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Enhancement of bone regeneration of calvarial defects through BMP2 polypeptide modified with 7E

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With the aging population and the popularity of oral implants, how to promote or accelerate bone regeneration and repair bone defects is increasingly important to improve the quality of life for people with the dentition defect or edentulous and maintain a healthy mental state. Calcined Bovine Bone (CBB) is commonly used as an alternative to the autogenous bone. However, CBB lacks many osteoinductive factors. Given this issue, we have designed and prepared a heptaglutamate (7E) modified BMP2 polypeptide (BMP2pep) and carried out a series of comprehensive physical characterization *in vivo* and *in vitro* studies to evaluate its role in the repair of cranial defects. The main findings and conclusions are 7E modified BMP2 does not change the original morphology of CBB. Analysis by X-ray photoelectron spectroscopy and cumulative release curve, 7E modified BMP2pep can effectively promote the adsorption of the polypeptide on the surface of allograft. Addition of E7 to BMP2 peptide resulted in greater peptide loading on allograft and significantly greater retention. *In vitro* experiments, ALP quantitative analysis, alizarin red staining and PCR detection from molecular levels were employed to evaluate the effect of BMP2pep on the osteogenic differentiation of BMSCs. The results further confirmed that 7E could significantly promote the efficient adsorption of BMP2pep on the surface of bone powder and more effectively promote the osteogenic differentiation of BMSCs through osteogenic markers. *In vitro* experiments, Micro-CT, H&E staining and Masson's trichrome staining demonstrated that the 7E modified BMP2pep could increase its binding rate to bone powder, which could make it perform the good function *in vivo* and have good biocompatibility. The effect of osteoinduction is more pronounced. In summary, the 7E modified BMP2pep coated bone powder prepared in this study, is a novel bone augmentation material with simple, convenient, low cost and excellent clinical application prospect.

Biography

Yue Xi is currently pursuing her Doctor degree in Oral Clinical Medicine from Zhejiang University. In terms of stomatology implants, she has conducted in-depth research to explore the mechanism of osseointegration. Esthetic of implantation and restoration in anterior teeth area and dental implant surface bionic coating are her areas of scientific focus.

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