2021

2021 Lambrew Research Retreat; Thomas Maciag Award for Excellence in Basic and Translational Science

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Recommended Citation

(2021) "2021 Lambrew Research Retreat; Thomas Maciag Award for Excellence in Basic and Translational Science," *Journal of Maine Medical Center*. Vol. 3 : Iss. 2 , Article 18.

Available at: <https://knowledgeconnection.mainehealth.org/jmmc/vol3/iss2/18> <https://doi.org/10.46804/2641-2225.1112>

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Primary cilia of mammalian cardiomyocytes: *Potential role in development of the ventricular myocardium?*

****No conflicts of interest.****
NOTHING TO DISCLOSE

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The Primary cilium: A CELLULAR ORGANELLE

et al.: 2021 Lambrew Research Retreat; Thomas Maciag Award for Excellence

CARDIOVASCULAR DISEASE

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Published in final edited form as:

doi: 10.1161/CIRCULATIONAHA.117.028752

NIHMSID: NIHMS1525148

PMID: [30818997](#)

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Published by MaineHealth Knowledge Connection, 2021

In vivo loss of primary cilia in cardiomyocytes of the developing heart

Journal of Maine Medical Center, Vol. 3 [2021], Iss. 2, Art. 18

Haycraft et al., 2007 Development

Tg(*Tnnt2-cre*)5Blh/JiaoJ
JAX stock #024240

Jiao et al., 2003 Genes & Development

Loss of primary cilia in embryonic CM

E14.5

CONTROL (*Tdt+ / CRE+ : Iff88^{WT/WT}*)

MUTANT (*Tdt+ / CRE+ : Iff88^{flox/flox}*)

Ventricular
myocardium
(LV)

In vivo loss of CM primary cilia

impairs myocardial maturation

Hedgehog GOF in developing CM

Hedgehog GOF in developing CM

CHD & Myocardial Phenotypes

Primary cilia in the pediatric heart with CHD

CHD CON

CHD+ MYOFIBER
DISARRAY

N=2 (FEMALE)

N=3 (FEMALE)

40X

CHD CON

CHD+ MYOFIBER DISARRAY

DAPI/Nuclei
 α Cardiac Troponin-T (cTnT) /555
 α ARL13B/Primary cilia/488

63X/Zoom 4.00

Ciliation in Myofiber Disarray & CHD

Conclusions & Future Directions

- Primary cilia are present in embryonic (Mouse) and postnatal (Human), ventricular cardiomyocytes
- Loss of primary cilia in developing cardiomyocytes (Mouse) leads to sarcomere disorganization and noncompaction of the ventricular myocardium
- Human CHD with Myocardial Disarray is correlated with:
 - 1) lengthening of primary cilia in cardiomyocytes
 - 2) increased ciliation of cardiomyocytes
- Primary cilia represent a viable and modulatory target for improving our understanding of/treatment for CHD involving ventricular myocardium

Acknowledgements

Journal of Maine Medical Center, Vol. 3 [2021], Iss. 2, Art. 18

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PEDIATRIC DONOR SAMPLES

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FUNDING SOURCES

<https://knowledgeconnection.mainehealth.org/journal/vol3/iss2/18>
DOI: 10.46804/2641-2225.1112

Katie Stieber
Lambrew
Research Retreat
5.5.21

Control of perivascular adipose tissue differentiation during cardiovascular disease

Hypothesis: Lower BMI will correlate with lower RAB27a expression

Progenitor Preadipocyte Rab27a Adipokine HVSMC Mature PVAT

VR donors are physiologically different than CABG donors

Average BMI

	CABG	VR
Average age	70	65.45
Donors with diabetes	5/16	0/11

Rab27a

Acknowledgments and References

Journal of Maine Medical Center, Vol. 3 (2021), Iss. 2, Art. 18

The Liaw Lab

Ashley Soucy
Ben Tero
Cathleen Huang
Ginger Paquette
Kimberly Malka
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Diagrams created with biorender.com

C. Stieber was supported by the University of Maine institutional training grant 1T32GM132006-01 from the National Institute of General Medical Sciences (PIs: L. Liaw and C. Henry), F31 HL156320-01 from the National Heart, Blood, and Lung Institute, and R01 HL141149.

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