Targeting glycolysis in endothelial cells to prevent intraplaque neovascularization and atherogenesis in mice

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“Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world”.

Louis Pasteur

Cover Image: Microscopic image of a vein graft with intraplaque neovessels
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Abbreviations:

AA: aortic arch
ApoE: apolipoprotein E
ATP: adenosine triphosphate
CA: carotid artery
CD31: cluster of differentiation 31
CPT1: carnitine palmitoyltransferase 1A
CHD: coronary heart disease
DCM : dichloromethane
DMSO: dimethylsulfoxide
EC: endothelial cell
EF: ejection fraction
ECM : extracellular matrix
FAO: fatty acid oxidation
FAS : fatty acid synthesis
Fbn: fibrillin
FDG: fluorodeoxyglucose
FGF: fibroblast growth factor receptor
FS: fractional shortening
F-1,6-P_2 : fructose -2,6-bisphosphate
F-6-P: fructose-6-phosphate
GAPDH: Glyceraldehyde-3-Phosphate Dehydrogenase
GLUT: Glucose transporter
HAEC: human aortic endothelial cell
HDL: high-density lipoprotein
HE: haematoxylin-eosin
HIF: hypoxian inducible factor
HK: Hexokinase
HMG-CoA: 3-hydroxy-3-methylglutaryl-coenzyme A
HUVEC: Human umbilical vein endothelial cell
ICAM-1: intercellular cell adhesion molecule
iDISCO: immunolabeling-enabled 3D Imaging of Solvent Cleared Organs

IL: interleukin

iNOS: inducible nitric oxide synthase

IP/PI: intra-plaque

IVRT: isovolumic relaxion time

i.p.: intraperitoneal

i.v.: intravenous

KLF2: Kruppel Like Factor 2

α-KG: α-ketoglutaric acid

LDH: lactate dehydrogenase

LDL: low-density lipoprotein

LDLR: LDL receptor

LV: left ventricular

LVID: left ventricular internal diameter

MI: myocardial infarction

MMP: matrix metalloproteinase

NADH: nicotinamide adenine dinucleotide

OOA: oxalacetate

Ox: oxidized

PAD: peripheral arterial disease

PDGF: platelet-derived growth factor

PET: positron emission tomography

PFK-1: 6-phosphofructo-1 -kinase

PFKFB3: 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase 3

PF: platelet factor

PFPE: paraformaldehyde fixed paraffin embedded

PGI: phosphoglucose isomerase

Plgf: placenta growth factor

PCSK9: Proprotein convertase subtilisin/kexin type 9

PGK: phosphoglycerate kinase

SMC: smooth muscle cell

TCFA : thin cap fibroatheroma

TGF-β: transforming growth factor-β

TIA: transient ischaemic attack

TNF-α: Tumor necrosis factor alfa

VCAM-1 : vascular cell adhesion molecule-1

VEGF: vascular endothelial growth factor

VEGFR : VEGF receptor

vWF: von Willebrand factor

WD : western-type diet

WT: wild type

3PO: 3-(3-pyridinyl)-1-(4-pyridinyl)-2-propen-1-one

3D: three dimensional