

Using cardiac stem cells to rescue the ischemic heart

S.Y. Lim, O'Brien Institute Department, St Vincent's Institute of Medical Research, 42 Fitzroy Street, Fitzroy, VIC 3065, Australia..

Stem cell-based therapies to repair and regenerate injured myocardium are exciting new avenues for treatment of ischaemic heart disease. Human W8B2+ cardiac stem cells (CSCs) isolated from adult atrial biopsies are cardioreparative when transplanted into infarcted rat hearts, and have been shown to exert powerful paracrine effects on endothelial cells and cardiomyocytes that are indicative of cardiac repair and regeneration. Identification of the paracrine factors responsible for the cardioreparative effect of W8B2+ CSCs might lead to development of pharmacological approaches to mimic the beneficial effect of stem cells. Using ion exchange chromatography and ultracentrifugation, we have separated charged proteins and extracellular vesicles in the conditioned media, respectively. We subsequently applied fractions in several *in vitro* bioassays that reflect cardiac repair and regeneration capacity (angiogenesis, cell survival and cardiomyocyte proliferation) to profile the biological activities of the separated proteins and extracellular vesicles. Finally, we used proteomic and transcriptomic approaches to characterize and profile the secretome constituents of these unique W8B2+ CSCs. Our study demonstrated that W8B2+ CSC secretomes contain bioactive paracrine factors that can be harnessed for therapeutic use in cardiac repair and regeneration.