AWARDS

Acknowledgements for 11th Hiroshi and Aya Irisawa Memorial Award for Excellent Papers in The Journal of Physiological Sciences

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(11th Hiroshi and Aya Irisawa Memorial Award
for Excellent Papers in The Journal of
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I am a Bangladeshi native, and completed Bachelor of Science and Master of Science in Biochemistry and Molecular Biology at the University of Dhaka, Bangladesh. In October 2016, I enrolled as a doctoral student at Kanazawa University Graduate School of Medical Sciences to pursue my doctoral study in Vascular Physiology in Professor Yoh Takuwa's laboratory. I graduated from Kanazawa University in September 2020. Now I am continuing research as a Postdoc Fellow at the Department of Biochemistry and Molecular Biology in Mayo Clinic Rochester, USA.

It is my great pleasure to have achieved the 11th Aya and Hiroshi Irisawa-Memorial JPS Excellent Article Award. I studied class II phosphatidylinositol 3-kinase (PI3K) in Professor Takuwa's laboratory. Class II PI3K comprises three isoforms PI3K-C2α(C2α), PI3K-C2β(C2β), and PI3K-C2γ, and mainly produce phosphatidylinositol-3,4-bisphosphate (PI (3, 4) P_2). Professor Takuwa and his colleagues discovered in 2007 that PI3K-C2α is required for vascular smooth muscle contraction through the engagement of PI3K-C2α in Rho activation and myosin phosphatase inhibition. Subsequent investigations by Professor Takuwa's group and other groups disclosed that PI3K-C2α is involved in endocytosis and cilia formation at the cellular level. However, the role of PI3K-C2α at the organismal level is unknown, and the function of its closely related paralogue PI3K-C2β is not well understood. In this study, we demonstrated that double knockout(KO)mice with both smooth muscle-specific deficiency of PI3K-C2α and global PI3K-C2β deficiency, but not single KO mice of either PI3K-C2α or PI3K-C2β, exhibited reductions in arterial blood pressure and substantial attenuation of contractile responses of isolated aortic rings. In wild-type vascular smooth muscle cells, double deficiency of PI3K-C2α and PI3K-C2β but not a single deficiency of either PI3K markedly inhibited contraction with reduced phosphorylation of 20-kDa myosin light chain and the myosin phosphatase regulatory subunit, MYPT1, and Rho activation, but without inhibition of the intracellular Ca^{2+} mobilization. These data indicated that PI3K-C2α and PI3K-C2β play an essential role in vascular smooth muscle contraction, very likely through their involvement in Rho activation, blood pressure regulation, and these class II PI3Ks have compensatory roles in these actions. These findings also suggested that a class II PI3K inhibitor may be potential candidates for developing new therapeutics for contractile disorders.