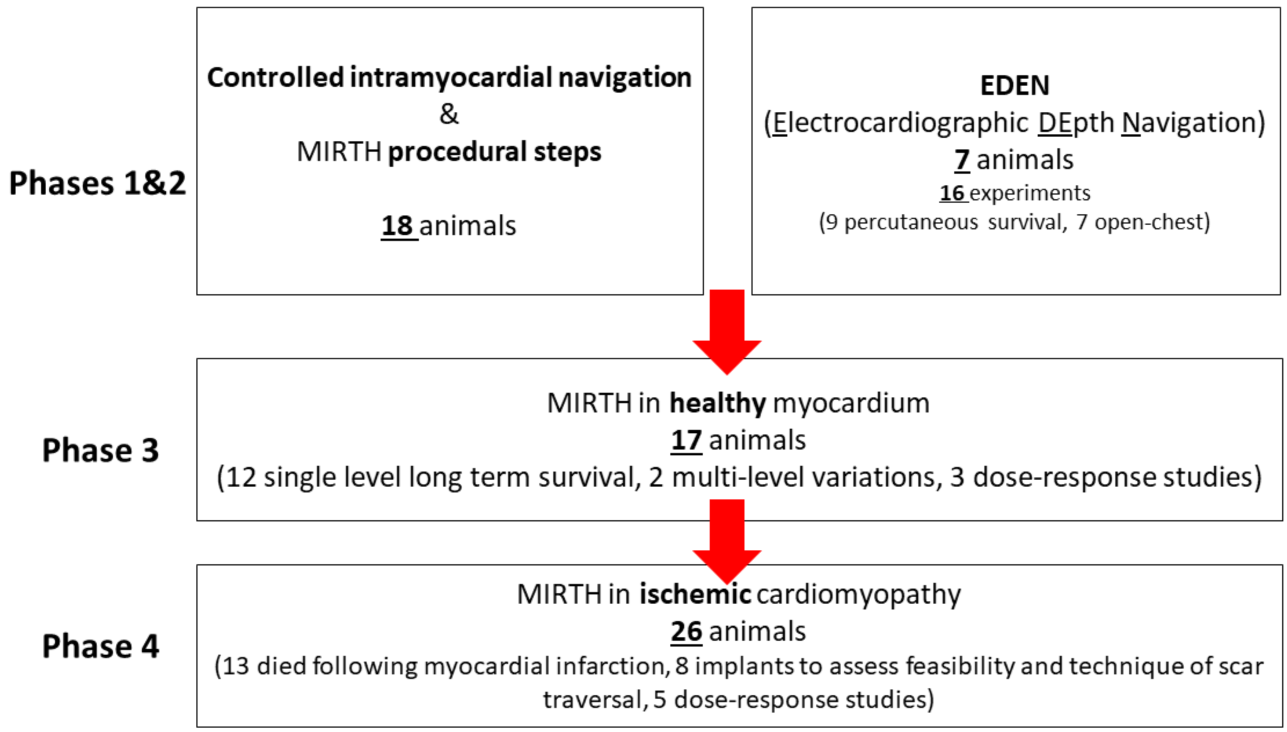
# SUPPLEMENTAL METHODS

## Study flow




## MIRTH technical refinements during early experimentation

Technical refinement included (a) care to assure the trajectory remains within the myocardium during ensnarement, using EDEN electrogram and ICE guidance; (b) assuring complete microcatheter ensheathment of the implant suture to prevent abrasion against the crimp-fastener over time; and (c) change from polyethylene (*Ethibond*, Ethicon) suture to ultra-high molecular weight polyethylene (UHMWPE) suture (*HS Fiber*, Riverpoint Medical) that better resists abrasion.

## EDEN (Electrocardiographic radial DEpth Navigation) experiments

### Preliminary experiments

In 9 percutaneous experiments we performed electrogram mapping from the left and right ventricles and interventricular septum using the same guidewire and microcatheter combinations used in MIRTH; in 7 open-chest, non-survival experiments we used a custom calibrated multi-electrode plunge needle.

## MIRTH implant *in-vitro* fatigue testing

### In vitro implant fatigue testing

To evaluate implant resistance to repetitive stress beyond which we could achieve in animal models, MIRTH implants were fixed to a custom jig generating cyclic expansion between 0.5-5 pounds/in$^2$ (3.5 – 35kPa) at 1000 cycles/minute. Implants were evaluated at intervals for signs of erosion and separation up to 20 million cycles.

# SUPPLEMENTAL RESULTS

## Fatigue testing

Four model implants (2 ultra-high molecular weight polyethylene, 2 polyethylene) secured with a single surgical crimp-fastener failed due to crimp slippage after 7- 9 million cycles. Interposing a Roeder knot between the MIRTH tether and crimp allowed four implants to complete the 20 million cycle test without failure.