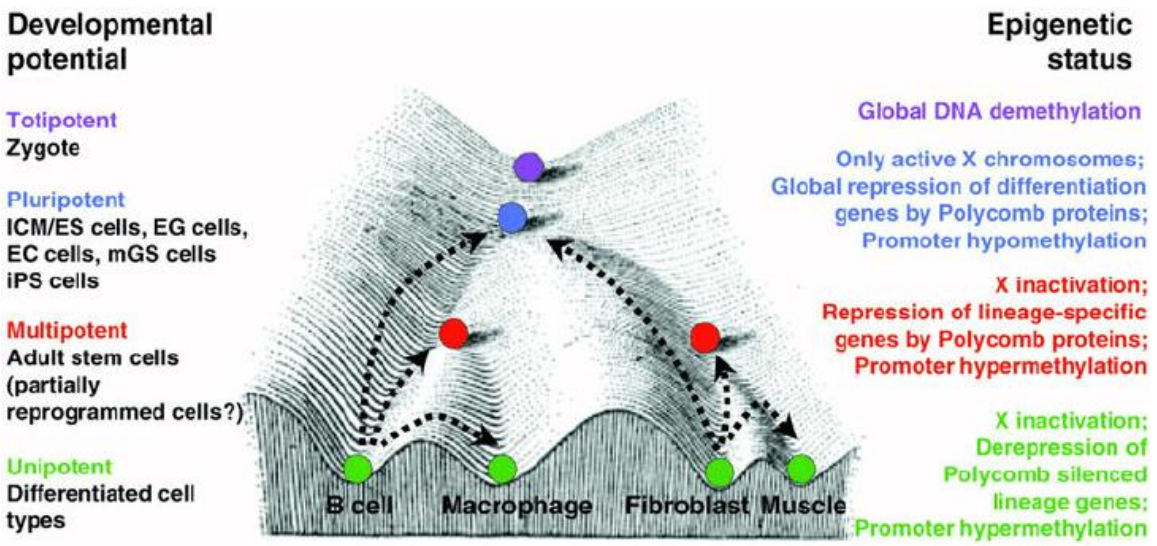
THE OHIO STATE UNIVERSITY

Wei Xie, Ph.D.

Principal Investigator

Tsinghua University

HHMI International Research Scholar



Yunhao Wang Ph.D.

December 18, 2020

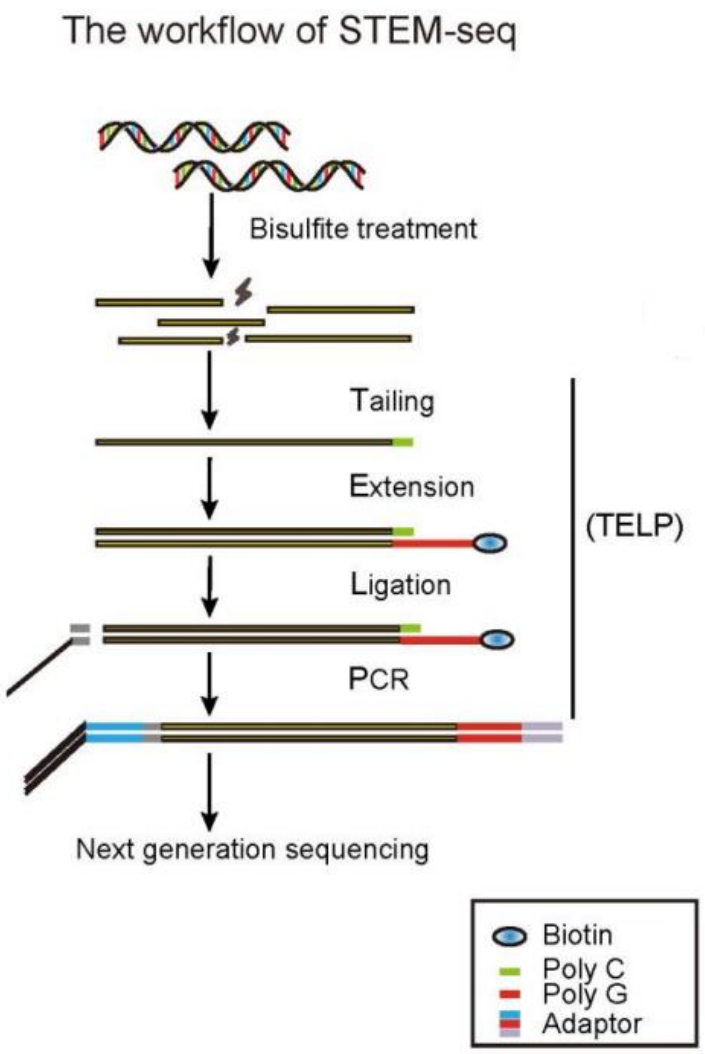
Department of Biomedical Informatics, Ohio State University

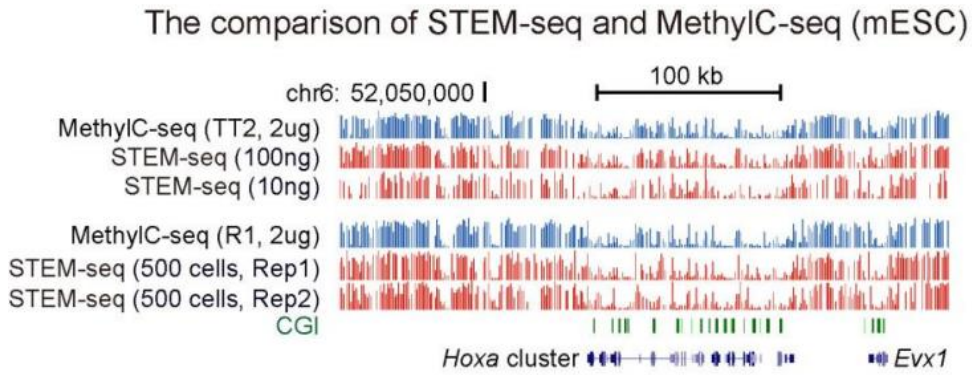
Research @ Xie Lab since 2013

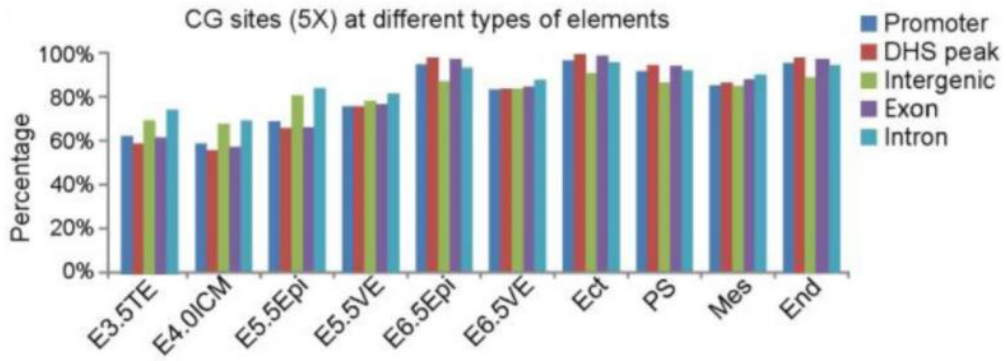
- **Goal: epigenetic regulation of mammalian early embryo development**
- **Technology: ultra-sensitive and low-input epigenetic analysis**
  - **DNA methylation: STEM-seq**
  - **Histone modifications: STAR ChIP-seq**
  - **Chromatin accessibility: miniATAC-seq**
  - **3D chromatin architecture: sisHi-C**
  - **DNA binding: Stacc-seq**

DNA methylation: STEM-seq

➢ STEM-seq: small-scale TELP-enabled methylome sequencing (500 cells)







nature genetics

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Article | Published: 04 December 2017

Dynamic epigenomic landscapes during early lineage specification in mouse embryos

Yu Zhang, Yunlong Xiang, Qiangzong Yin, Zhenhai Du, Xu Peng, Qiujun Wang, Miguel Fidalgo, Weikun Xia, Yuanyuan Li, Zhen-ao Zhao, Wenhao Zhang, Jing Ma, Feng Xu, Jianlong Wang, Lei Li & Wei Xie

Molecular Cell

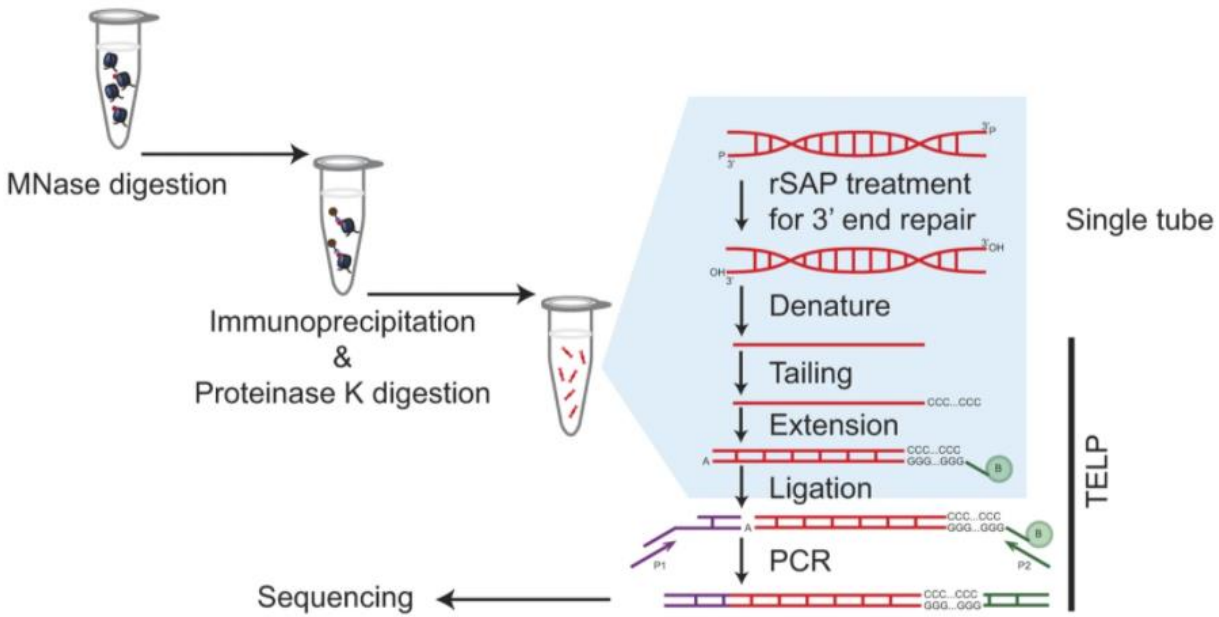
ARTICLE | VOLUME 64, ISSUE 6, P1062-1073, DECEMBER 15, 2016

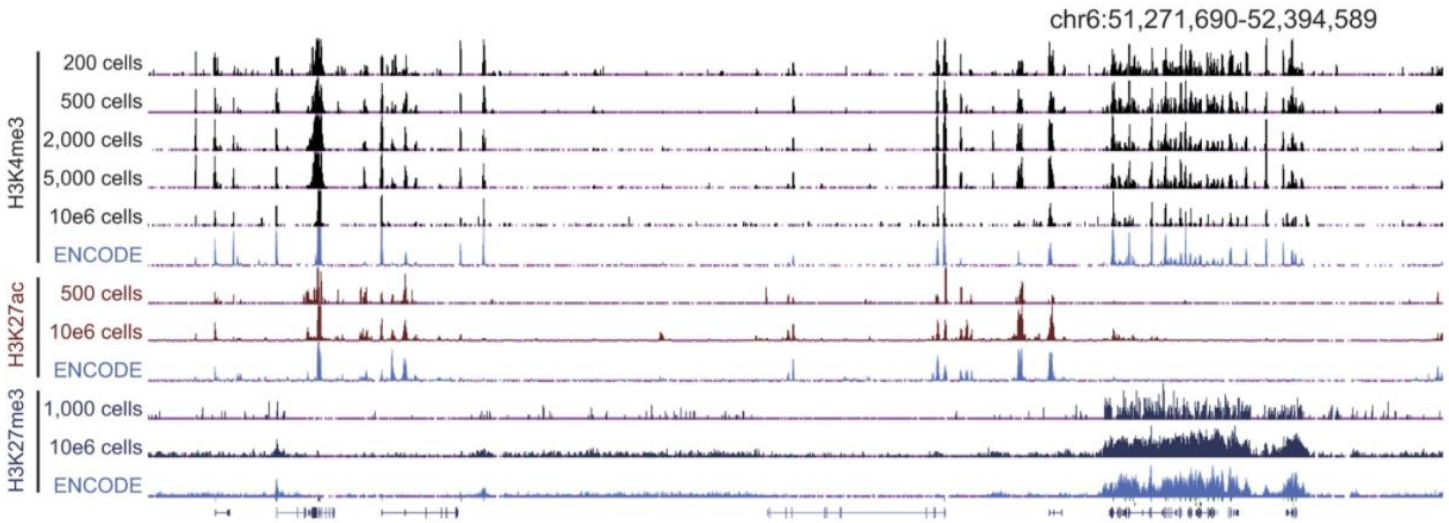
Isoform Switch of TET1 Regulates DNA Demethylation and Mouse Development

Wenhao Zhang [10] • Weikun Xia [10] • Qiujun Wang • ... Shaorong Gao • Yong-hui Jiang • Wei Xie [11]

Histone modifications: STAR ChIP-seq

➢ STAR ChIP-seq: small-scale TELP-assisted rapid ChIP–seq (200 cells)





Molecular Cell

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Isoform Switch of TET1 Regulates DNA Demethylation and Mouse Development

Wenhao Zhang [10] • Weikun Xia [10] • Qiujun Wang • ... Shaorong Gao • Yong-hui Jiang • Wei Xie [11] •

Molecular Cell

ARTICLE | VOLUME 72, ISSUE 4, P673-686.E6, NOVEMBER 15, 2018

Widespread Enhancer Dememorization and Promoter Priming during Parental-to-Zygotic Transition

Bingjie Zhang [3] • Xiaotong Wu [3] • Wenhao Zhang [3] • ... Yuanyuan Li • Anming Meng •

Wei Xie [4] • Show all authors • Show footnotes

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Published: 14 September 2016

Allelic reprogramming of the histone modification H3K4me3 in early mammalian development

Bingjie Zhang, Hui Zheng, [...] Wei Xie ✉

Nature **537**, 553–557(2016) | Cite this article

nature genetics

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Article | Published: 16 December 2019

Epigenomic analysis of gastrulation identifies a unique chromatin state for primed pluripotency

Yunlong Xiang, Yu Zhang, Qianhua Xu, Chen Zhou, Bofeng Liu, Zhenhai Du, Ke Zhang, Bingjie Zhang, Xiaoxiao Wang, Srimonta Gayen, Ling Liu, Yao Wang, Yuanyuan Li, Qiujun Wang, Sundeep Kalantry, Lei Li & Wei Xie ✉

nature genetics

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Article | Published: 29 April 2019

SETD2 regulates the maternal epigenome, genomic imprinting and embryonic development

Qianhua Xu, Yunlong Xiang, Qiujun Wang, Leyun Wang, Julie Brind'Amour, Aaron Blair Bogutz, Yu Zhang, Bingjie Zhang, Guang Yu, Weikun Xia, Zhenhai Du, Chunyi Huang, Jing Ma, Hui Zheng, Yuanyuan Li, Chao Liu, Cheryl Lyn Walker, Eric Jonasch, Louis Lefebvre, Min Wu, Matthew C. Lorincz, Wei Li ✉, Li Li ✉ & Wei Xie ✉

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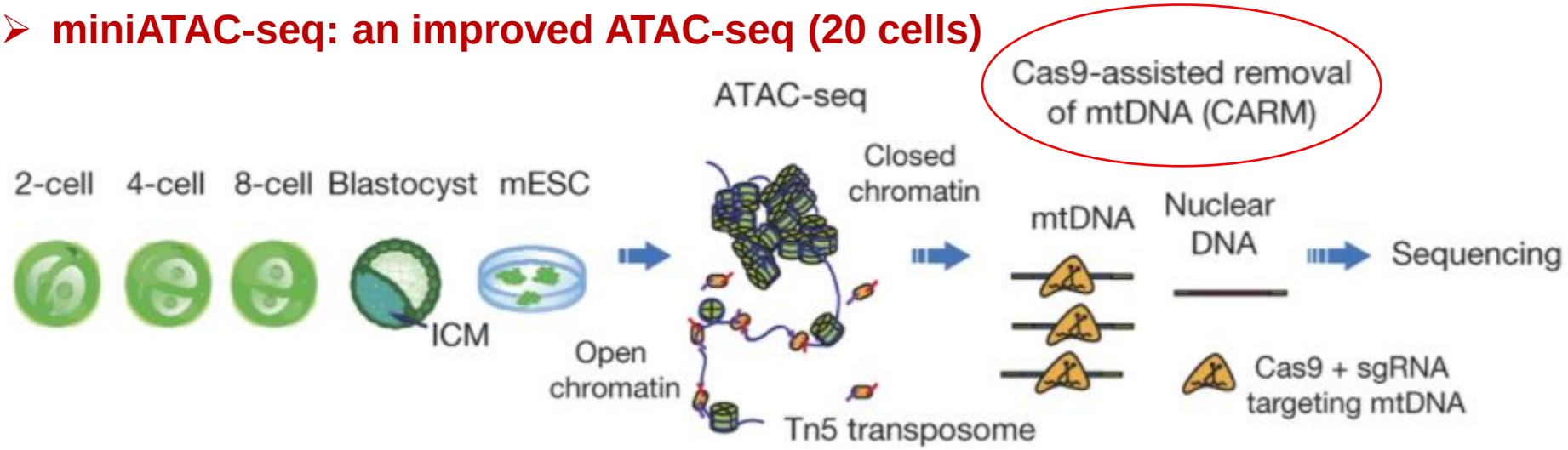
RESEARCH ARTICLE

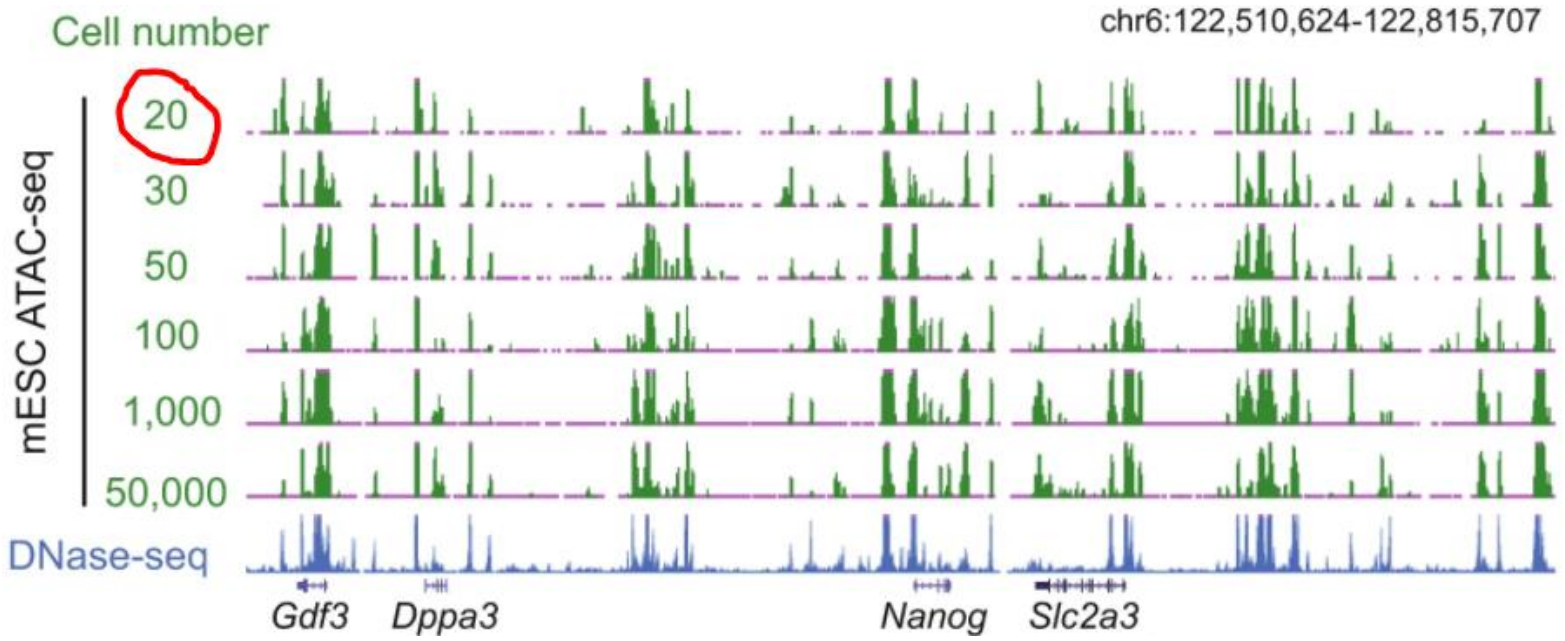
Resetting histone modifications during human parental-to-zygotic transition

Weikun Xia[1,*], Jiawei Xu[2,*,†], Guang Yu[1,*], Guidong Yao[2,*], Kai Xu[1,‡], Xueshan Ma[2,‡], Nan Zhang[2,‡], Bofen...

Chromatin accessibility: miniATAC-seq

- **miniATAC-seq: an improved ATAC-seq (20 cells)**





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Published: 15 June 2016

The landscape of accessible chromatin in mammalian preimplantation embryos

Jingyi Wu, Bo Huang, He Chen, Qiangzong Yin, Yang Liu, Yunlong Xiang, Bingjie Zhang, Bofeng Liu, Qiujun Wang, Weikun Xia, Wenzhi Li, Yuanyuan Li, Jing Ma, Xu Peng, Hui Zheng, Jia Ming, Wenhao Zhang, Jing Zhang, Geng Tian, Feng Xu, Zai Chang, Jie Na, Xuerui Yang & Wei Xie

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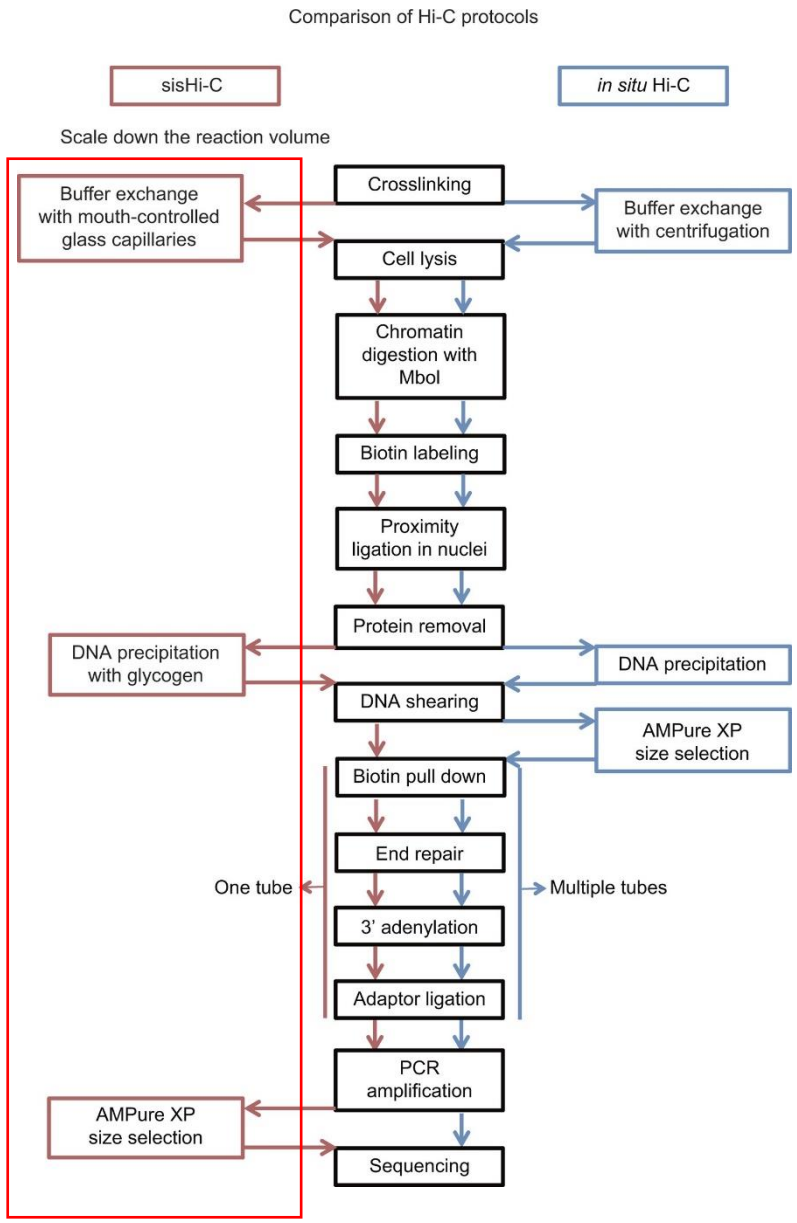
Letter | Published: 02 May 2018

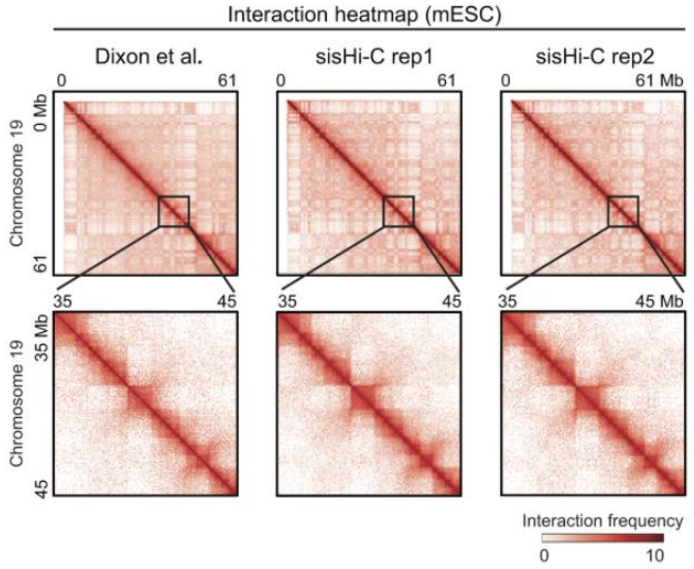
Chromatin analysis in human early development reveals epigenetic transition during ZGA

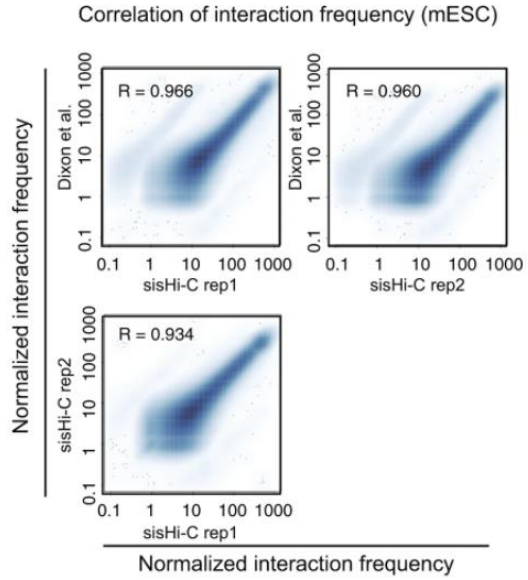
Jingyi Wu, Jiawei Xu, [...] Yingpu Sun

3D chromatin architecture: sisHi-C

➢ sisHi-C: small-scale *in situ* Hi-C (500 cells)







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Published: 13 July 2017

Allelic reprogramming of 3D chromatin architecture during early mammalian development

Zhenhai Du, Hui Zheng, Bo Huang, Rui Ma, Jingyi Wu, Xianglin Zhang, Jing He, Yunlong Xiang, Qiujun Wang, Yuanyuan Li, Jing Ma, Xu Zhang, Ke Zhang, Yang Wang, Michael Q. Zhang, Juntao Gao, Jesse R. Dixon, Xiaowo Wang, Jianyang Zeng & Wei Xie

Molecular Cell

ARTICLE | VOLUME 77, ISSUE 4, P825-839.E7, FEBRUARY 20, 2020

Polycomb Group Proteins Regulate Chromatin Architecture in Mouse Oocytes and Early Embryos

Zhenhai Du [11] • Hui Zheng [11] • Yumiko K. Kawamura [11] • ... Kikuë Tachibana • Antoine H.F.M. Peters • Wei Xie [12] • Show all authors • Show footnotes

Molecular Cell

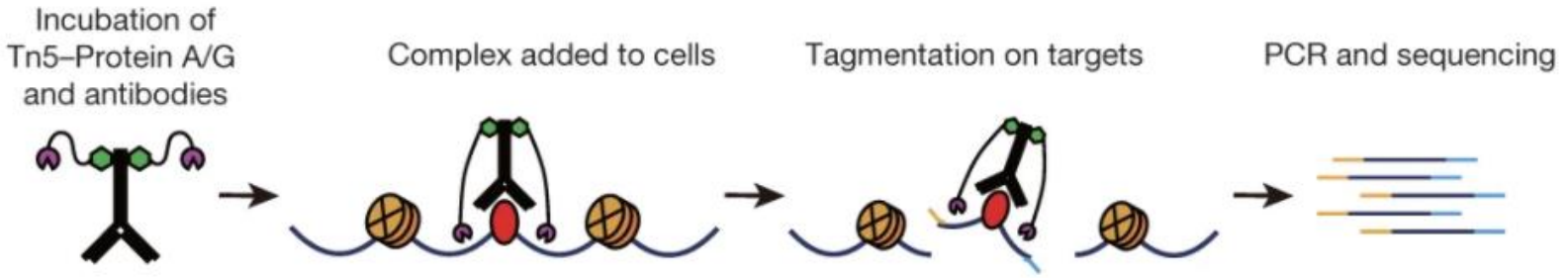
ARTICLE | VOLUME 73, ISSUE 3, P547-561.E6, FEBRUARY 07, 2019

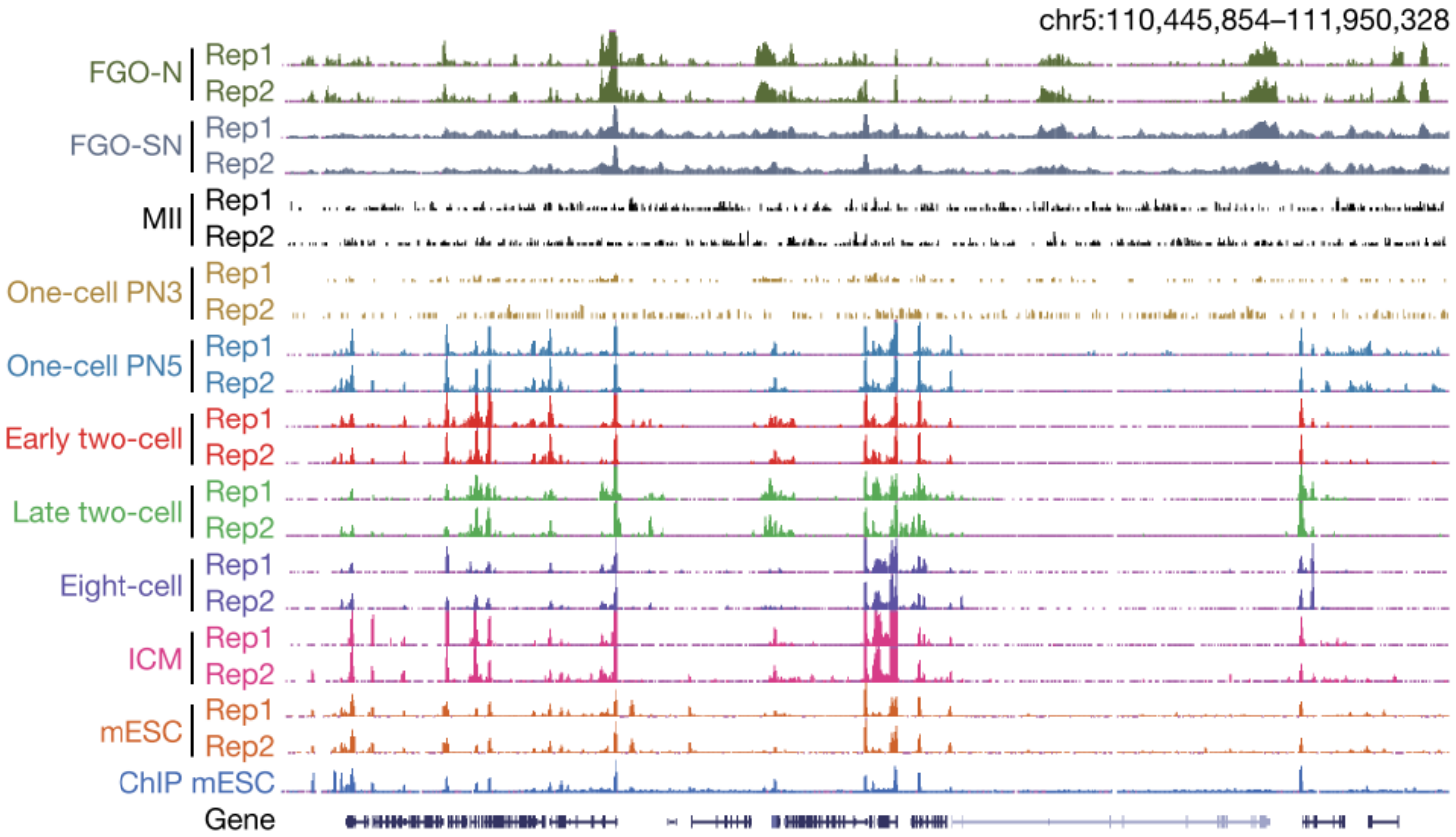
Reprogramming of Meiotic Chromatin Architecture during Spermatogenesis

Yao Wang [5] • Hanben Wang [5] • Yu Zhang [5] • ... Qinghua Shi • Xin Wu • Wei Xie [6] •

DNA binding: Stacc-seq

- **Stacc-seq: small-scale Tn5-assisted chromatin cleavage with sequencing (200 cells, within 3.5 hour)**





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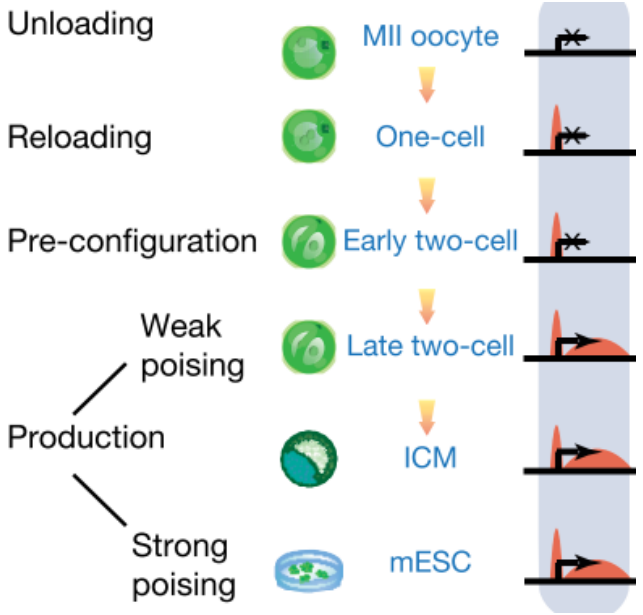
Article | Published: 28 October 2020

The landscape of RNA Pol II binding reveals a stepwise transition during ZGA

Bofeng Liu, Qianhua Xu, Qiujun Wang, Su Feng, Fangnong Lai, Peizhe Wang, Fangyuan Zheng, Yunlong Xiang, Jingyi Wu, Junwei Nie, Cui Qiu, Weikun Xia, Lijia Li, Guang Yu, Zili Lin, Kai Xu, Zhuqing Xiong, Feng Kong, Ling Liu, Chunyi Huang, Yang Yu, Jie Na & Wei Xie



Thanks