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MODELLING OF CELL INVASION OF SCAFFOLD AT THE INITIAL STAGE OF SEEDING

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Cell seeding process influence the final tissue formation [1,2]. Preceding all other steps of tissue engineering, better cell adhesion and even spatial distribution are associated with improved culture results [3]. For understanding cell seeding process deeply, two geometry scaffold were designed to investigate the cell attachment process through experiment and simulation analysis, including a cubic design and a truncated octahedron design . A novel numerical model is developed by coupling the volume of fluid (VOF), discrete phase model (DPM) and cell impingement model (CIM) for predicting cell distribution after cell seeding. This methodology could help to predict initial stage of cell attachment clinical test more accuracy and also reduce a number of in vivo experiments.This method is able to predict the cell distribution and assessing the scaffold design. Truncated octahedron scaffold showed a more even distribution than cubic design in vitro cell seeding. Truncated octahedron scaffold with spatial distribution beams could provide a more suitable environment for nurtients transport and cell movement and distribution.

Keywords: Cell seeding; Computational Fluid Dynamics; Osteochondral

scaffold