In vitro assessment of osteoblast and macrophage mobility in presence of β-TCP particles by videomicroscopy

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Résumé en anglais	β-TCP is widely used to repair bone defects due to its good biocompatibility, macroporosity (favoring bone ingrowth) and bioresorbability. However, cell interactions with the biomaterial at the first times of implantation remain largely unknown. We have observed cell behaviors in direct contact with β-TCP particles using long-term culture under videomicroscopy. Osteoblastlike cells (SaOs-2) and macrophages (J774.2 and mouse peritoneal macrophages) were cultured in the presence of β-TCP particles. For each experiment, images from 20 independent fields were acquired and stored every 15 min during 8 days. At the end of the culture, they were combined to generate time lapse videos; coverslips were fixed and observed by scanning electron microscopy (SEM). SaOs-2 proliferation was determined by counting cells on six different and independent fields at days 1, 3, and 6. Videos showed the capacity of cells to displace the particles. Dynamic follow-up showed active proliferation of SaOs-2 occurring in the direction of the particles. J774.2 and peritoneal macrophages did not proliferate but came in direct contact with the particles and actively eroded them. SEM showed that cells were stretched and fixed onto the surface and seemed to climb from the coverslip to the particles. The long-term culture under videomicroscopy allowed a better understanding of the colonization process of β-TCP particles by osteoblastlike cells and macrophages. Data obtained from long-term videomicroscopy are in agreement with in vivo observations confirming the interest of β-TCP to promote osteogenesis.
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