HA/CF), and evaluating it as a potential bone-repairing material by assessment of growth and differentiation of osteoblast-like MG63 cells and by estimation of osteointegration in vivo. Our results indicated that the adhesion, proliferation and osteogenic differentiation of cells, as well as the mechanical properties were greatly promoted for the PEEK/n-HA/CF biocomposite compared with pure PEEK matrix. More importantly, the ternary composite implant boosted in vivo bioactivity and osseointegration in canine tooth defect model. Thus, the PEEK/n-HA/CF ternary biocomposite with enhanced mechanics and biological performances hold great potential as bioactive implant material in dental and orthopedic applications.

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