



## Prof. Jonathan Leor, Ph.D.

Neufeld Cardiac Research Institute, Tel Aviv University; Tamman Cardiovascular Institute, Sheba Medical Center; Sheba Center of Regenerative Medicine, Stem Cells and Tissue Engineering



# Cardiovascular Regenerative Medicine and Targeting of Inflammation and Fibrosis

## Positions

Professor of Cardiology, Sackler Faculty of Medicine

Director, Neufeld Cardiac Research Institute, Tel Aviv University

Director, Tamman Cardiovascular Research Institute, Sheba Medical Center

Director, Sheba Center of Regenerative Medicine, Stem Cells and Tissue Engineering

## Research

Our lab is focused on translational research. Specifically, we study cardiovascular regenerative medicine, stem cells and tissue engineering. In addition, we aim to target cardiovascular inflammation and fibrosis using novel nano-medicine and a theranostic (therapy + diagnosis) approach. We use a combination of gene profiling, new biomaterials, liposomes, tissue engineering, physiological testing, and molecular imaging technologies, to understand heart cell biology in vitro and in vivo. Particularly, we work on the development of novel nano-therapies for cardiovascular disease.

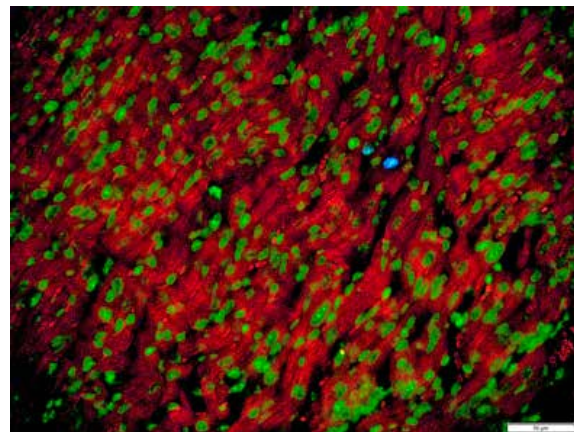
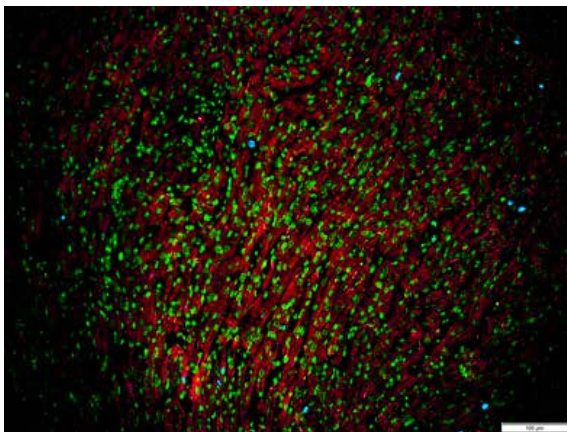
## Publications

Konfino T, Landa N, Ben-Mordechai T, Leor J. The type of injury dictates the mode of repair in neonatal and adult heart. *J Am Heart Assoc.* 2015 (in press).

Rinkevich-Shop S, Landa-Rouben N, Epstein FH, Holbova R, Feinberg MS, Goitein O, Kushnir T, Konen E and **Leor J**. Injectable collagen implant improves survival, cardiac remodeling, and function in the early period after myocarditis in rats. *J Cardiovasc Pharmacol Ther.* 2014;19:470-80.

Rinkevich-Shop S, Konen E, Kushnir T, Epstein FH, Landa-Rouben N, Goitein O, Ben Mordechai T, Feinberg MS, Afek A and **Leor J**. Non-invasive assessment of experimental autoimmune myocarditis in rats using a 3 T clinical MRI scanner. *Eur Heart J Cardiovasc Imaging.* 2013;14:1069-79.

Overgaard CB, Dzavik V, Buller CE, Liu L, Banasiak W, Devlin G, Maggioni AP, **Leor J**, Burton JR, Reis G, Ruzyllo W, Forman SA, Lamas GA, Hochman JS and Investigators OAT. Percutaneous revascularization and long term clinical outcomes of diabetic patients randomized in the Occluded Artery Trial (OAT). *Int J Cardiol.* 2013;168:2416-22.



Myocardial regeneration in a neonatal heart of a mouse, 3 days after apical resection. We used the heart of a newborn mouse to study the mechanism of myocardial regeneration and repair. The regenerating myocardium is characterized by cardiomyocyte (cardiac actin, red) dedifferentiation, and proliferation. Phospho-histone 3 immunostaining detects dividing nuclei (blue) and mitotic activity. Nuclei are stained green with DAPI

Naftali-Shani N, Itzhaki-Alfia A, Landa-Rouben N, Kain D, Holbova R, Adutler-Lieber S, Molotski N, Asher E, Grupper A, Millet E, Tessone A, Winkler E, Kastrup J, Feinberg MS, Zipori D, Pevsner-Fischer M, Raanani E and **Leor J**. The origin of human mesenchymal stromal cells dictates their reparative properties. *J Am Heart Assoc*. 2013;2:e000253.

Mina Y, Rinkevich-Shop S, Konen E, Goitein O, Kushnir T, Epstein FH, Feinberg MS, **Leor J** and Landa-Rouben N. Mast cell inhibition attenuates myocardial damage, adverse remodeling, and dysfunction during fulminant myocarditis in the rat. *J Cardiovasc Pharmacol Ther*. 2013;18:152-61.

Ben-Mordechai T, Holbova R, Landa-Rouben N, Harel-Adar T, Feinberg MS, Abd Elrahman I, Blum G, Epstein FH, Silman Z, Cohen S and **Leor J**. Macrophage subpopulations are essential for infarct repair with and without stem cell therapy. *J Amer Coll Cardiol*. 2013;62:1890-901.

Adutler-Lieber S, Ben-Mordechai T, Naftali-Shani N, Asher E, Loberman D, Raanani E and **Leor J**. Human macrophage regulation via interaction with cardiac adipose tissue-derived mesenchymal stromal cells. *J Cardiovasc Pharmacol Ther*. 2013;18:78-86.

Naresh NK, Xu Y, Klibanov AL, Vandsburger MH, Meyer CH, **Leor J**, Kramer CM, French BA and Epstein FH. Monocyte and/or macrophage infiltration of heart after myocardial infarction: MR imaging by using T1-shortening liposomes. *Radiology*. 2012;264:428-35.

Klempfner R, **Leor J**, Tenenbaum A, Fisman EZ and Goldenberg I. Effects of a vildagliptin/metformin combination on markers of atherosclerosis, thrombosis, and inflammation in diabetic patients with coronary artery disease. *Cardiovasc Diabetol*. 2012;11:60.

Shachar M, Tsur-Gang O, Dvir T, **Leor J** and Cohen S. The effect of immobilized RGD peptide in alginate scaffolds on cardiac tissue engineering. *Acta Biomaterialia*. 2011;7:152-62.

Ruvinov E, **Leor J** and Cohen S. The promotion of myocardial repair by the sequential delivery of IGF-1 and HGF from an injectable alginate biomaterial in a model of acute myocardial infarction. *Biomaterials*. 2011;32:565-78.

Naresh NK, Ben-Mordechai T, Leor J and Epstein FH. Molecular Imaging of Healing After Myocardial Infarction. *Curr Cardiovasc Imaging Reports*. 2011;4:63-76.

Harel-Adar T, Ben Mordechai T, Amsalem Y, Feinberg MS, **Leor J** and Cohen S. Modulation of cardiac macrophages by phosphatidylserine-presenting liposomes improves infarct repair. *Proc Natl Acad Sci USA*. 2011;108:1827-32.

#### Grants

2012-2015 MRI imaging of infarct macrophage subset, Binational Science Foundation (BSF)

2012-2015 Israeli National Nanotechnology Initiative and Helmsley Charitable Trust for a focal technology area (FTA) on Nanomedicines for Personalized Theranostics

2014-2019 Israel Science Foundations, Role of macrophages in myocardial regeneration