



Activation of proto-oncogenes by disruption of chromosome neighborhoods

Denes Hnisz,^{1*} Abraham S. Weintraub,^{1,2*} Daniel S. Day,¹ Anne-Laure Valton,³
Rasmus O. Bak,⁴ Charles H. Li,^{1,2} Johanna Goldmann,¹ Bryan R. Lajoie,³ Zi Peng Fan,^{1,5}
Alla A. Sigova,¹ Jessica Reddy,^{1,2} Diego Borges-Rivera,^{1,2} Tong Ihn Lee,¹
Rudolf Jaenisch,^{1,2} Matthew H. Porteus,⁴ Job Dekker,^{3,6} Richard A. Young^{1,2†}

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汇报人：张维

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Index



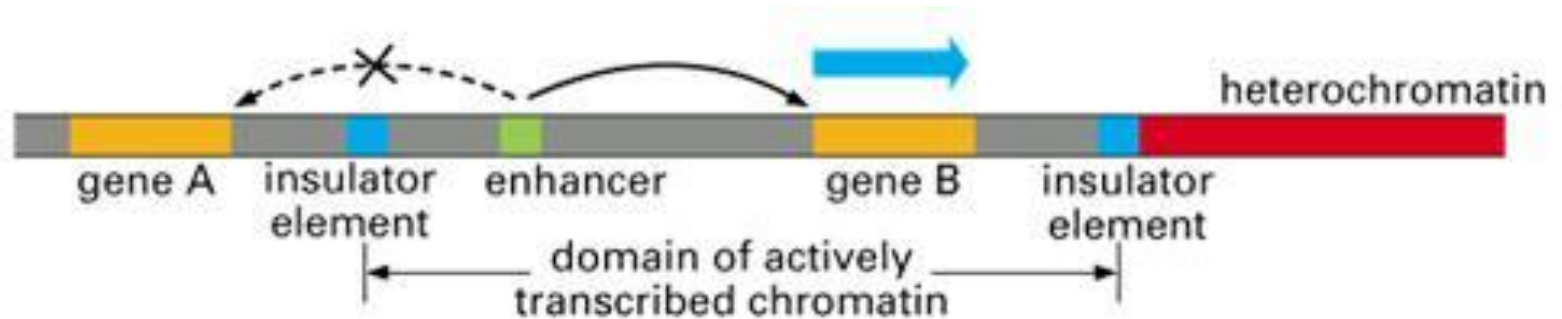
- Background
- Materials and methods
- Results
- Discussion
- Further idea

Background

Proto-oncogene: 原癌基因

Silencer : 沉默子

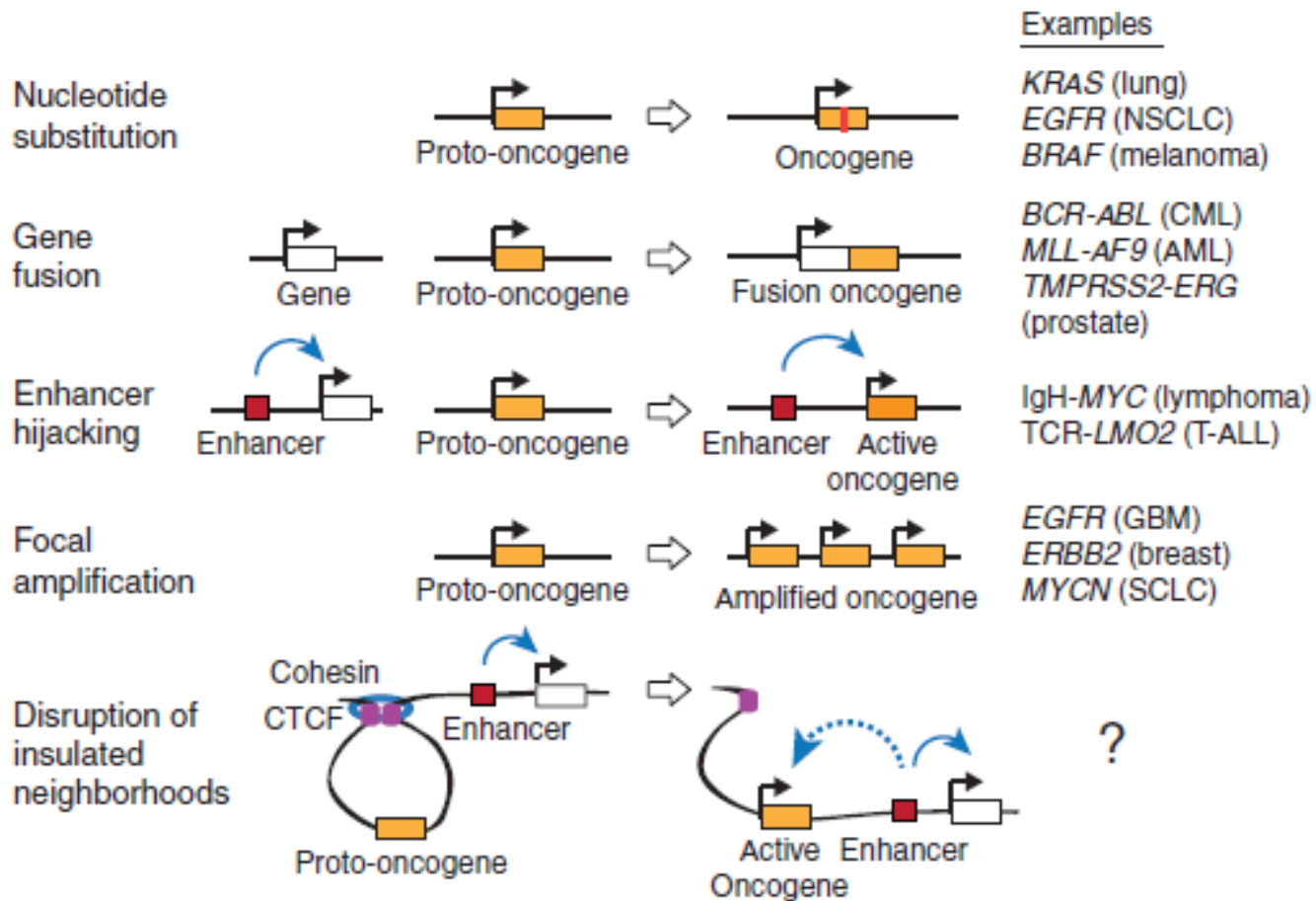
Insulator: 绝缘子



Background



A



Materials and methods



Jurkat T-ALL: T细胞急性淋巴细胞白血病

HEK-293T : 人胚肾细胞株

SMC1的ChIA-PET数据

T-ALL细胞株CTCF、SMC1、H3K27Ac的ChIP-Seq数据

T-ALL细胞株的RNA-Seq数据

HEK-293T 细胞CTCF、H3K27Ac、p300、CBP的ChIP-Seq数据

HEK-293T 细胞株的RNA-Seq数据

HEK-293T 细胞株的野生型和CTCF缺失突变体的5C数据

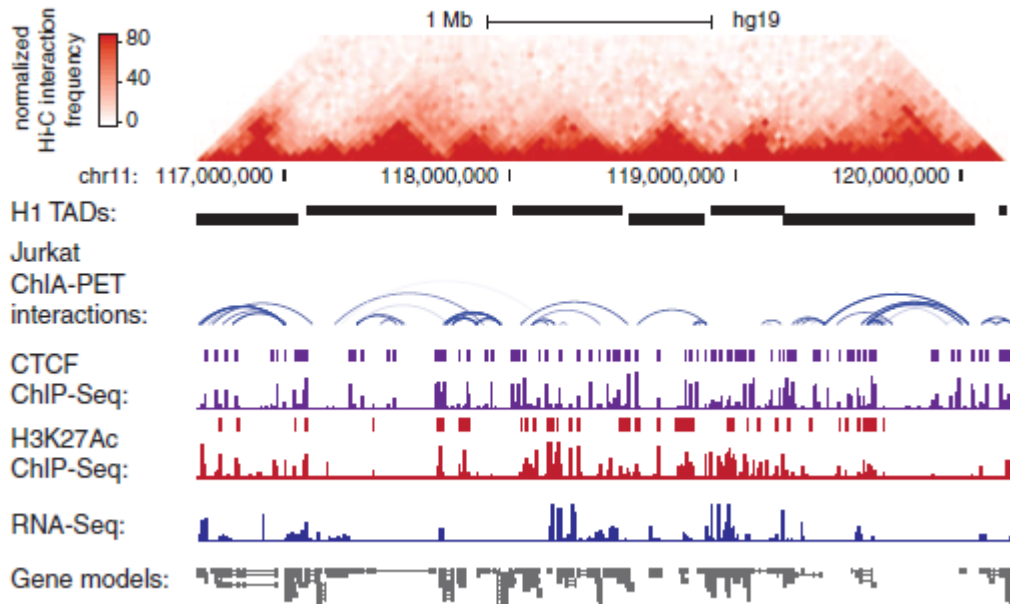
International Cancer Genome Consortium (ICGC) database

Results

Fig. 1. 3D regulatory landscape of the T-ALL genome.



B



C

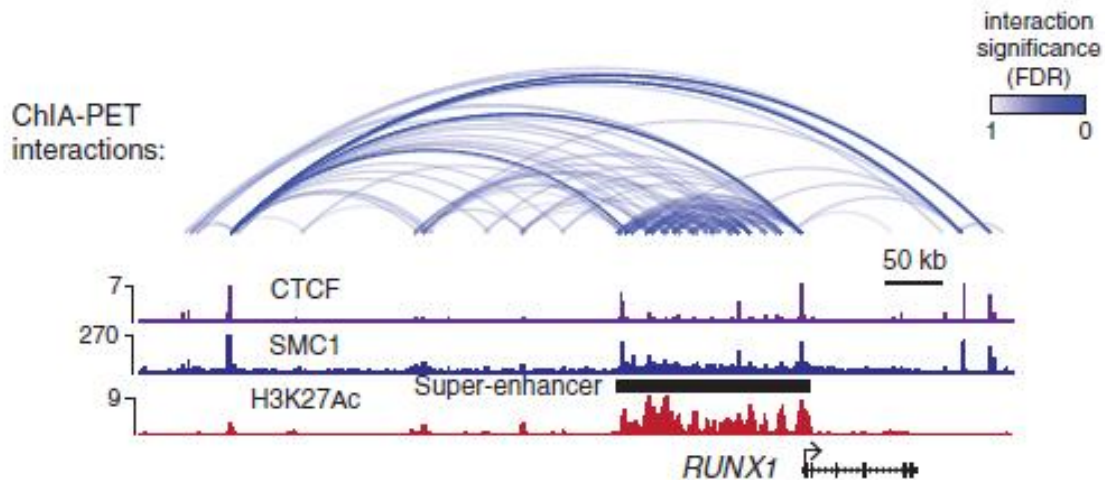




Fig. 2. Active oncogenes and silent proto-oncogenes occur in insulated neighborhoods.

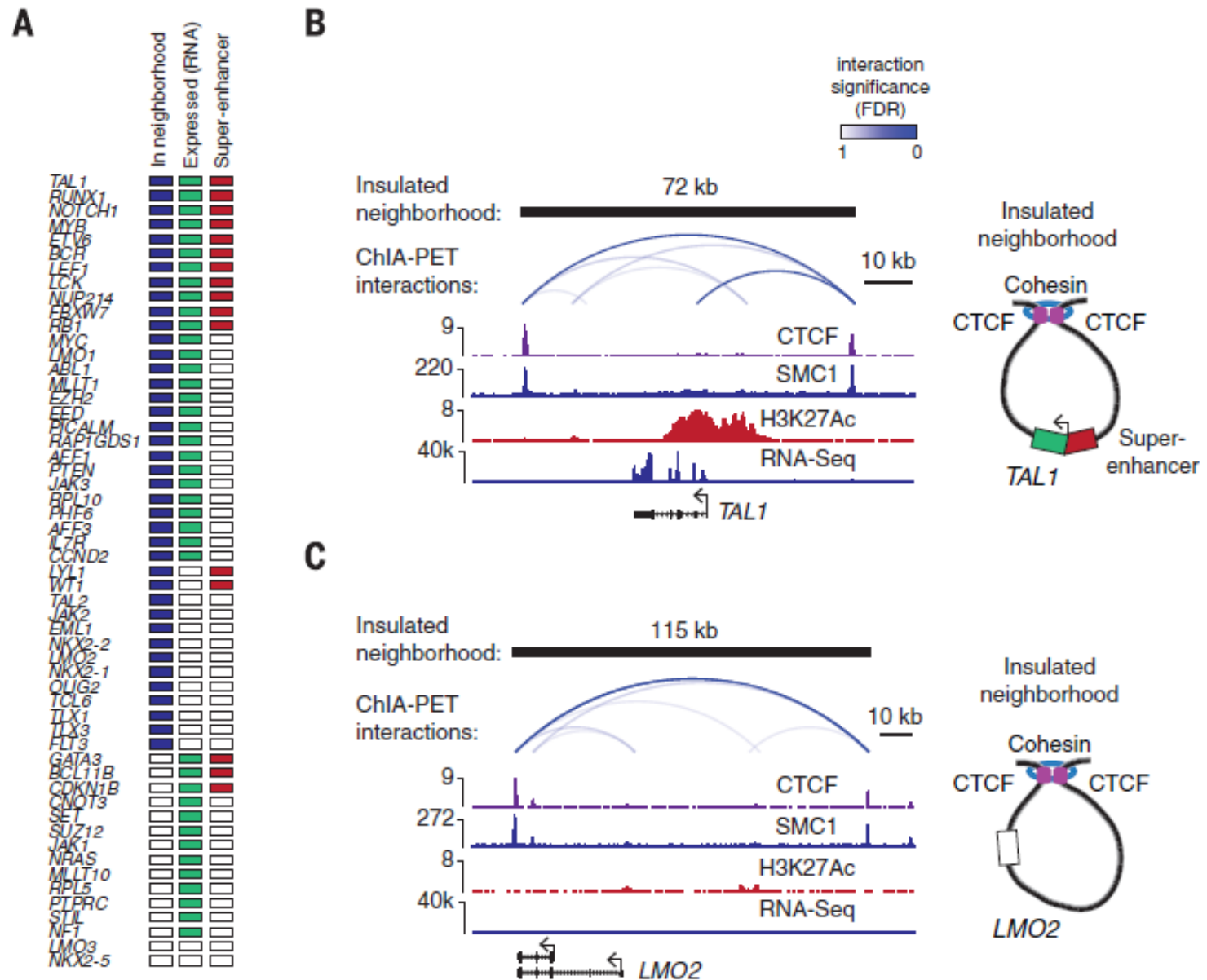
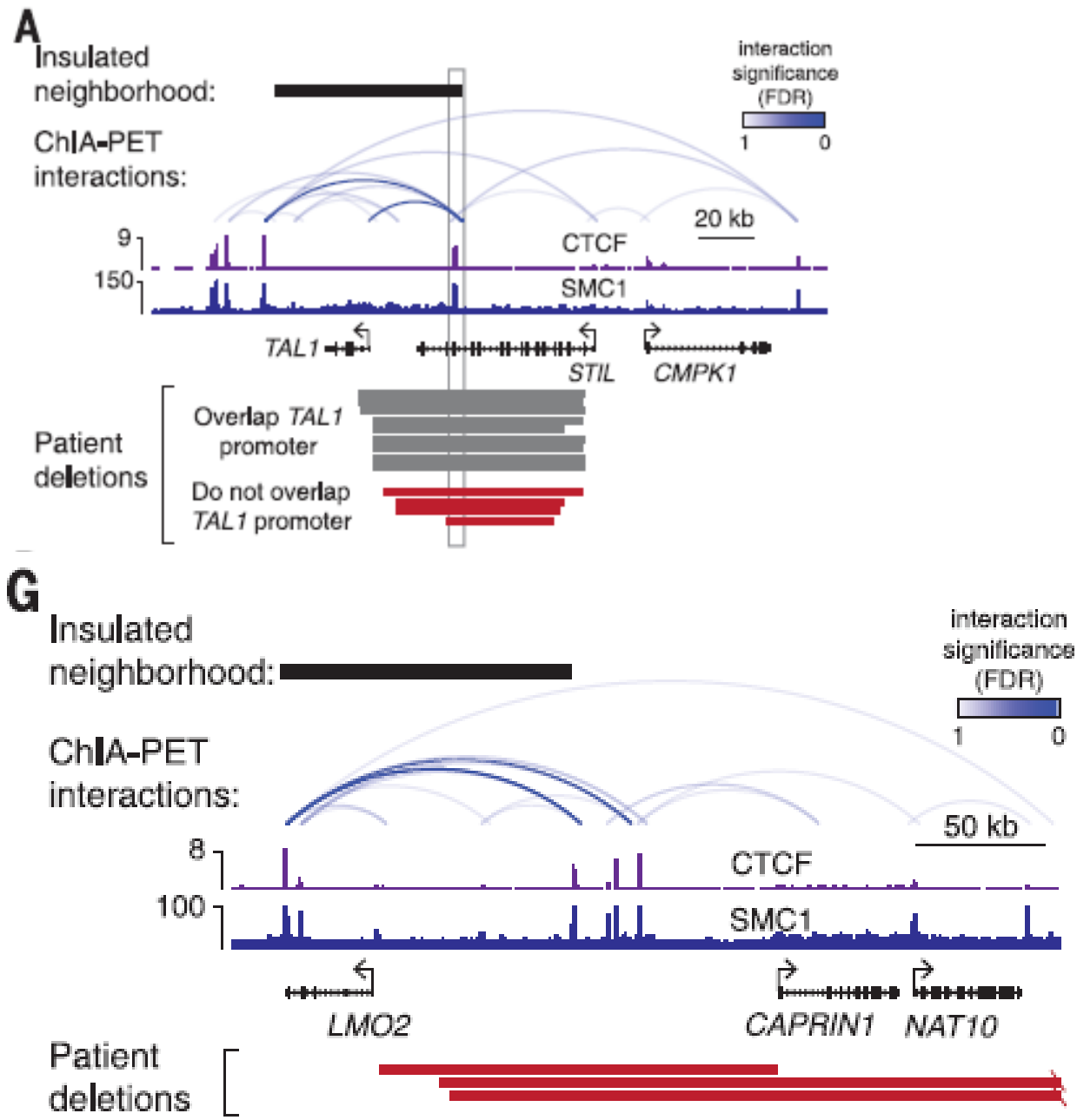
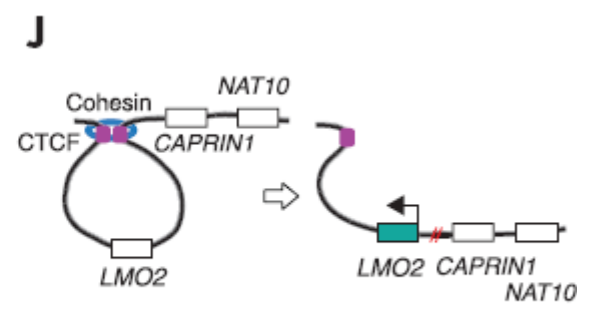
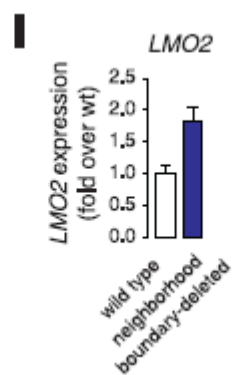
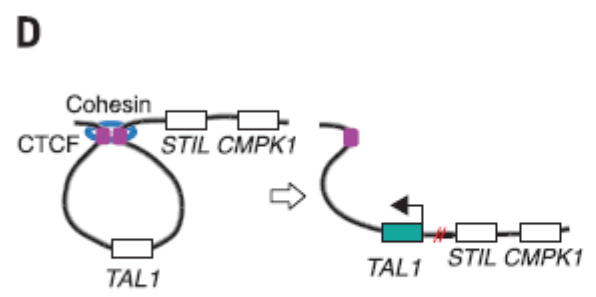
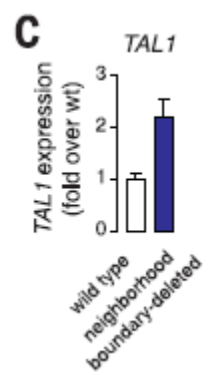
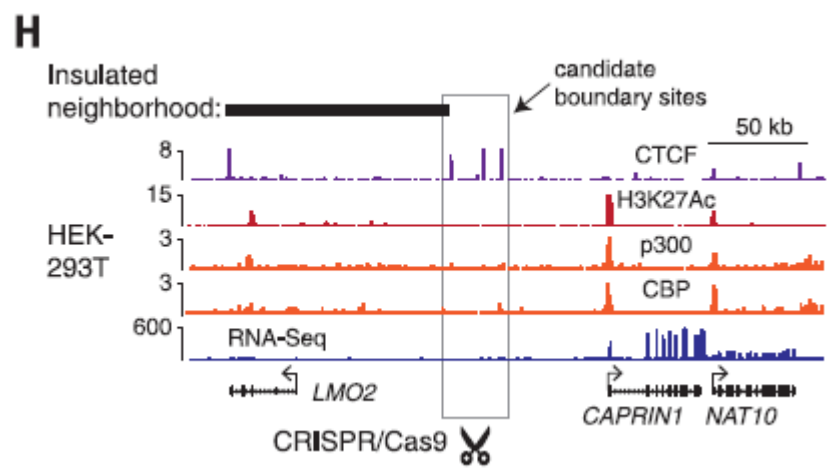
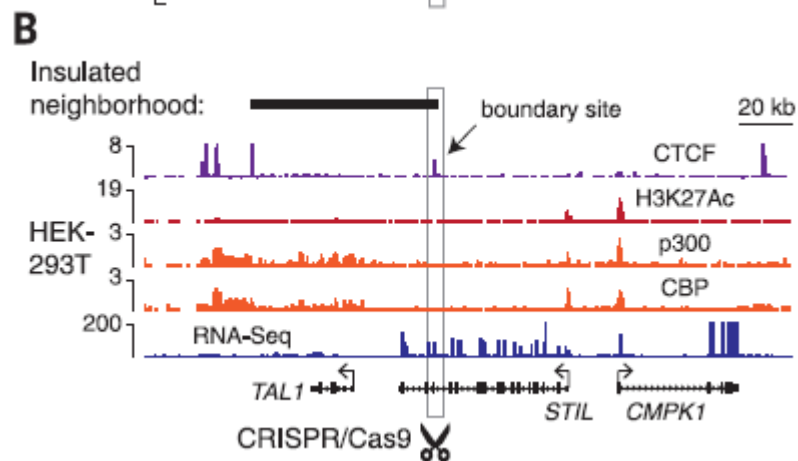


Fig. 3. Disruption of insulated neighborhood boundaries is linked to proto-oncogene activation





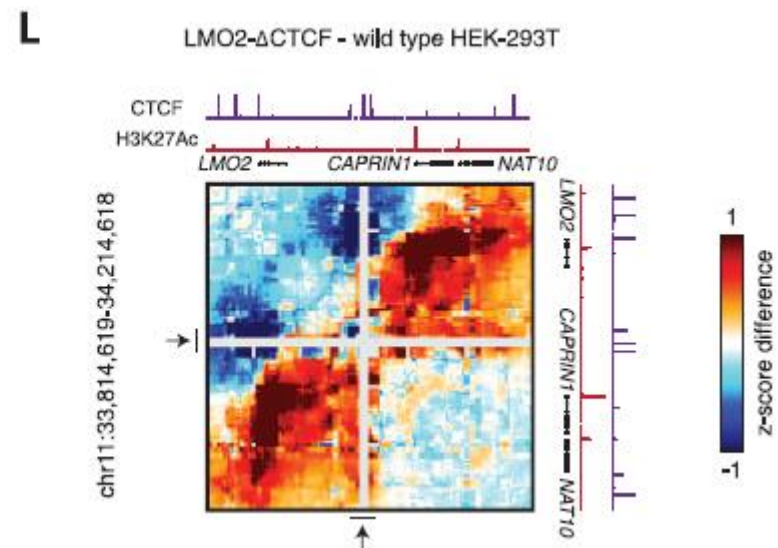
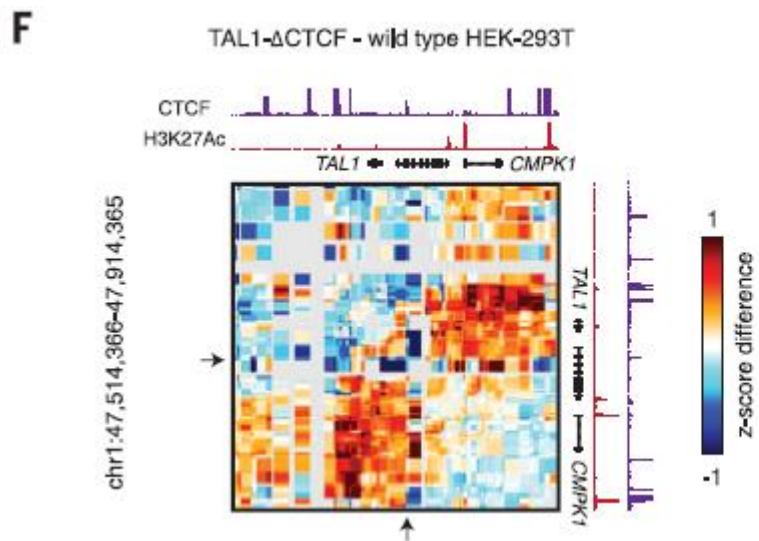
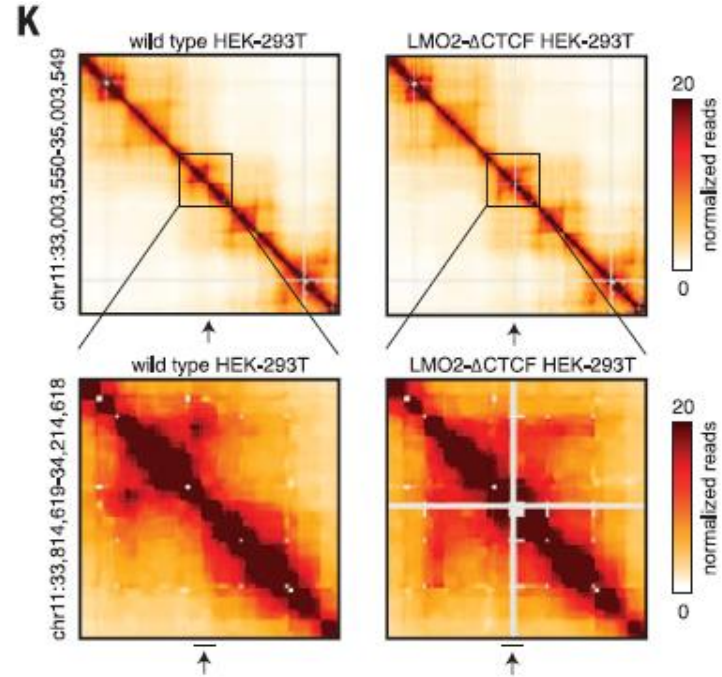
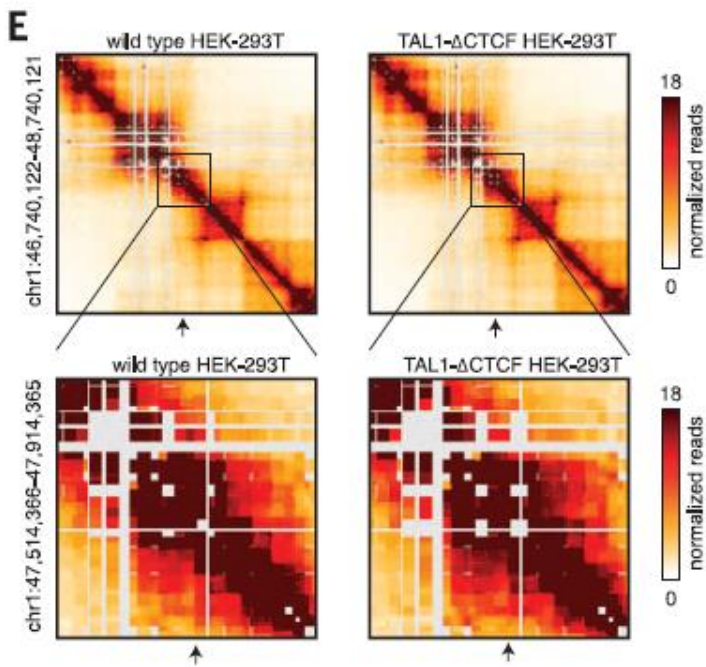
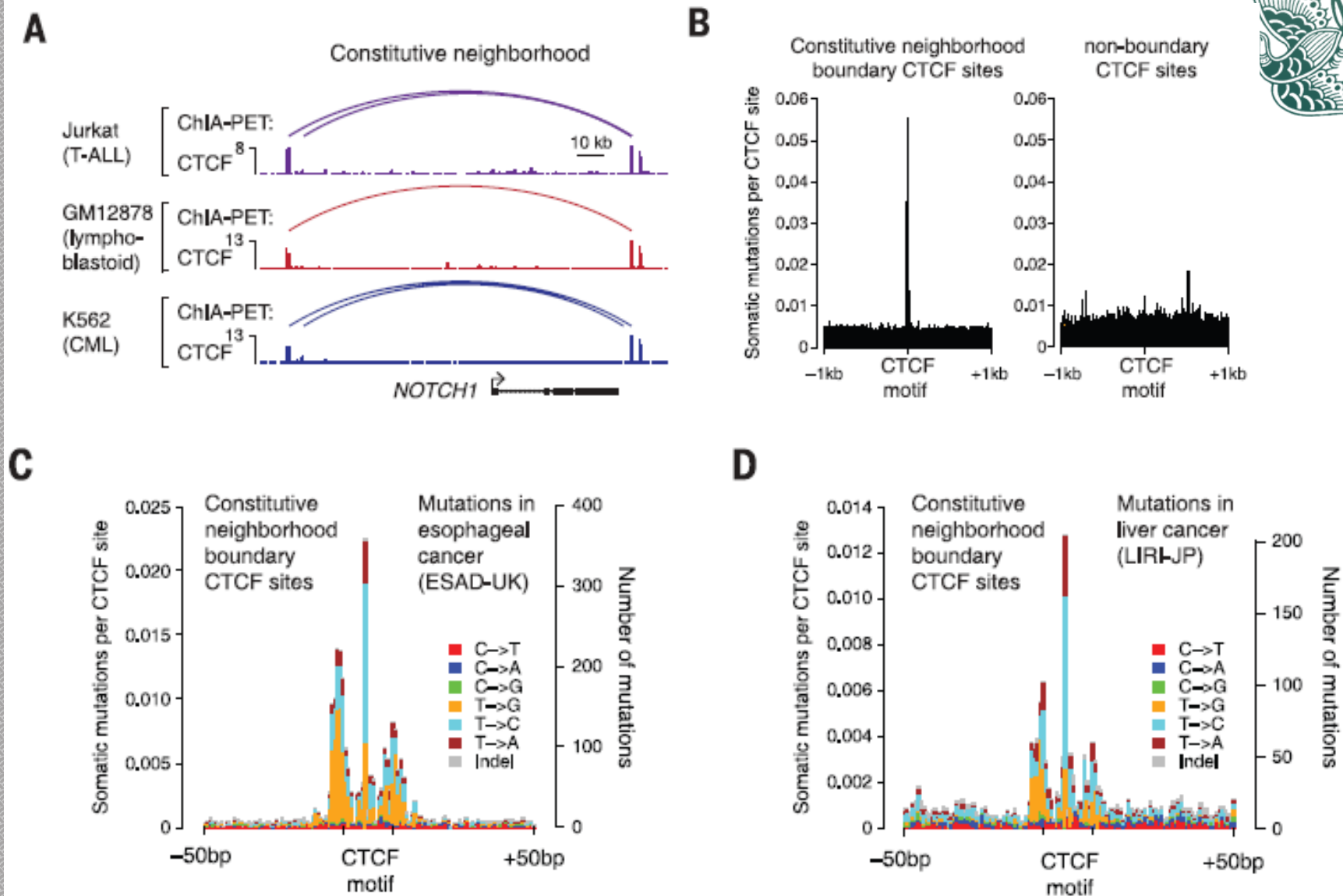
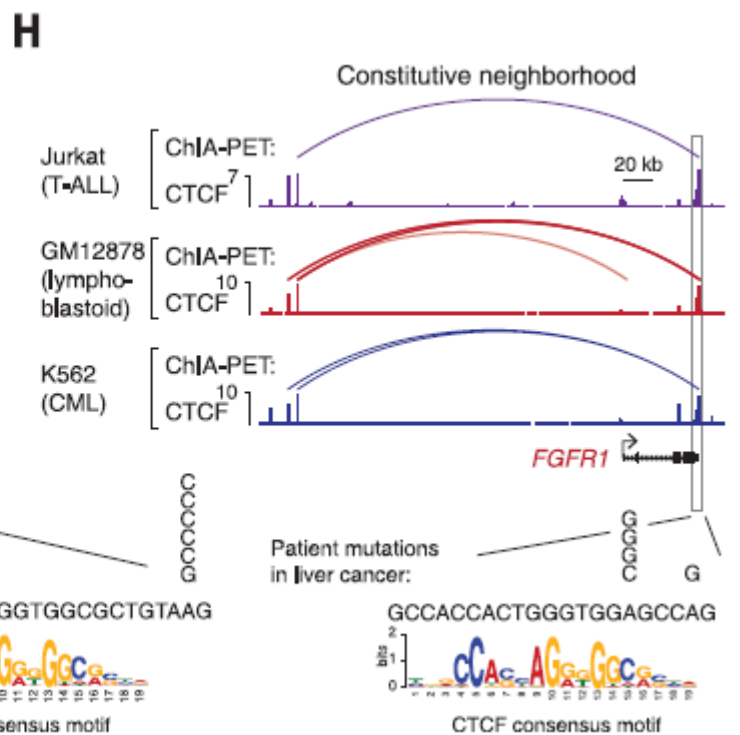
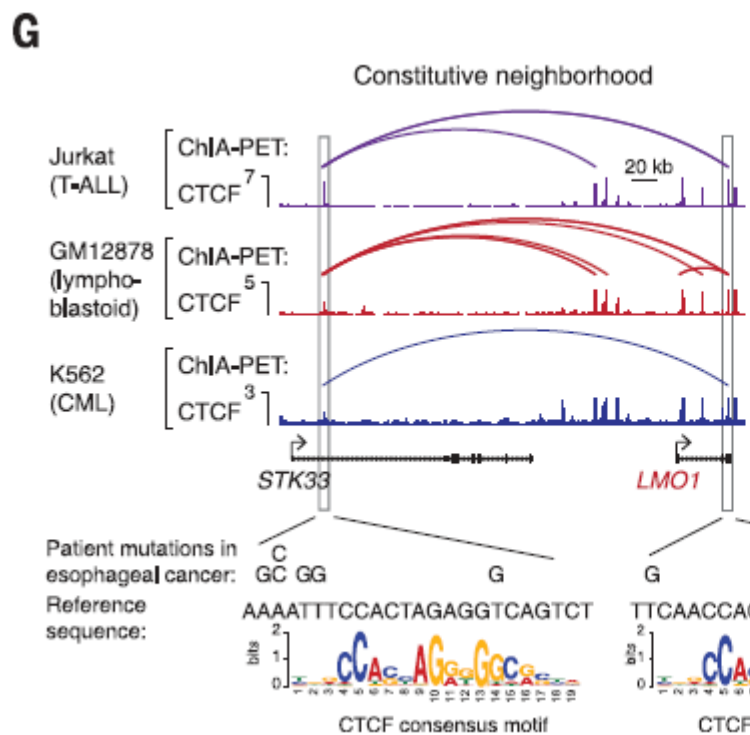
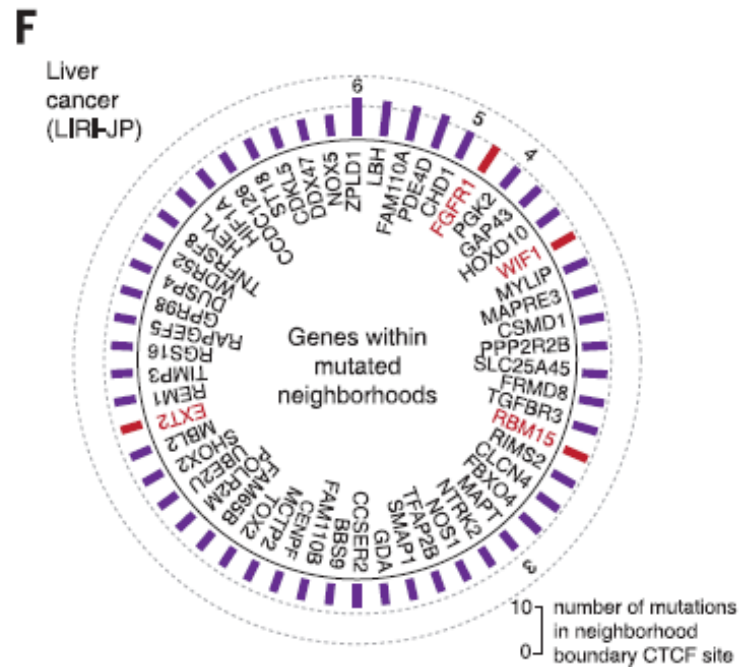
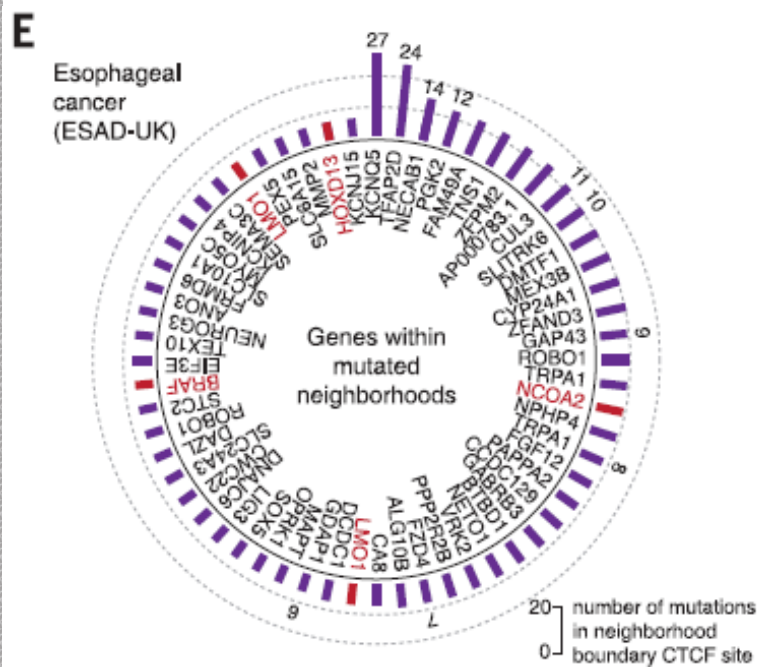


Fig. 4. Somatic mutations of neighborhood boundaries occur in many cancers.







Discussion

- 发现绝缘子边界区域的瓦解会激活原癌基因的表达
- 通过3D结构比对，得到了绝缘子边界区域突变是怎样影响基因表达的

Further idea



优点：

创造性的提出了边界缺失影响基因表达的模型。

3D结构的比对使得突变对基因表达的影响更为直观。

不足：

没有统计该模型适用的普遍性，是否具有普遍意义。

启发：

对于验证基因组的3D结构提供了新思路。

对于其他癌症的研究具有指导意义。

Thank you for your attention !

