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# Can mesenchymal stem cell survive in hydroxyapatite sulphate?

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Abstrak

Latar belakang: Sel Punca Mesenkimal (SPM) berfungsi sebagai penyedia komponen osteogenik dalam penyembuhan fraktur. Pada kasus dengan defek tulang, penyembuhan juga memerlukan komponen osteokonduktif (scaffold). Kalsium hidroksiapatit sulfat (HA-CaSO4) telah digunakan secara luas sebagai bone void filler, mampu berperan sebagai scaffold untuk SPM, namun belum ada penelitian yang mengevaluasi pengaruh scaffold terhadap viabilitas SPM. Metode: Dilakukan isolasi SPM dari sumsum tulang krista iliaka kelinci Giant Flamish dan diekspansi dalam medium DMEM rendah glukosa dengan teknik histogradient density. Setelah 1 minggu, sel di subkultur pada TC flask ukuran 25cc sebagai pasase pertama, kemudian dilakukan pergantian medium setiap 3 hari. Ketika subkultur dikerjakan, kami membenamkan pellet HA-CaSO4 pada flask tersebut. Lalu evaluasi dilakukan pada sel tersebut dengan menggunakan mikroskop cahaya setiap minggu. Hasil: Pada minggu pertama, SPM sangat sulit diidentifikasi karena dominasi kristal HA-CaSO4. Memasuki minggu ketiga, SPM telah tumbuh dan kristal HA-CaSO4 sudah dibilas dengan pergantian medium. Pada minggu keempat, SPM tetap terlihat pada evaluasi. Kesimpulan: HA-CaSO4 dapat digunakan sebagai kandidat scaffold yang unggul untuk menghantarkan SPM secara in vivo tanpa mempengaruhi kelangsungan hidup SPM.
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Abstract<br>
Background: Many studies have reported the role of Mesenchymal Stem Cells (MSC) in treating fractures. In case with bone defect, fracture healing needs not only osteogenic but also osteoconductive component (scaffold). Hydroxyapatite calcium sulphate (HA-CaSO4) being widely used as bone void filler, may serve as scaffold for MSC. However, the effect of this scaffold to the viability of MSC has not been evaluated before. Methods: MSC were isolated from the iliac marrow of a Giant Flamish rabbit, and expanded in DMEM using histogradient density. After one week, they were sub-cultured in a 25cc TC flask (passage 1) and have the medium replaced every 3 days. During the subculture, we embedded a HA-CaSO4 pellet into the flask. The cells were evaluated under inverted microscope at a weekly interval. Results: At the first week, MSC are difficult to be identified in microscope due to the large number of HA-CaSO4 crystals. By the third week however MSC have grown and the HA-CaSO4 crystals can readily be washed off by medium replacement. By the fourth weeks, MSC can be still seen on microscope. Conclusion: HA-CaSO4 could serve as a good scaffold due to its pellet shape and easily absorbed, thus providing revascularization which is essential for bone healing.In addition, HA-CaSO4 does not interfere with MSC survival.