Heart to Heart: Cardiospheres for Myocardial Regeneration

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Disclosure: founder & stockholder, Capricor Inc.
(no products)
Major landmarks 2000-present

• Cardiac stem cells (CSCs)
  – First recognized in 2000 (Deisher)
  – Antigenically-selected in rats and mice (Beltrami et al., Oh et al., 2003)

• Human cardiospheres (CSps)
  – Outgrowth of human surgical biopsies in primary culture (Messina et al., 2004)
  – Self-organize in suspension, increase post-ischemic function

• Cardiosphere-derived cells (CDCs)
  – Millions of cardiac stem cells from percutaneous endomyocardial biopsies (Smith et al., 2007)
  – Paradigm for autologous therapeutics
Percutaneous heart biopsies to generate cardiospheres and cardiosphere-derived cells
Considerations in choosing the first clinical product

• Cardiospheres interesting biologically, regenerative and effective

• But, favored clinical delivery route is by intracoronary catheters
  – Safety record with bone marrow cells
  – Widely available, minimally-invasive technology

• Cardiospheres too large for intracoronary infusion

• Replating of cardiospheres to produce cardiosphere-derived cells
CDCs and cardiospheres improve cardiac function post-MI

Citations as in Malliaras and Marbán, British Medical Bulletin 2011
CDC technology: Summary of Progress in Translation to the Clinic

- Cell isolation and expansion optimized
- Engraftment and differentiation demonstrated in mice, rats and pigs
- Dosage optimized in pigs
- Pivotal preclinical study completed: reduced scar size by MRI and improved hemodynamics*

*P Johnston et al, Circulation 2009
CADUCEUS: CARDiosphere-Derived aUTologous stem CElls to reverse ventricUlar dySfunction

Clinicaltrials.gov identifier: NCT00893360

- Recent MI & ischemic LV dysfunction (EF 25-45%)
- NIH-funded, Phase I/II randomized, controlled, dose-escalation safety and preliminary efficacy study (MRI for scar size, volumes, & function)
- Two centers (Cedars-Sinai Heart Institute; Johns Hopkins)
- Endomyocardial biopsies; CDCs manufactured at Cedars-Sinai Heart Institute
- Intracoronary infusions of autologous CDCs
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