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IN BRIEF

ARRHYTHMIAS

Optogenetic control of cardiac rhythm

Optogenetics — a biological technique that uses light to control cell behaviour — can terminate ventricular arrhythmias in rats, as shown in a proof-of-concept study. The researchers injected rats with cardiotropic adeno-associated virus vectors, which encoded the red-activatable variant of the light-gated depolarizing ion channel, channelrhodopsin. Subsequently, ventricular tachyarrhythmias (VTs) were induced by irregular electrical burst pacing in Langendorff-perfused hearts. A 470 nm light pulse illuminating 125 mm^2 of the ventricular surface terminated 97% of monomorphic and 57% of polymorphic VTs, whereas no termination was observed without illumination. These results could stimulate the development of innovative biological treatments for cardiac arrhythmias that overcome the limitations of conventional therapies, such as tissue ablation or implantation of implantable cardioverter–defibrillators.

ORIGINAL ARTICLE Nyns, E. C. A. *et al.* Optogenetic termination of ventricular arrhythmias in the whole heart: towards biological cardiac rhythm management. *Eur. Heart J.* http://dx.doi.org/10.1093/eurheartj/ehw574 (2017)

HEART FAILURE

Recombinant neuregulin for HF treatment

The safety and tolerability of cimaglermin-α, an isoform of membrane-bound pro-neuregulin 1 (also known as glial growth factor), was evaluated in a first-in-human, phase I, randomized, placebo-controlled trial in patients with left ventricular systolic dysfunction and heart failure (HF). The investigators observed no discontinuation of cimaglermin-α treatment owing to acute adverse events, although headache (33%) and nausea (26%) were more common in patients receiving cimaglermin-α than in those who received placebo. Transient elevation in liver transaminase level and hyperbilirubinaemia were observed in one patient who received the highest dose of cimaglermin-α (1.512 mg/kg). Of note, left ventricular ejection fraction significantly improved in the high-dose cimaglermin-α treatment groups compared with the placebo group.

ORIGINAL ARTICLE Lenihan, D. J. *et al.* A phase I, single ascending dose study of cimaglermin alfa (neuregulin 1β3) in patients with systolic dysfunction and heart failure. *JACC Basic Transl. Sci.* http://dx.doi.org/10.1016/j.jacbts.2016.09.005 (2017)

CELL THERAPY

Autologous cardiac stem cells for congenital HF

Treatment with cardiosphere-derived cells (CDCs) improves ventricular function in children with single ventricle physiology, according to the findings of the phase II, randomized, controlled PERSEUS study. A total of 41 patients with single ventricle physiology undergoing second-stage or third-stage palliation were randomly assigned to receive either intracoronary infusion of CDCs or standard care. The investigators found that at 3 months after treatment, ventricular function (primary outcome) was significantly improved in the CDC-treated group compared with controls (6.4% vs 1.3%; $P = 0.003$). "Although several clinical trials have suggested that somatic stem cell transplantation may not be effective in improving myocardial function after infarction in adults, our observations show infusion of CDCs in children with single ventricle physiology improves cardiac function and heart failure status," conclude the investigators.

ORIGINAL ARTICLE Ishigami, S. *et al.* Intracoronary cardiac progenitor cells in single ventricle physiology: the PERSEUS randomized phase 2 trial. *Circ. Res.* http://dx.doi.org/10.1161/CIRCRESAHA.116.310253 (2017)