

Dr. Mark Sussman is a Distinguished Professor of Biology at San Diego State University and Director of the San Diego State University Integrated Regenerative Research Institute. Dr. Sussman created the first mouse model of dilated cardiomyopathy, which exhibited myofibril organizational defects resulting from cardiac-specific transgenic overexpression of tropomodulin. Additional studies on myocardial signal transduction involving the small GTPase rac1 produced another murine model of cardiomyopathy and prompted Dr. Sussman to examine molecular interventional strategies to inhibit the progression of dilation and heart failure. Intrigued by prevailing paradoxical observations in published literature linking the cardioprotective kinase Akt/PKB to heart failure in transgenic mouse models, Dr. Sussman found nuclear accumulation of Akt/PKB in response to anti-apoptotic stimuli. His Akt/PKB-related research involves surprising effects of nuclear Akt/PKB signaling for cardiomyocytes including anti-hypertrophic signaling, induced downstream mediators of cell survival including Pim-1 kinase, and the potentiation of survival and regenerative capacity for cardiac stem cells.

Repairing and restoring myocardial structure and function represents the ideal outcome for treatment of cardiomyopathy. Discoveries linking stem cell-based therapies to improvements in myocardial performance have invigorated the field, but current limitations in stem cell-based approaches present significant barriers. Dr. Sussman's research concentrates upon existing challenges in stem-cell based treatment and how these may be overcome by incorporation of gene therapy, resulting in a combinatorial approach that uses genetic engineering to potentiate stem cell activity for myocardial repair.

Recently, Dr. Sussman has become interested in the cardiopulmonary effects of vaping and consequences for the heart and lungs. He has embarked upon novel studies to assess the biology of vaping using mouse and rat models. Dramatic increases in use of flavored vaping juices among young people, the incredibly addictive impact of nicotine-salts in vape fluids, recent legalization of marijuana, and expanding use of cannabinoid-derived compounds for medicinal purposes are all compelling reasons to pursue research in this expanding area. Equipment in the Sussman lab enables rodent inhalation studies using commercially available vape pens, e-cigarettes, and conventional cigarettes to produce experimental models that mimic real-world conditions. Dr. Sussman's research has been supported by grant awards from the National Institutes of Health and the American Heart Association since establishing his independent laboratory in 1995. He has authored over 200 peer-review articles and is a popular speaker at national and international venues with over 230 invited presentations in the last 20 years.