Target-specific Delivery of Therapeutic Agents for Cardiac Infarction Treatment

Inventors: Kimberly Kelly, Brent French, Siva Dasa
Myocardial Infarction

- A myocardial infarction (MI), most commonly known as heart attack, occurs when blood flow decreases or stops to parts of the heart, leading to damage of the heart muscle
  - Left ventricle undergoes progressive physiological and anatomical transformations, which is the major cause of heart failure
- 34% of patients die acutely from MI and 25% succumb due to downstream heart failure

Clinical Problem:
- Currently no effective treatments for preventing or reversing the process of left ventricle remodeling initiated by MI
- Current drugs in use have a short half-life and off-target effects at higher doses
PARP-1 Inhibitor AZ7379

Solution: Researchers at the University of Virginia have developed a liposomal formulation of a poly(ADP-ribose) polymerase-1 inhibitor (AZ7379) that targets damaged tissue

- Liposomes bear peptides specific for cells present in the infarct/border zone
  -- Increased drug efficacy
  -- Minimized off-target effects
- Allows for effective and specific delivery of small molecules
- Liposome-based therapeutics might help improve cardiac function or reverse LV remodeling
AZ7379 I-1 liposome increases efficiency of PARP-1 inhibition in cardiomyocytes and phagocytes

Measurement of the PAR production in cardiomyocytes and phagocytes after targeted delivery of liposomal formulation of AZ7379 (I-1 AZ7379) compared with negative controls: NCP-negative control peptide AZ7379, free AZ7379 and Empty I-1. White arrows point to cardiomyocytes/phagocytes, green indicates PAR expression.
Relevant Publications

Intellectual Property

- **UVA Tech ID:** KELLYK-CARDIAC
  - Title: Target-specific delivery of therapeutic agents