

**New Standards Working Group Scientist/Clinician Candidate for ICOC
Consideration**

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Organ System/Disease Focus

Cardiac, ischemic heart disease, heart failure, arrhythmias

Aligned Research Focus

Cardiogenesis from embryonic stem cells

Research Description

Dr. Kamp's research focuses on embryonic stem cells (ESCs) and their applications to cardiovascular research and potentially cardioregenerative medicine. Initial work with human ESCs demonstrated that these cells differentiate in embryoid bodies to form spontaneously contracting cardiomyocytes. Electrophysiological characterization of the hESC-derived cardiomyocytes revealed that different types of cardiomyocytes differentiate including atrial, ventricular and nodal type cells. Current research is focused on understanding cardiogenesis in the ES cell system and harnessing this process to efficiently obtain defined populations of hESC-derived cardiomyocytes. The human cardiomyocytes obtained from hESCs provide a powerful system to create disease models and to evaluate the cellular electrophysiological and functional properties of human cardiomyocytes at different stages of development. Other projects in the laboratory examine the use of ESCs and their derivatives in cellular therapies for heart disease. Myocardial infarction models in mice and large animals have been developed to pilot cellular therapies first employing mouse ESCs and derivatives. Our initial studies have provided proof of principal evidence that mouse ESCs can induce regeneration in infarcted mouse heart. Ongoing research focuses on identifying optimal cellular populations derived from ESCs for cardiac therapy, determining the best delivery strategies, and overcoming challenges related to immune rejection of allogeneic cells.

Selected References

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Kamp TJ and Lyons GE (2007), "Embryonic Stem Cells and Cardiogenesis." In *Cardiac Regeneration and Stem Cell Therapy*, Editors A Leri, P Anversa, and W Frishman, Blackwell Publishing, Oxford, UK.

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