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NON-CODING RNAs



Principal Investigator

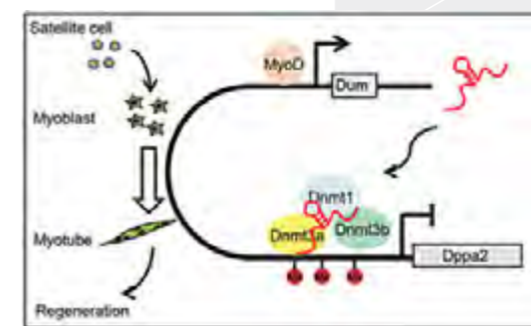
Professor Huating Wang

Team

Karl So, Xiaona Chen, Yu Zhao

Research Progress Summary

During the past year, the team led by Professor Huating Wang continued the work on lncRNAs and initiated the investigation of functional roles of enhancers in normal cellular processes and human diseases. Specifically, they have been focusing on the following projects: (1) to study the functional roles of a novel lncRNA, Sam in skeletal muscle stem cells and muscle regeneration; (2) to elucidate the functional roles of a lncRNA, Malat1 in skeletal myoblast differentiation; and (3) to identify and characterise the enhancer function in myoblast differentiation.



Proposed model of Dum regulation of Dppa2 expression. The model depicts the role of the MyoD-Dum-Dppa2 regulatory axis in myogenic differentiation and regeneration. Dum expression is induced by MyoD upon myoblast differentiation. The intrachromosomal looping between Dum and Dppa2 loci juxtaposes Dum transcripts to Dppa2 promoter; subsequently, Dum interacts and recruits Dnmts to Dppa2 promoter, leading to CpG site hypermethylation and gene silencing.

lncRNA Dum interacts with Dnmts to regulate Dppa2 expression during myogenic differentiation and muscle regeneration. The figure was published by Cell Research 2015; 25(3):335-50. doi: 10.1038/cr.2015.21. Copyright © 2015 Cell Research

Recognitions

Awards and Fellowships

Member's Full Name	Details
Xiaona Chen	CUHK Faculty Postdoctoral Fellowship Scheme 2015-2016

Grants and Consultancy

Full Name of PI	Project Title	Funding Source	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Amount (HK\$)
Huating Wang	lncRNA Dum Interacts with Dnmts to Regulate Dppa2 Expression during Myogenic Differentiation and Muscle Regeneration	Direct Grants, CUHK	30/06/2016	29/06/2017	25,000
Huating Wang	Mechanistic Exploration of Super-enhancer Associated seRNA Function in Skeletal Muscle Cells	Research Grant Council – General Research Fund	01/01/2016	31/12/2019	922,171

Full Name of PI	Project Title	Funding Source	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Amount (HK\$)
Huating Wang (Co-I)	Identification and Functional Characterization of Super Enhancer Associated RNAs (seRNAs) in Skeletal Myogenesis Using Integrated Genomic Approach	Research Grant Council – General Research Fund	01/01/2016	31/12/2018	1,228,445
Huating Wang	利用CRISPR-Cas9技術探索胚胎幹細胞中超級增強子的功能	中國科學院再生生物學重點實驗室開放課題	10/2015	10/2017	RMB 50,000
Huating Wang	Functional Characterization of YY1 in Skeletal Muscle Stem Cells and Muscle Regeneration	Research Grant Council – General Research Fund	01/01/2015	31/12/2018	1,182,869
Huating Wang (Co-I)	Integrating Large Intergenic Noncoding RNAs into Pax7 Mediated Regulatory Circuitry in Muscle Satellite Cells	Research Grant Council – General Research Fund	01/01/2015	31/12/2018	623,277
Huating Wang (Co-I)	Elucidation of the Role of Pax7 in Muscle Stem Cells	Research Grant Council / Collaborative Research Fund	01/08/2015	31/07/2018	750,000
Huating Wang	Functional Characterization of Malat1 in Skeletal Muscle Stem Cells and Muscle Regeneration	Research Grant Council – General Research Fund	01/01/2014	31/12/2017	1,086,500
Huating Wang (Co-I)	多能幹細胞向中胚層細胞分化的研究機制	973 Program, China	01/01/2014	31/12/2017	RMB 1,080,000
Huating Wang	Functional Characterization of Linc-YY1 in Muscle Stem Cells and Muscle Regeneration	Research Grant Council – General Research Fund	01/01/2014	31/12/2016	1,039,239
Huating Wang (Co-I)	Genome-wide Identification and Characterization of Functional Long Noncoding RNAs in Skeletal Muscle Stem Cells Using Integrated High-throughput Sequencing and Regulatory Network Analysis	Research Grant Council – General Research Fund	01/01/2014	31/12/2016	1,125,842

Publications

A. Journal Papers

1. Stunnenberg H, The International Human Epigenome Consortium, Hirst M. The International Human Epigenome Consortium: A Blueprint for Scientific Collaboration and Discovery. *Cell*. 2016; 167(7):1897.
2. Sun K, Zhou L, Zhao Y, Wang H, Sun, H. Genome-wide RNA-seq and ChIP-seq reveal Linc-YY1 function in regulating YY1/PRC2 activity during skeletal myogenesis. *Genome Data*. 2016; 7:247-9. (Data in brief)
3. Zhao Y, Sun H, Wang H. Long noncoding RNAs in DNA methylation: new players stepping into the old game. *Cell Bioscience*. 2016; 6:45. (Review)
4. Zhu H, Xiao F, Wang G, Wei X, Jiang L, Chen Y, Zhu L, Wang H, Diao Y, Wang H, Ip NY, Cheung TH, Wu Z. STAT3 regulates self-renewal of adult muscle satellite cells during injury-induced muscle regeneration. *Cell Reports*. 2016; 16(8):2102-15.

B. Conference Papers

1. So KH, Peng X, Zhao Y, Sun H, Wang H. Super-enhancer activity is regulated by MyoD in myogenic differentiation process. In: *Enhancer Malfunction in Cancer, Keystone Symposia on Molecular and Cellular Biology*; Santa Fe, New Mexico, USA; 2016 Feb 21-24.
2. Peng X, So KH, Zhou J, Zhao Y, Wang H, Sun H. Integrative characterization of super-enhancers in mouse skeletal muscle cells. In: *Noncoding RNAs in Health and Disease, Keystone Symposia on Molecular and Cellular Biology*; Santa Fe, New Mexico, USA; 2016 Feb 21-24.
3. Chen X, Li Y, Sun K, Zhao Y, Chen F, Zhou L, Lu L, Wang L, Sun H, Wang H. Functional characterization of Malat1 in skeletal myogenic differentiation and muscle regeneration. In: *Frontiers in Stem Cell Research*; Hong Kong; 2016 Jan 15.
4. Peng X, Zhao Y, So KH, Wang H, Sun H. Integrative Characterization of Super-enhancers in Mouse Skeletal Muscle Cells. In: *Noncoding RNAs in Health and Disease, Keystone Symposia on Molecular and Cellular Biology*; Santa Fe, New Mexico, USA; 2016 Feb 21-24.
5. Chen XN; Li YY; Sun K; Zhao Y; Chen FY; Zhou L; Lu LN; Wang LJ; Nakagawa S; Prasanth VK; Sun H and Wang HT. miR-181 Targeted Malat1 Interacts with Suv39h1 to Regulate MyoD Transcriptional Activity during Myogenic Differentiation and Muscle Regeneration. In: *Noncoding RNAs in Health and Disease, Keystone Symposia on Molecular and Cellular Biology*; Santa Fe, New Mexico, USA; 2016 Feb 21-24.
6. Peng X, Zhao Y, So KH, Wang H, Sun H. Integrative characterization of super-enhancers in mouse skeletal muscle cells. In: 2016 *Cold Spring Harbor Asia*; Suzhou, China; 2016 May 9-13.
7. Zhao Y, Peng X, Zhou J, Sun H, Wang H. An enhancer and eRNA exploration in skeletal muscle cells. In: *3rd Non-coding RNA and Epigenetics Workshop*; Guangzhou, China; 2016 Jun.
8. Chan F, Sun H, Wang HT. Functional characterization of Yy1 in skeletal muscle regeneration. In: *FASEB symposium on Skeletal Muscle Satellite Cells and Regeneration*; Keystone, Colorado, USA; 2016 Jul 24-29.
9. Zhao Y, Peng X, Zhou J, Sun H, Wang HT. Functional study of super enhancer associated eRNAs in myogenic differentiation. In: *Cell Symposia: Functional ncRNA*; Guangzhou, China; 2016 Nov 6-8.
10. Wang H, Sun H, Li Y, Lu L, Chen X, Chen F, Zhou J. Functional study of long noncoding RNA SAM in skeletal muscle. In: *Cell Symposia: Functional ncRNA*; Guangzhou, China; 2016 Nov 6-8.
11. Zhou J, Zhang S, Wang H, Sun H. An integrated gene regulatory network approach for functional long noncoding RNA identification. In: *Cell Symposia: Functional ncRNA*; Guangzhou, China; 2016 Nov 6-8.