MARSHALL UNIVERSITY
Joan C. Edwards School of Medicine

Translational Research and personalized medicine

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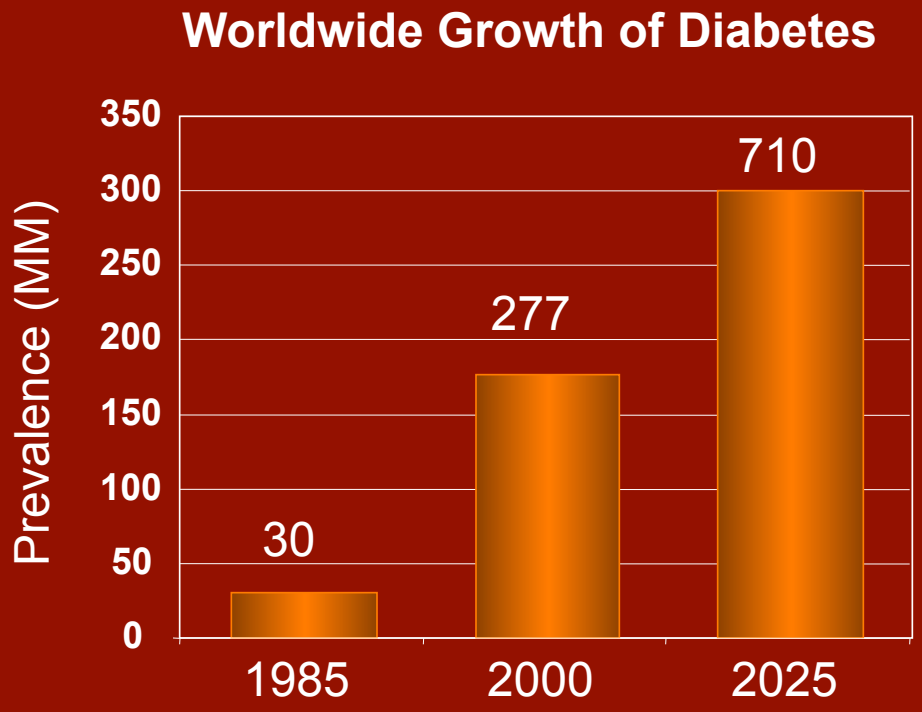
Vice Dean for Research,
IGESOM

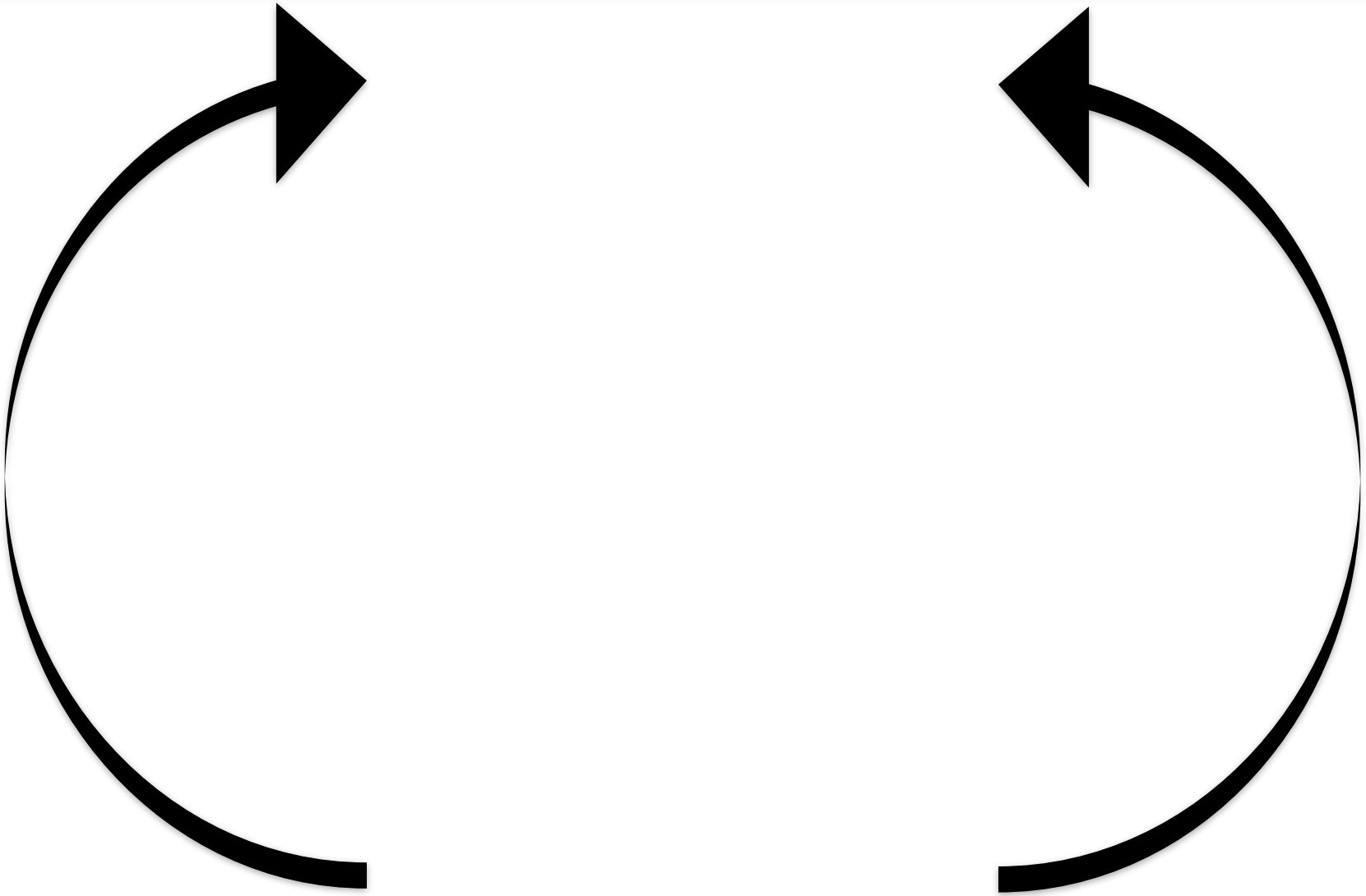
Increasing Prevalence of obesity and Diabetes



- The rapidly rising prevalence of type 2 diabetes is due to:
  - Aging population
  - Unhealthy diets
  - Sedentary lifestyles
  - Obesity prevalence
- Limitations of current therapies

- 47MM diabetics in 7 major markets (18MM in US)
- 51% of diabetics are not diagnosed or treated
- **600,000 obese-diabetes in WV**

Disruption Of Redox Homeostasis in Obesity and diabetes : A Vicious Pathological Loop



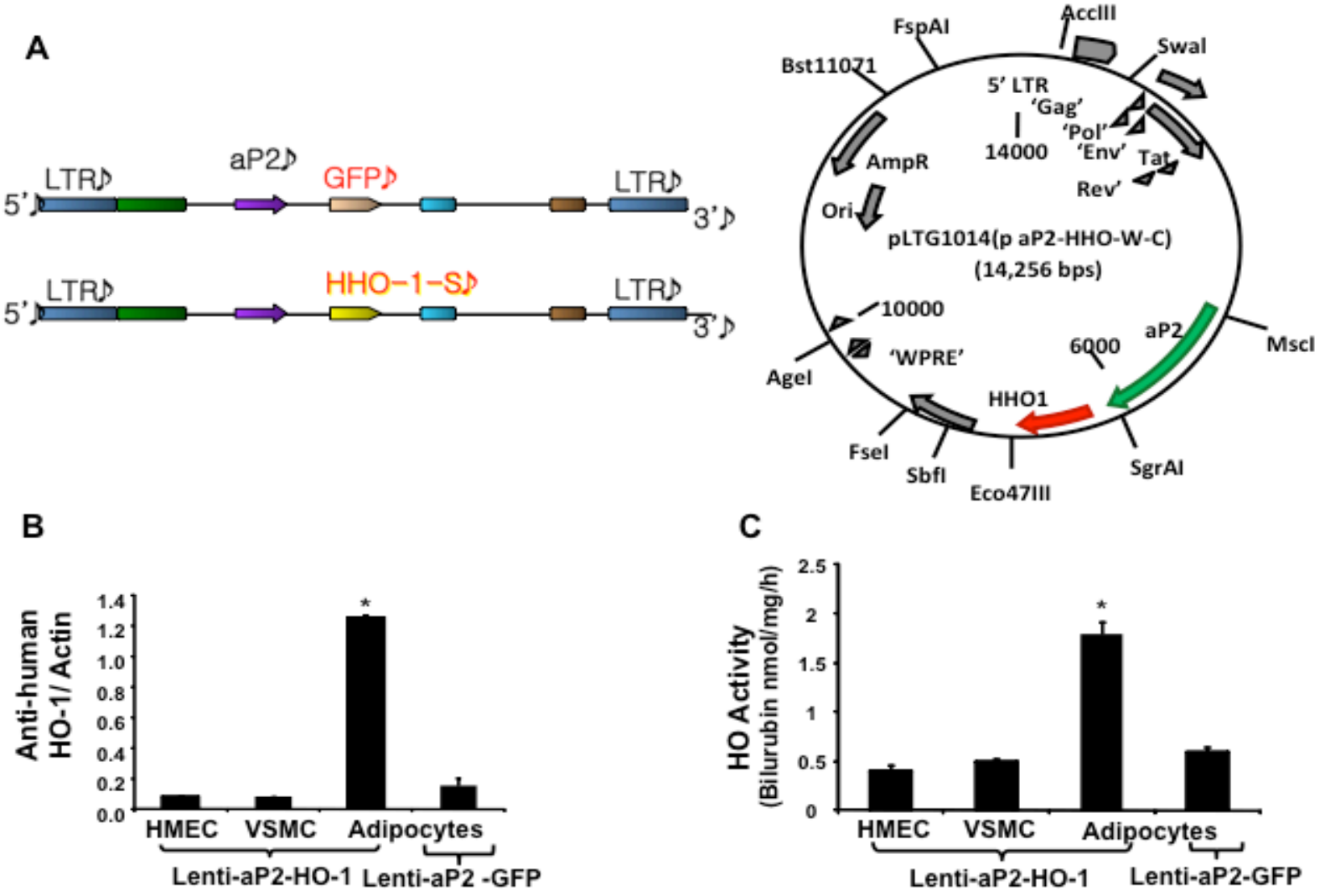
Dysfunctional Adipogenesis

Targeted Induction Of HO-1 In Adipocytes: Effects On Diet-induced Obesity

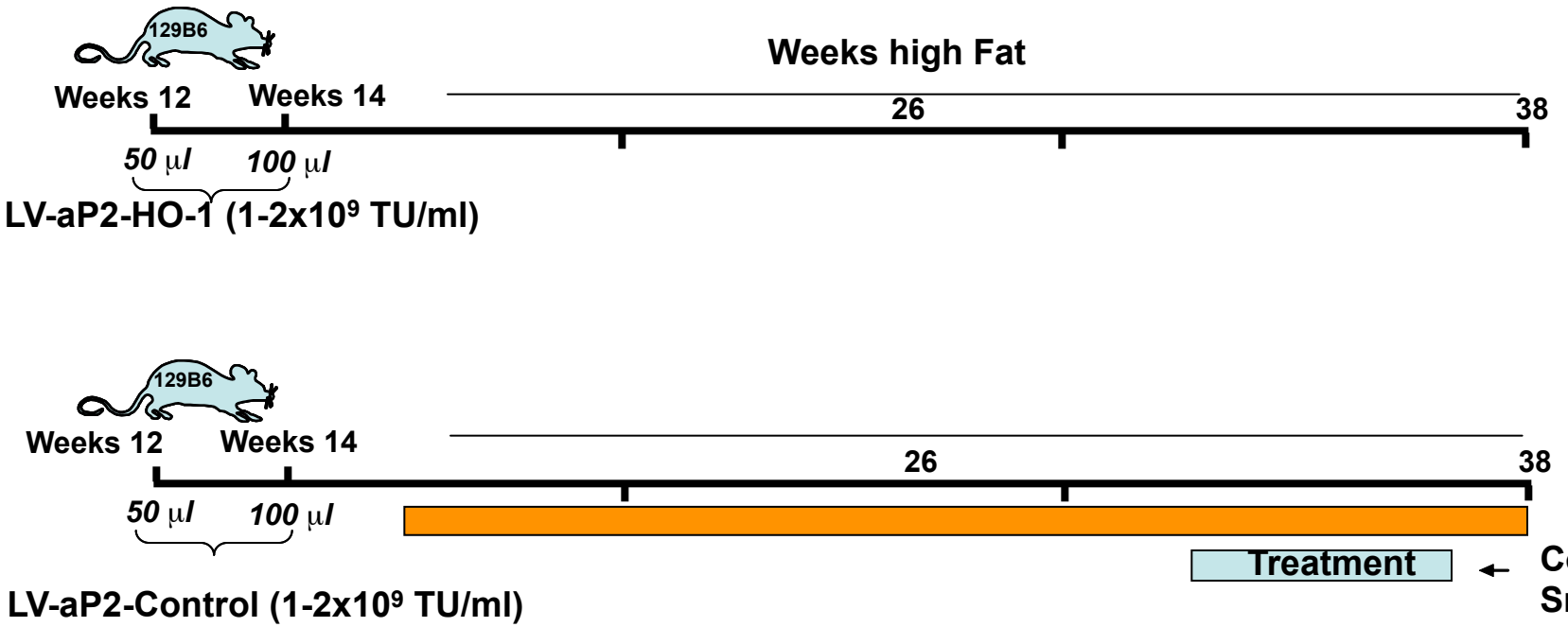
- HO-1 gene targeting to adipocytes utilizing lentiviral vector for gene delivery to fat stem cells.

- Examining the effects on visceral adiposity and associated vascular dysfunction in mice fed a high fat diet

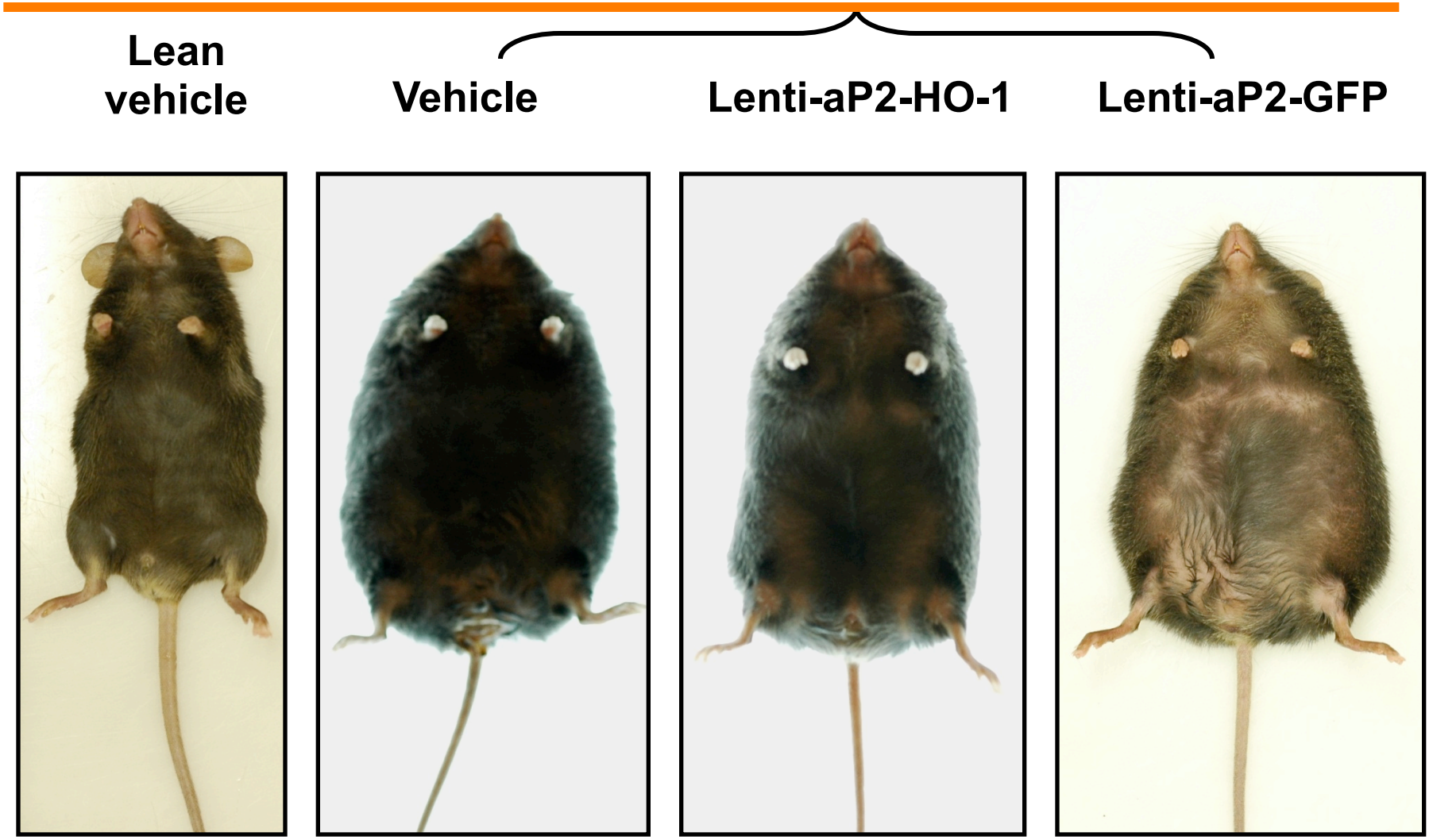
Viral vector construction and adipocyte-specific expression of the transgene *in vivo*



Experimental protocols



Effect of HO-1 Gene targeting to fat tissues on mice fed HF diets, mice appearance



Clinical Implications

This study provides strong evidence that long-term using lentivirus (FDA approved) targeting HO-1 to fat stem cells provide a therapeutic approach to address the risk factor of obesity

Stem cells Therapy

- Application of stem cells for human with myocardial infraction

Criteria for patient participation

- Patients scheduled for coronary artery bypass grafting.
- Acute transmural myocardial infarct is extensive with isotopic, LVEF≤30%.
- Patients are ≤70 years.

Methods and Procedures

✓Infarct size is stable (3-5 days post infarct)

✓Harvest 200 ml of blood after 6-7 days

✓CD34+ selection using immunoselection and expansion

✓Re-inject stem cells into the infarct tissue.
This process takes about 25-30 days.

Patient

Apheresis

200 ml

PBSC Collection

$CD34^+$ Stem Cell Immunoisolation

Selective Expansion

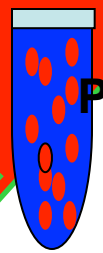
Heart Function Survey

Ejection Fraction

Cardiac Muscle Contractility (PetScan)

(PetScan)

eptide

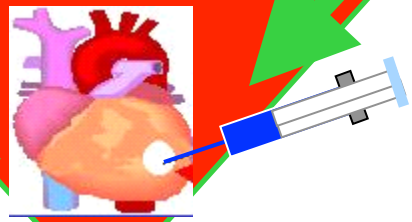


Purified $CD34^+$ cells

% 30 loss, Subset Evaluation

CD 133+ KDR+ Cardiomyocyte

Inject $7X10^7$



Bypass Surgery

12 months myocardial function improvement Petscan

Patient	LVEF before /12 months	LVEDD (mm) before/12 months
1	34% / 38%	
2	30% / 44 %	
3	33% / 53%	
4	31% / 47%	
5	36% / 51%	
6	40% / 56%	
7	30% / 54%	

Segment area			Area kinesis (- to ++ +)	NYHA grade before/6 months
				IV/III
				IV/I
				IV/I
				IV/III
				IV/II
				IV/I
				IV/I

Regeneration Therapy / Cell Therapy

Stem cells are promising therapeutic tools with wide applications including Metabolic syndrome, Cardiovascular disease , renal repair and Neurodegenerative diseases