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ENHANCED ENDOCHONDRAL OSSIFICATION IN VESSEL DERIVED STEM CELLS BY ATHEROSCLEROTIC ENVIRONMENT

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Vascular calcification, far from being a degenerative passive process, is increasingly being understood as an active, highly organised cell controlled event. The presence of a number of stem progenitor niches and/or lineages in vasculature has been postulated and their possible role in vascular calcification is heavily under investigation. Pericytes are such poorly defined cell populations. Although traditionally considered as supporting cells, they have recently been proposed to play a more active role in the repair and pathogenesis of various vascular diseases. In this study, we hypothesised that a pericyte-like stem cell population, termed vessel derived stem cells or VSCs with chondrogenic and osteogenic potential exist in the vessel wall and in presence of the inflammatory cytokines seen in atherosclerotic environment, contribute, along with the circulating mesenchymal stem cells (MSCs), to the calcification of atherosclerotic plaques vi a endochondral ossification. VSCs from aortae of ApoE−/− mice and background C57BL/6 mice were isolated and characterised for cell surface markers by flow cytometry and immunocytochemistry. MSCs from bone marrow of these mice were also isolated and characterised. To assess the ability of VSCs and MSCs from normal and ApoE−/− mice to form bone, cells were seeded onto collagen glycosaminoglycan scaffolds and primed chondrogenically in vitro followed by subcutaneous implantation for 8 weeks. Chondrogenically primed constructs from both cell types (VSCs and MSCs) showed the ability to form bone by endochondral ossification in vivo in both ApoE−/ and C57BL/6 mice. Assessment of quantity and quality of bone formed is currently being performed.

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