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Abstract Submission FORM

Evaluation of the osteoclast asset associated to a potential 3D-printed approach for repairing bone defects in MRONJ patients

SECTION: *5A*

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Background: Medication-related osteonecrosis of the jaw (MRONJ) is a serious adverse event characterized by non-healing necrotic bone tissue of mandible or maxilla. Drugs such as bisphosphonates (BPs) and denosumab target osteoclasts, inhibiting osteoclast (OC) formation and activity, thus blocking bone resorption, without a stimulation of osteoblast (OB) activity. These anti-resorptive drugs cause the uncoupling of OC and OB activity, hindering the healing of the affected area, that are characterized by bone resorption and necrotic bone. In this study, we investigated the rate of circulating osteoclast precursors (OCP) in MRONJ patients to understand whether the local bone resorption could be linked to a more systemic dysregulation of the OC compartment. Moreover, we tested 3D-printed scaffold for biocompatibility to verify their potential use in regenerative approach.
Methods: breast cancer-induced bone metastatic patients, who developed MRONJ were enrolled in the study. Patients' PBMCs were isolated from peripheral blood samples, and cells were stained for characterization of OCPs by flow cytometry. Then, the capability of PBMCs to spontaneously differentiate into OCs in *in vitro* cultures were checked. To restore the bone damage, we tested a 3D-printed polymer/ceramic (PCL+Al2O3) scaffold to sustain the mesenchymal stem cell (ASC52hTert) growth, which could lead to regeneration of the bone tissue.
Results: MRONJ patients did not show an increased in circulating OC precursors and in *in vitro* osteoclastogenesis, as expected for the effectiveness of the anti-resorptive treatment in bone metastatic patients. The 3D printed scaffold resulted biocompatible since ASCs grew and colonized it.
Conclusions: Our results on OCPs and OCs demonstrated that in MRONJ patients there is not a systemic dysregulation of OC compartment, but the bone damage is locally controlled. Since the resorbing OC activity and the apposition of new bone by OBs are dysregulated due to the action of the anti-resorptive drugs, we investigated the potential use of a scaffold made of biocompatible materials, able to sustain the grow and the differentiation of mesenchymal stem cells, which at last could result into a repair and regeneration of the bone damage.

Il titolo non deve essere superiore a 130 caratteri (spazi inclusi); l'abstract deve essere scritto in Times New Roman carattere 10. Numero minimo di parole: 400 inclusi titoli, autori e affiliazioni; numero massimo di parole: 600 inclusi titoli, autori e affiliazioni. Inserire al massimo 3 note bibliografiche. L'abstract (tutto in inglese titolo e testo) deve essere contenuto all'interno della prima pagina del form.