

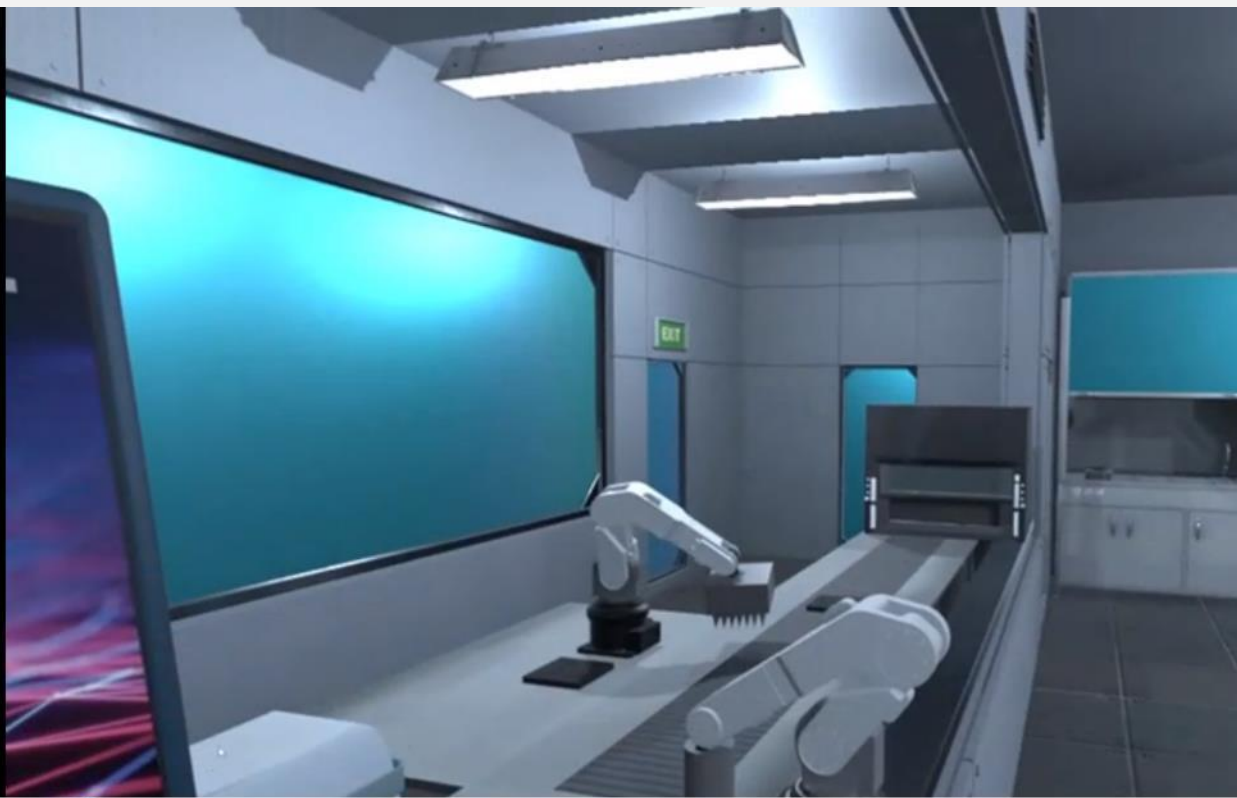
The Science behind the VR

Nadja Ring - ICGEB

The Facility



Interreg ITA-SLO 2014-2020



High throughput screening VR



High throughput screening VR



A main area of expertise: High Throughput Screenings

Problem

Cardiac regeneration

Simple model of your problem

Lack of vascularisation, reduction of contractive tissue, formation of scar tissue
Endothelial cell tube formation, cardiomyocyte proliferation, **fibroblast activation**

Collections of molecules

Library of chemical compounds
Library of RNAs (miRNAs or siRNAs)

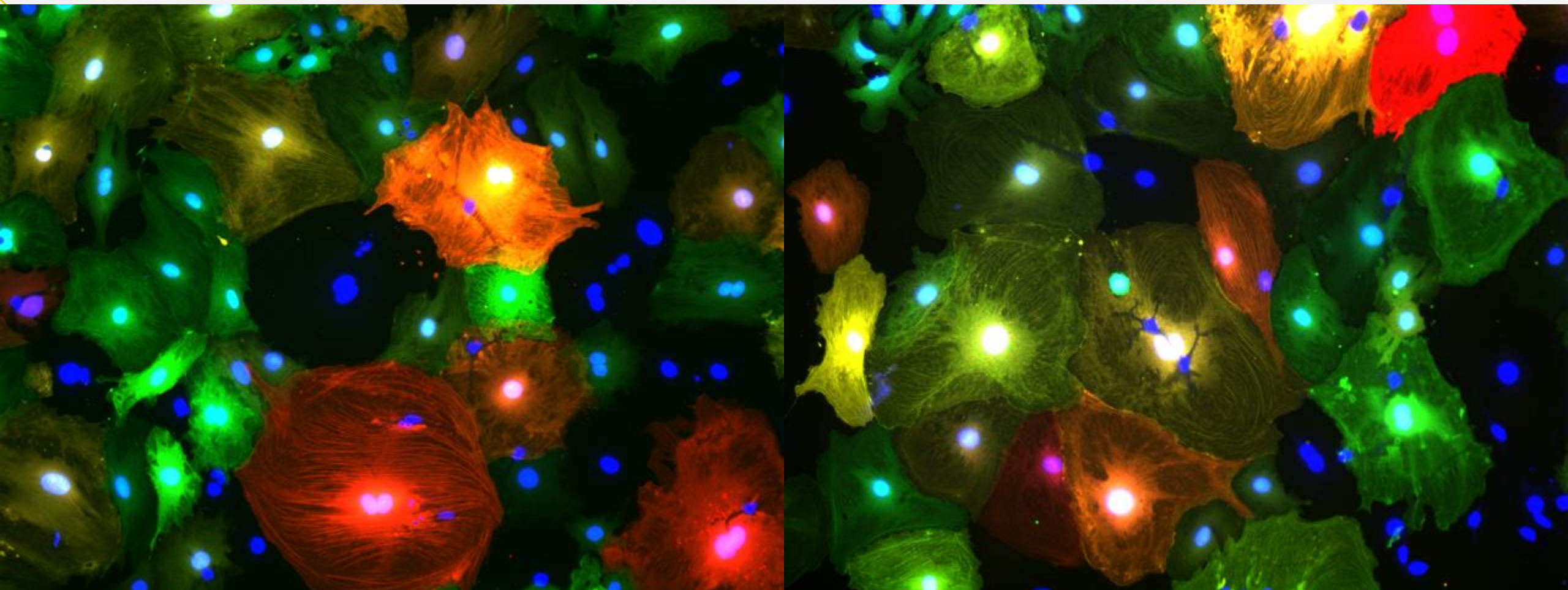
Solution

Unbiased
Based on function

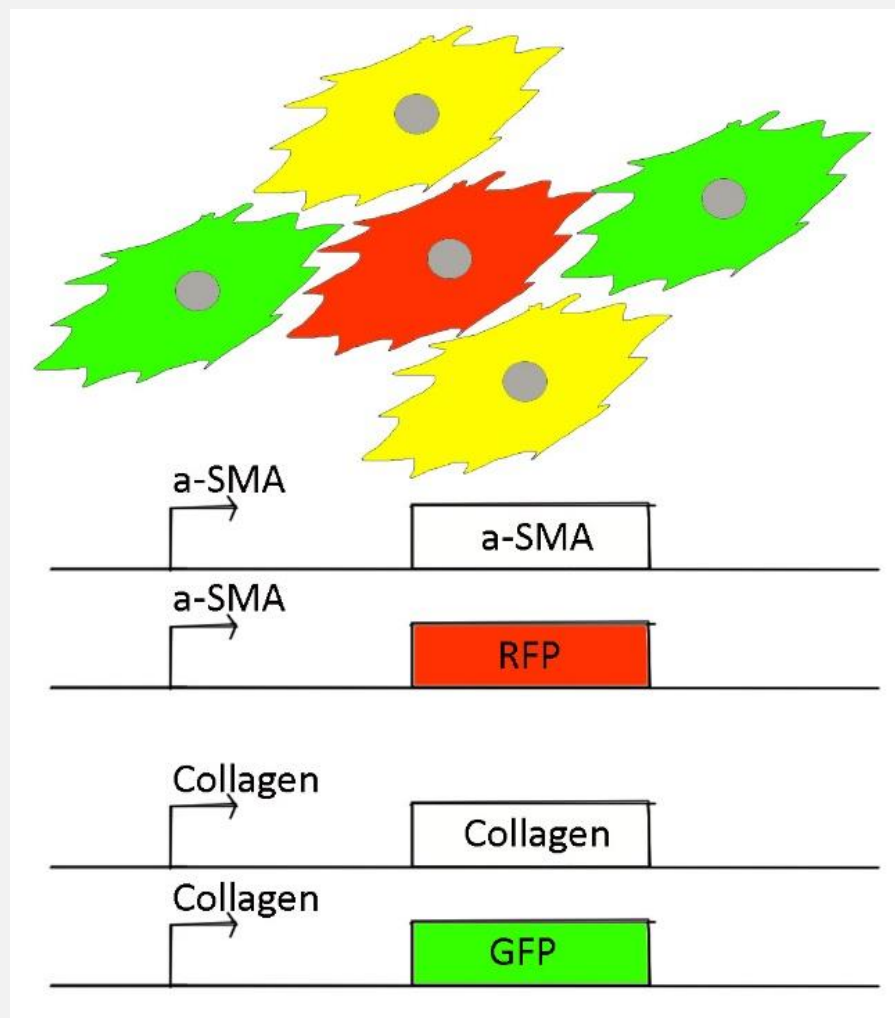
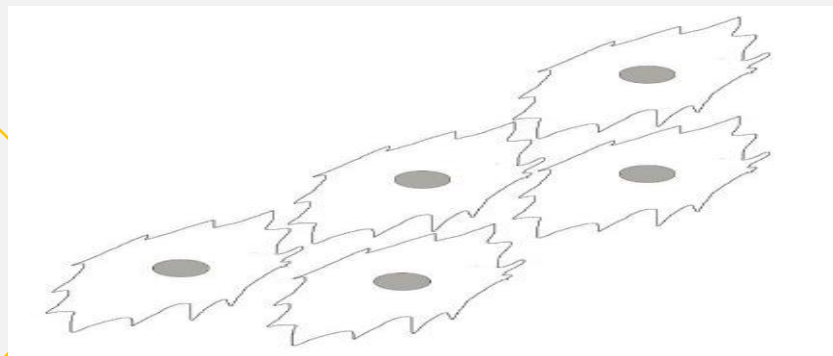
Identify compounds/RNAs which can
Increase proliferation of endothelial cells and cardiomyocytes,
Reduce activation of fibroblasts into myofibroblasts

Culture the cells
for the screen





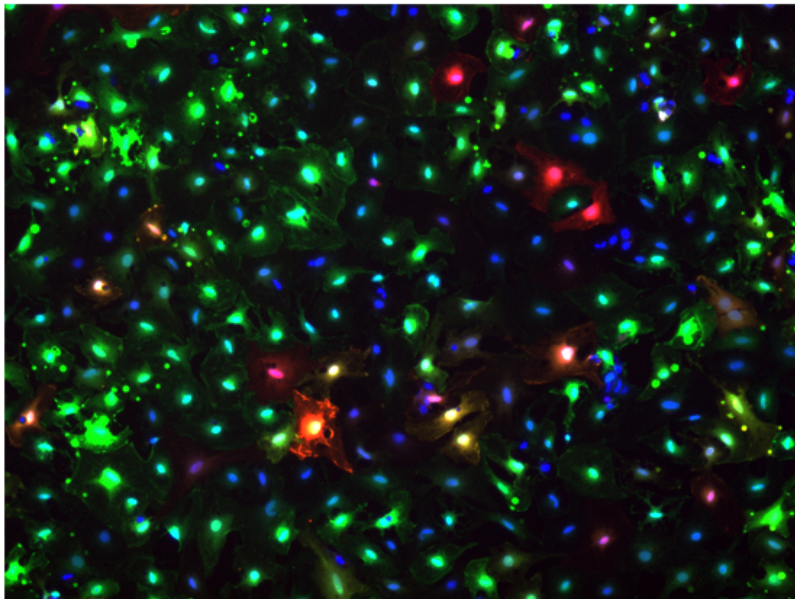
Problem: formation of scar tissue



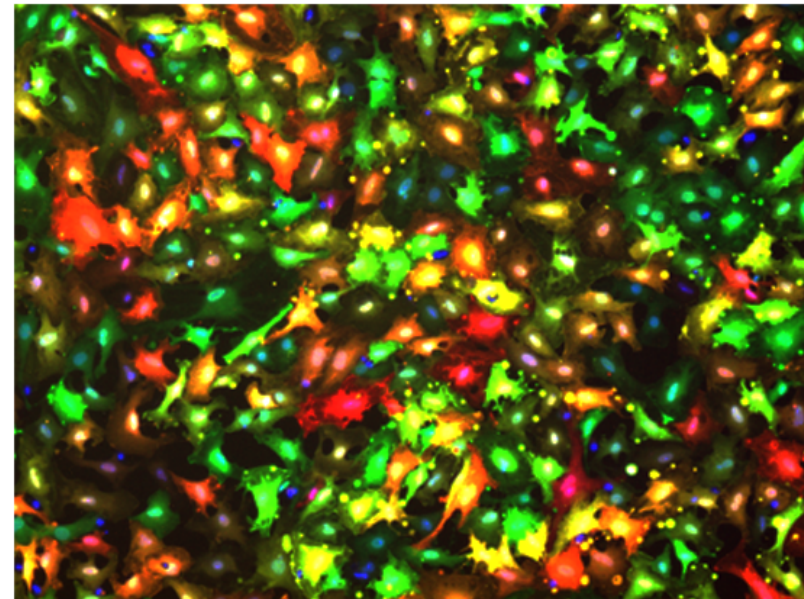
Model of fibroblast activation in myocardial infarction

■ Fibrosis

Fibroblasts
+ Myofibroblasts



Fibroblasts
+ Myofibroblasts
treated with TGFb



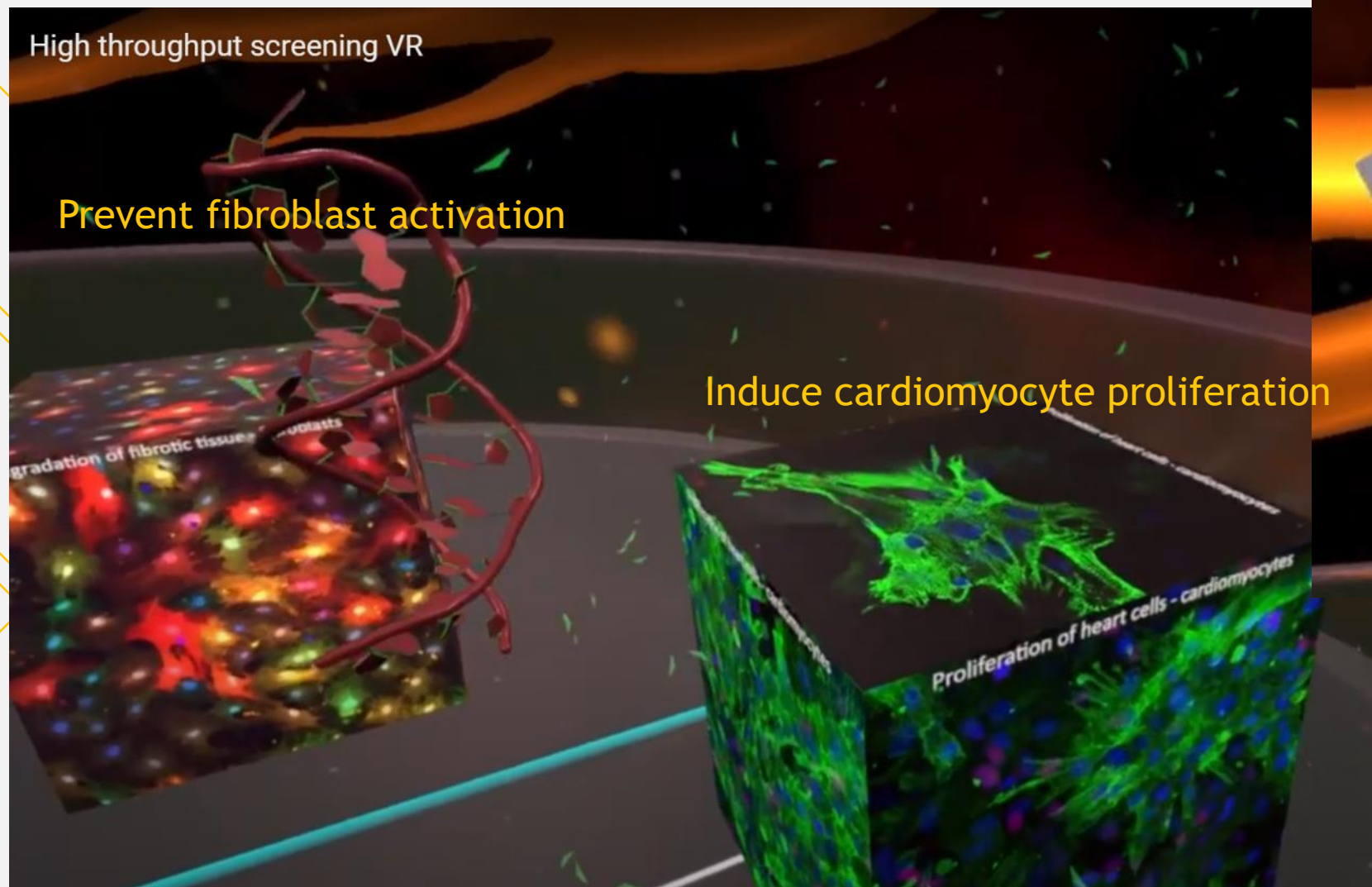
Fibroblasts (collagen-GFP)
Myofibroblasts (aSMA-RFP)
Cell nuclei (Hoechst)

The Screen

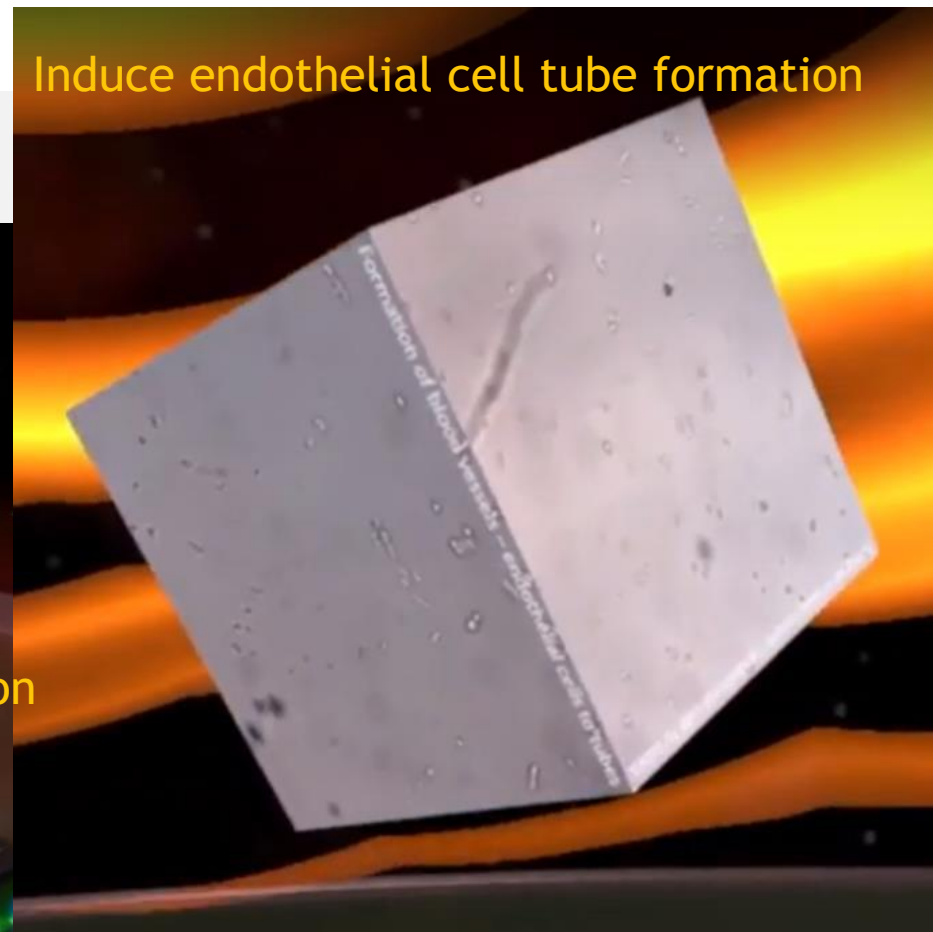
High throughput screening VR

Prevent fibroblast activation

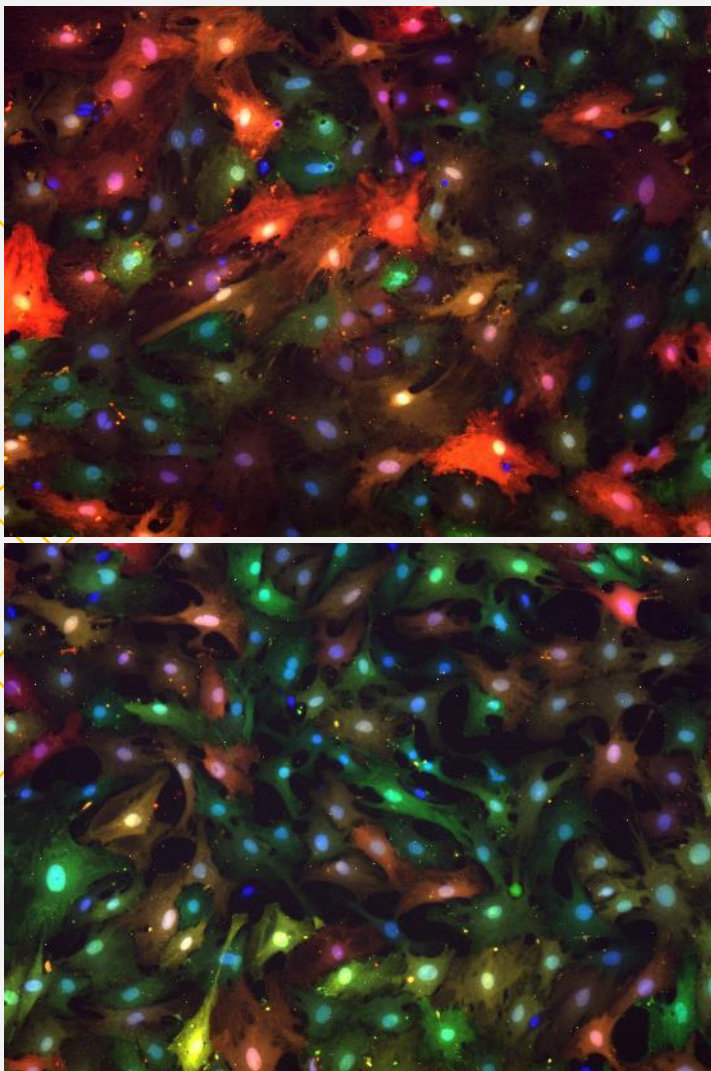
Induce cardiomyocyte proliferation



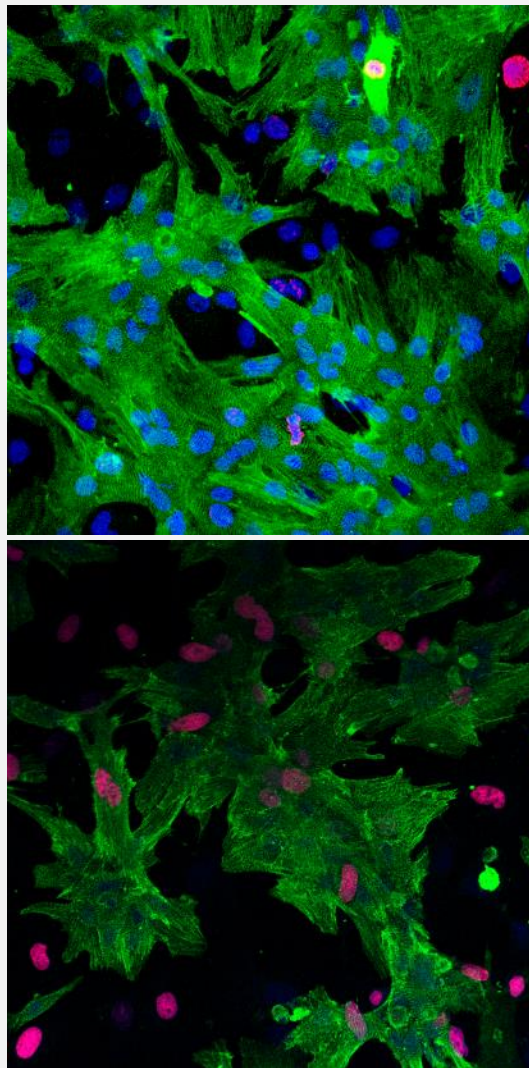
Induce endothelial cell tube formation



Fibroblast activation



Cardiomyocyte proliferation



Endothelial cell tube formation

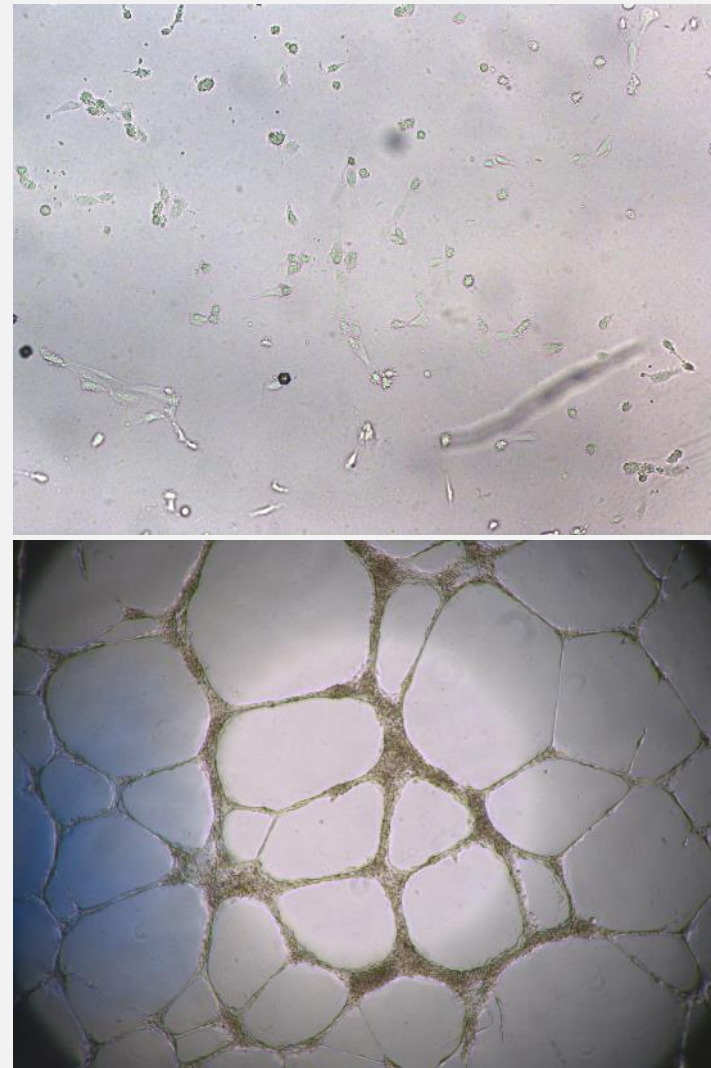


Plate the libraries





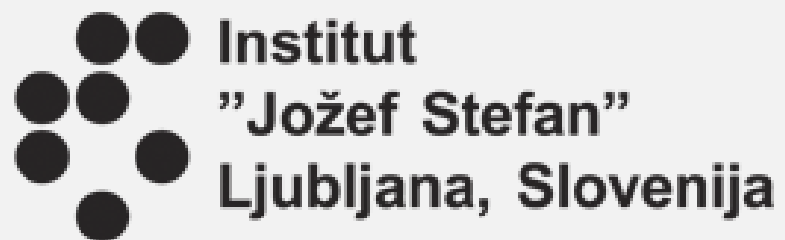
Acquire the images

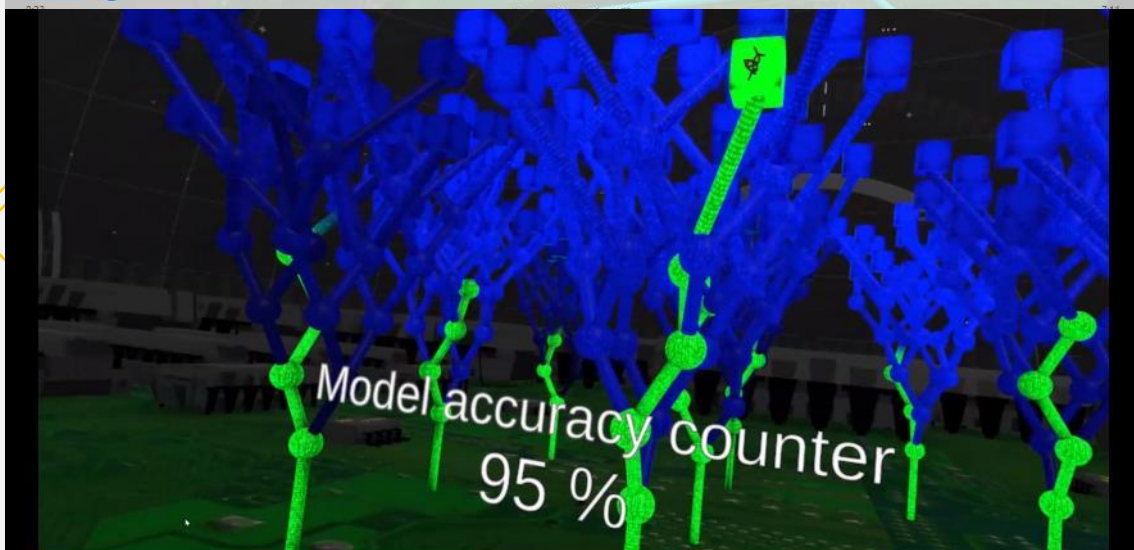
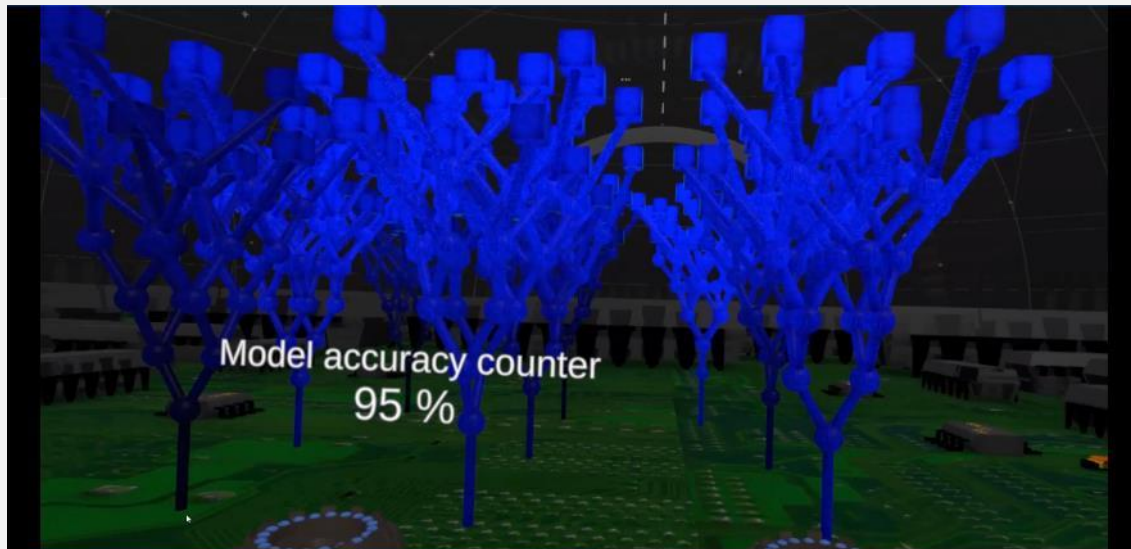


Analyse the images to
identify interesting potentially
therapeutic molecules



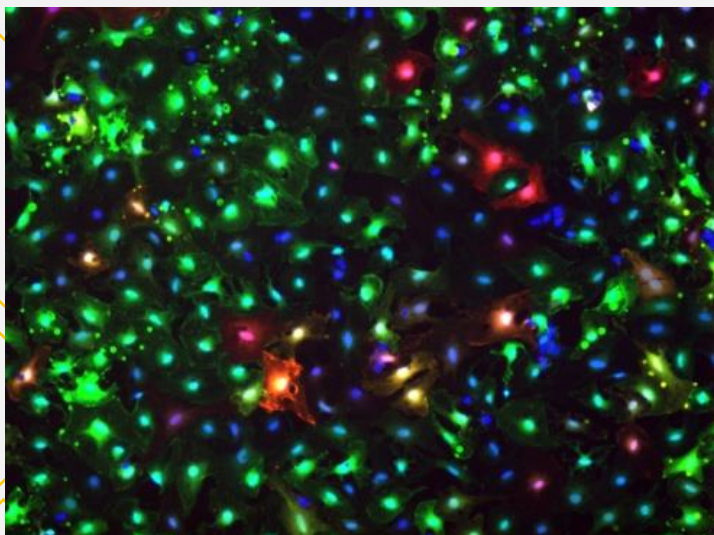
Virtual Screen to find additional hits



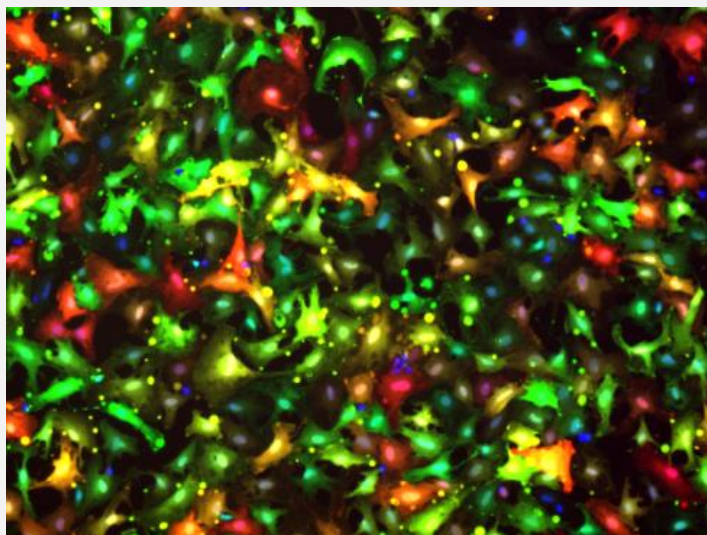


Validation of bioinformatically predicted compounds

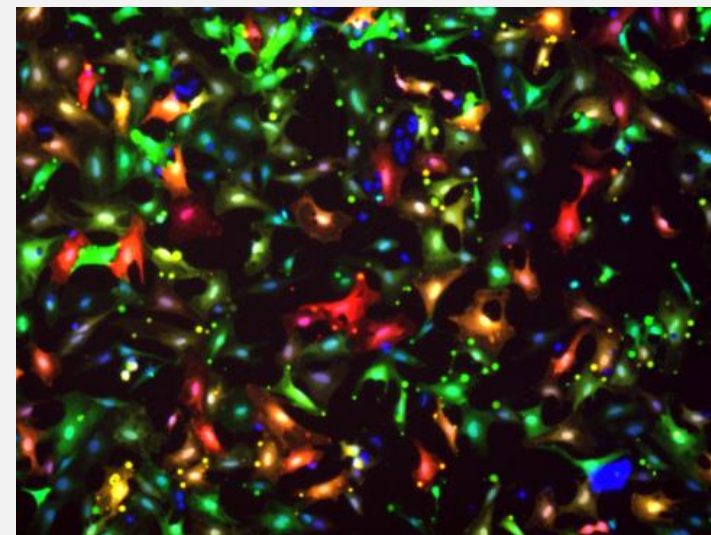
untreated



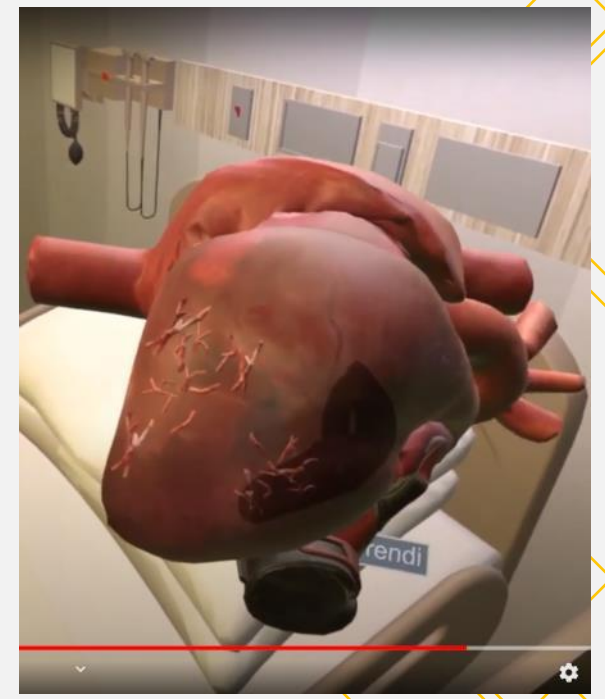
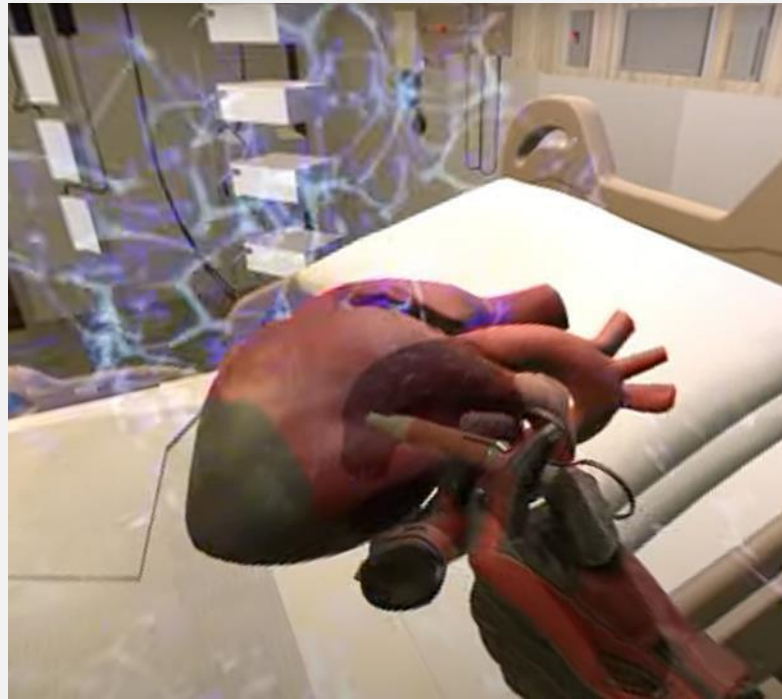
TGFb



TGFb +
anti-fibrotic drug



Identified compounds can be developed for clinical application



Interreg



UNIONE EUROPEA
EVROPSKA UNIJA

ITALIA-SLOVENIJA



TRAIN

Progetto standard co-finanziato dal Fondo europeo di sviluppo regionale
Standardni projekt sofinancira Evropski sklad za regionalni razvoj

**BIG DATA e MODELLI DI MALATTIE: PIATTAFORMA TRANSFRONTALIERA
DI KIT VALIDATI PER L'INDUSTRIA BIOTECH**

**BIG DATA in MODELI BOLEZNI: EZMEJNA PLATFORMA VALIDIRANIH
KOMPLETOV ZA BIOTEHNOLOŠKO INDUSTRIJO**