

Investigation of stress induced Tbx20 function in autophagy in heart with comparative analyses of extracellular matrix remodeling with multiple stress inductions in cultured cardiac cell line.

Thesis submitted for the partial fulfilment of the requirements
for the degree of
Doctor of Philosophy in Science

By

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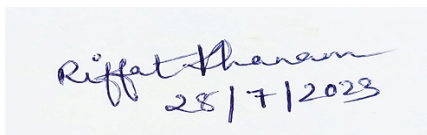
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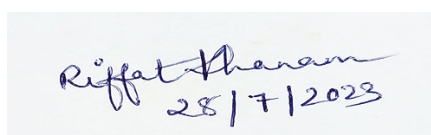
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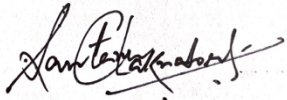


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List of published research papers

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Identification of Adamts4 as a novel adult cardiac injury biomarker with therapeutic implications in patients with cardiac injuries

[Riffat Khanam](#),¹ [Arunima Sengupta](#),² [Dipankar Mukhopadhyay](#),³ and [Santanu Chakraborty](#)^{✉1}

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Abstract

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Pathological cardiac remodeling as an aftermath of a severe cardiac injury can lead to ventricular dysfunction and subsequent heart failure. Adamts4, a metalloproteinase, and disintegrin with

> [Int J Cell Biol.](#) 2020 Apr 10;2020:2045969. doi: 10.1155/2020/2045969. eCollection 2020.

Asporin Reduces Adult Aortic Valve Interstitial Cell Mineralization Induced by Osteogenic Media and Wnt Signaling Manipulation *In Vitro*

Anisha Polley ¹, Riffat Khanam ¹, Arunima Sengupta ², Santanu Chakraborty ¹

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Abstract

Worldwide, calcific aortic valve disease is one of the leading causes of morbidity and mortality among patients with cardiac abnormalities. Aortic valve mineralization and calcification are the key events of adult calcific aortic valve disease manifestation and functional insufficiency. Due to heavy mineralization and calcification, adult aortic valvular cusps show disorganized and dispersed stratification concomitant with deposition of calcific nodules with severely compromised adult valve function. Interestingly, shared gene regulatory pathways are identified between bone-forming cells and heart valve cells during development. *Asporin*, a small leucine-rich proteoglycan (43 kDa), acts to inhibit mineralization in periodontal ligament cells and is also detected in normal murine adult

Table of Abbreviations

CVD: Cardiovascular disease

CHD: Congenital heart disease

AV: Atrio-ventricular

SA: Sino-atrial

AVC: Atrioventricular canal

LV: Left ventricle

RV: Right ventricle

OFT: Outflow tract

E: Embryonic day

MI: Myocardial infarction

AMI: Acute myocardial infarction

IHD: Ischemic heart disease

IWMI: inferior wall MI

AWMI: Anterior wall MI

T2D: Type 2 diabetes

ECM: Extracellular matrix

MMP: Matrix metalloproteinase

TIMP: Tissue inhibitor of matrix metalloproteinase

I/R: Ischemia- Reperfusion

DCM : Dilated cardiomyopathy

DCM & D: DCM with T2D.

EMT: epithelial to mesenchymal transformation

Con: Control

Strv: Starvation

Rap: Rapamycin

CS: Carnegie stage

MESP: Mesoderm Posterior Protein 1

BMP: Bone morphogenetic protein

ANF: Atrial natriuretic factor

Cx40: Connexin40

Yap: Yes associated protein

MST1: mammalian STE20-like protein kinase 1

LATS1: Large tumor suppressor kinase 1

SAV1: Salvador homologue1

SHF: Secondary heart field

RA: Retinoic acid

SRF: Serum Response Factor

Mef2c: Myocyte enhancer factor 2c

MLC2v: Myosin light chain 2v

bHLH: Basic helix loop helix

ROS: Reactive oxygen species

Hyp: Hypoxia

LOF: Loss of function

Col: Collagen

HA: Hyaluronic acid

LOF: Loss of function

LAMP-2A: Lysosomal associated membrane protein 2A

DMEM: Dulbecco's modified eagle medium
FBS: Fetal bovine serum
PBS: Phosphate buffered saline
EDTA: Ethylenediaminetetraacetic acid
TAE: Tris-acetate-EDTA
GSK-3 β : Glycogen synthase kinase-3 β
mTOR: Mammalian target of Rapamycin
TGF- β : Transforming growth factor β
 α -SMA: α Smooth muscle actin
Col-III: Collagen III
Sirt1: Sirtuin1
Glut1: Glucose transporter
WGA: Wheat germ agglutinin
SRF: Serum response factor
PBMC: Peripheral blood mononuclear cells
RT-PCR: Reverse transcriptase PCR
qPCR: Quantitative Real time PCR
WB: Western blotting
IF: immunofluorescence
IHC: Immunohistochemistry
CV450: Cytocalcein violet 450
AG: Apoxin green
7-AAD: 7-amino actinomycin D
Tbx20si: Tbx20 siRNA
AT4si: Adamts4 siRNA
ALKI: ALK inhibitor
ELISA: Enzyme linked immunosorbent assay
PAGE: Polyacrylamide gel electrophoresis
SDS: Sodium dodecyl sulphate

PI-3K: Phosphoinositide-3- kinase

AKT: Protein kinase B

DAPI: 4',6-diamidino-2-phenylindole

TBS: Tris-buffered saline

TBST: Tris-buffered saline with Tween 20

RT: Room temperature

Scr: scrambled siRNA

HHD: Hypertensive heart disease

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Conference and seminar certificates

 BITS Pilani K.K. Birla Goa Campus	 INDIAN SOCIETY OF CELL BIOLOGY (REGD.) SINCE 1951 ESTD.
XLII ALL INDIA CELL BIOLOGY CONFERENCE and 2 ND International Conference on TRENDS IN CELL AND MOLECULAR BIOLOGY	
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has participated in the XLII All India Cell Biology Conference.	
He/she has presented a paper entitled " <u>Tbx20 function in starvation induced autophagy in cultured H9c2 cells</u> " in oral/poster session of the conference.	
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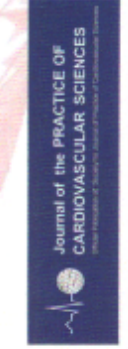
..... *Riffat.....Khanam*..... has participated

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