



# Hong Kong RNA Club

## RNA Enthusiast Spotlight (Oct 2022)



**Dr. Huating Wang** is a professor in the Department of Orthopaedics and Traumatology, the Chinese University of Hong Kong. Dr. Wang's research work focuses on exploring the gene expression regulatory mechanisms in skeletal muscle stem cells during muscle regeneration and aging. The main research direction in the group is to study intrinsic factors governing SC activities; these factors include both transcriptional and post-transcriptional regulators such as Long non-coding RNAs (lncRNAs), transcription factors (TFs), enhancers, and RNA binding proteins (RBPs). Please find more information at <http://sunlab.cpy.cuhk.edu.hk/wanglab/>.

### Recent representative publications:

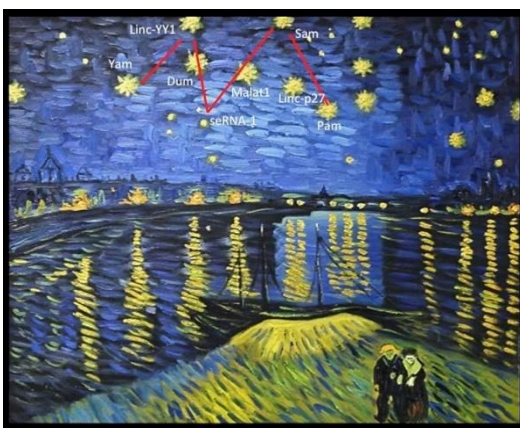
Chen, X., Xue, G., Zhao, J., Zhang, Y., Zhang, Z., Wang, W., Li, Y., Yuan, J., He, J., Chan, C.Y., Liu, Y., Chen, W., Zhao, Y., Hu, P., Sun, H., Kwok, C.K. & **Wang, H.** *Lockd* promotes myoblast proliferation and muscle regeneration via binding with DHX36 to facilitate 5' UTR rG4 unwinding and *Anp32e* translation. *Cell Reports*. 39, 110927 (2022).

He L, Ding Y, Zhao Y, So KK, Peng XL, Li Y, Yuan J, He Z, Chen X, Sun H, **Wang H.** CRISPR/Cas9/AAV9-mediated in vivo editing identifies MYC regulation of 3D genome in skeletal muscle stem cell. *Stem Cell Reports*. 12;16(10):2442-2458 (2021).

Chen X, Yuan J, Xue G, Campanario S, Wang D, Wang W, Mou X, Liew SW, Umar MI, Isern J, Zhao Y, He L, Li Y, Mann CJ, Yu X, Wang L, Perdiguero E, Chen W, Xue Y, Nagamine Y, Kwok CK, Sun H, Muñoz-Cánoves P, **Wang H.** Translational control by DHX36 binding to 5'UTR G-quadruplex is essential for muscle stem-cell regenerative functions. *Nature Communications*. 12(1):5043(2021).

Yuying Li, Jie Yuan, Fengyuan Chen, Suyang Zhang, Yu Zhao, Xiaona Chen, Leina Lu, Liang Zhou, Ching Yan Chu, Hao Sun, **Wang H.** Long noncoding RNA SAM promotes myoblast proliferation through stabilizing Sugt1 and facilitating kinetochore assembly. *Nature Communications*. 11(1):2725(2020).

Yu Zhao, Jiajian Zhou, Liangqiang He, Yuying Li, Jie Yuan, Kun Sun, Xiaona Chen, Xichen Bao, Miguel A. Esteban, Hao Sun, **Wang H.** MyoD induced enhancer RNA interacts with hnRNPL to activate target gene transcription during myogenic differentiation. *Nature Communications*. 10(1):5787(2019).



**lncRNAs** we have studied in skeletal muscle: Yam, Linc-YY1, Dum, seRNA-1, Malat1, Linc-p27, Sam, Pam.

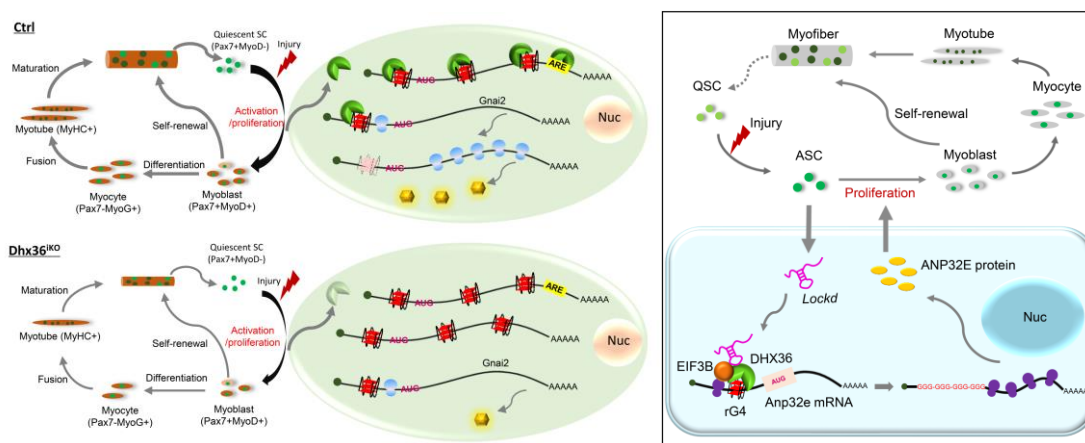
Over a decade's trudging through the non-coding genome, it is never about the footprints we leave behind or the stars we name in the nightly sky, it is about the excitement of wandering into an uncharted wonderland, it is to experience all the hardships in the journey that build us into a real human being, it is about escaping into the solitary world of objective perception and thought, it is to make a simplified and intelligible picture of the world.



**Dr. Xiaona Chen** is a research assistant professor in the Department of Orthopaedics and Traumatology at the Chinese University of Hong Kong.

Dr. Chen's research focuses on deciphering the regulatory mechanisms of long non-coding RNA, RNA binding proteins and G-quadruplexes (G4) in modulating gene expression in skeletal muscle stem cells (also known as muscle satellite cells, SC) during muscle regeneration and ageing.

Her recent publication demonstrates that G4 resolving helicase DHX36 is highly induced upon SC activation and DHX36 functions to promote SCs proliferation and acute injury induced muscle regeneration. Mechanistically, DHX36 binds predominantly to rG4 structures at various regions of mRNAs, while integrated polysome profiling shows that DHX36 promotes mRNA translation via 5'-UTR rG4 binding. Specifically, DHX36 regulates the translation of *Gnai2* mRNA by unwinding its 5' UTR rG4 structures and *GNAI2* is a downstream effector of DHX36 for SC expansion. In a separate study, we demonstrate that long non-coding RNA *Lockd* interacts with G4 helicase DHX36 to facilitate the resolve of RNA G4 structure formed at the 5'UTR of *Anp32e* mRNA and *Anp32e* translation, which further promotes SCs proliferation and muscle regeneration.



### **Recent representative publications**

**Chen, X**, Xue, G, Zhao, J, Zhang, Y, Zhang, Z, Wang, W, Li, Y, Yuan, J, He, J, Chan, CY, Liu, Y, Chen, W, Zhao, Y, Hu, P, Sun, H, Kwok, CK, Wang, H. *Lockd* promotes myoblast proliferation and muscle regeneration via binding with DHX36 to facilitate 5' UTR rG4 unwinding and *Anp32e* translation. *Cell Reports*. 39, 110927 (2022).

**Chen X**, Yuan J, Xue G, Campanario S, Wang D, Wang W, Mou X, Liew SW, Umar M, Isern J, Zhao Y, He L, Li Y, Mann C, Yu X, Wang L, Perdiguero E, Chen W, Xue Y, Nagamine Y, Kwok CK, Sun H, Muñoz-Cánoves P, Wang H. Translational control by DHX36 binding to 5'UTR G-quadruplex is essential for muscle stem-cell regenerative functions. *Nature Communications*. 19;12(1):5043 (2021).

**Chen X**, He L, Zhao Y, Li Y, Zhang S, Sun K, So K, Chen F, Zhou L, Lu L, Wang L, Zhu X, Bao X, Esteban MA, Nakagawa S, Prasanth KV, Wu Z, Sun H, Wang H. *Malat1* regulates myogenic differentiation and muscle regeneration through modulating MyoD transcriptional activity. *Cell Discovery*. 14;3:17002 (2017).

Yuying Li, Jie Yuan, Fengyuan Chen, Suyang Zhang, Yu Zhao, **Xiaona Chen**, Leina Lu, Liang Zhou, Ching Yan Chu, Hao Sun, Wang H. Long noncoding RNA SAM promotes myoblast proliferation through stabilizing Sugt1 and facilitating kinetochore assembly. *Nature Communications*. 11(1):2725(2020).

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