



## MatP-mediated positioning of chromosome terminus regions in *V. cholerae*

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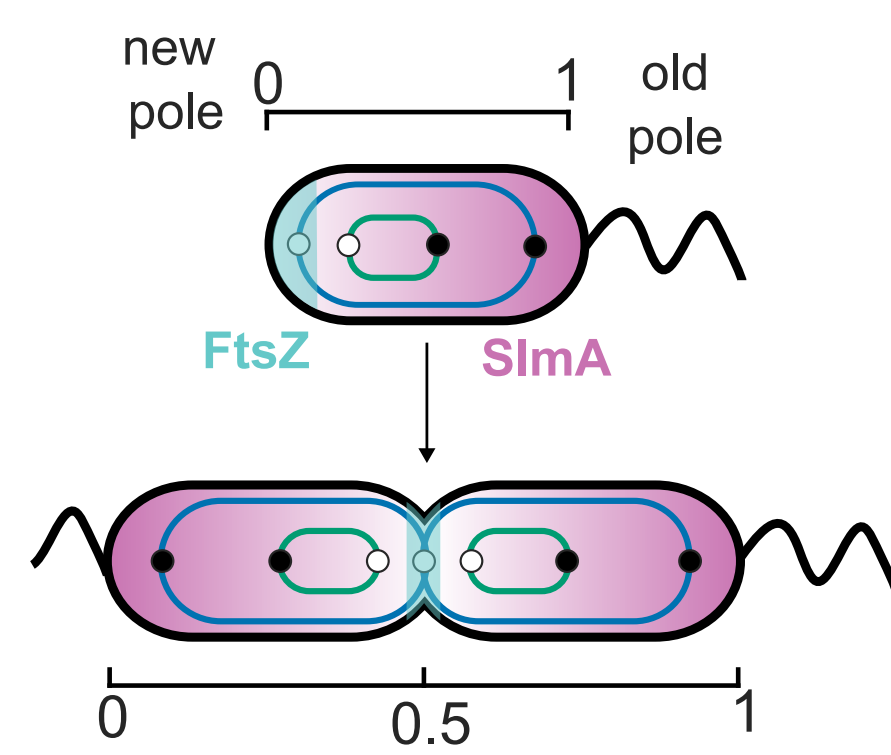
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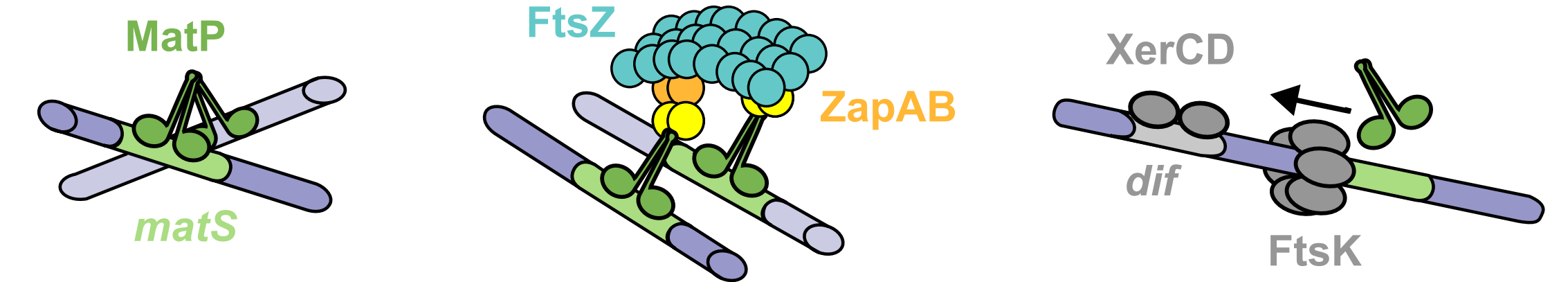
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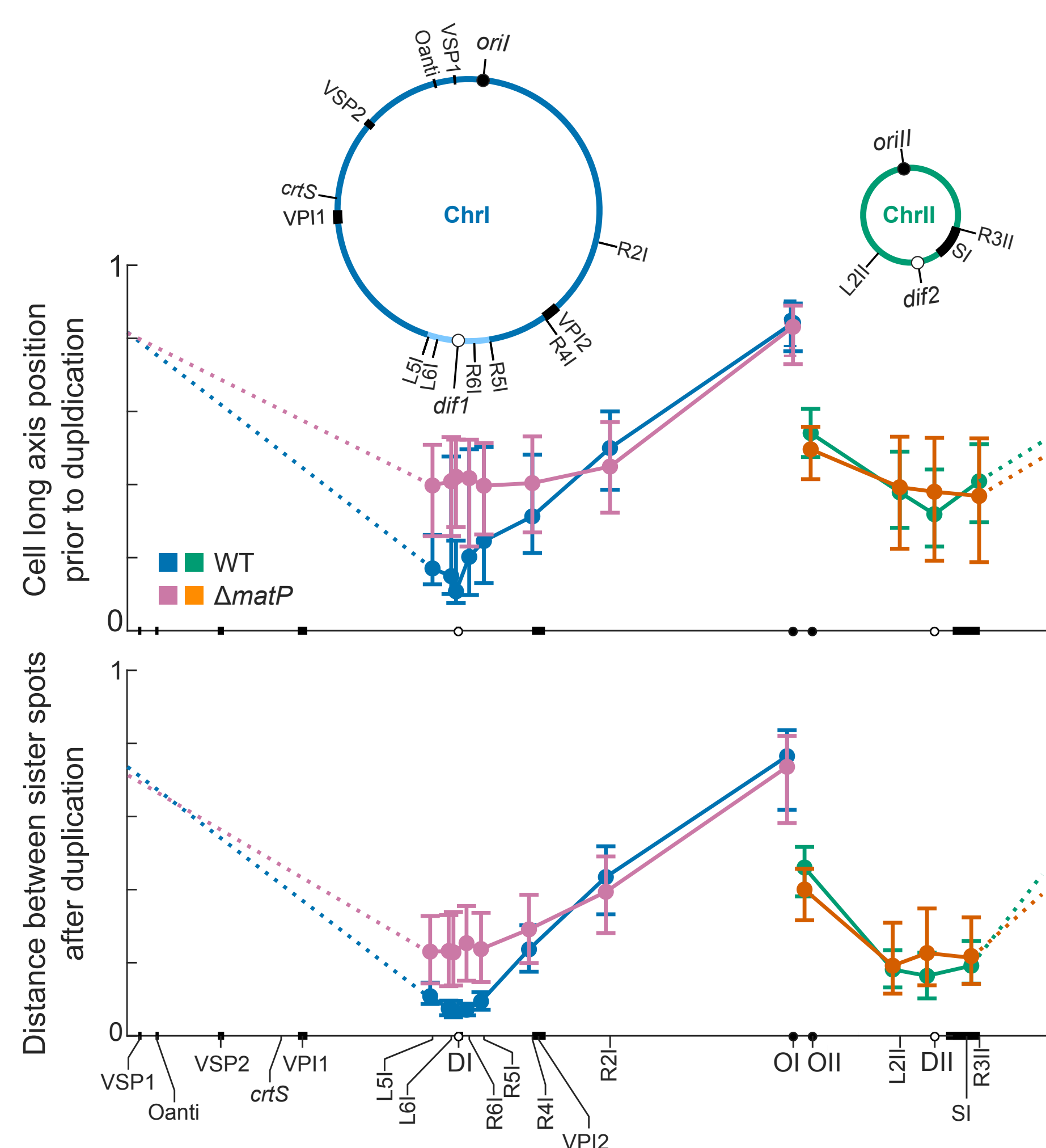
*V. cholerae* is a curved rod-shaped bacterium with a single polar flagellum. Its genome is distributed on two circular chromosomes, ChrI and ChrII. Each carries a single origin of replication, *oriI* and *oriII*, with replication terminating in a diametrically opposite zone, *terI* and *terII*. ChrII is derived from a megaplasmid. Its replication begins after duplication of *crtS*, a sequence located in the middle of the left replication arm of ChrI, and ends at the same time as ChrI replication. Cell division is coordinated with the replication/segregation cycle by SImA, an inhibitor of FtsZ-ring assembly that is bound all along ChrI and ChrII but *terI* and *terII*.



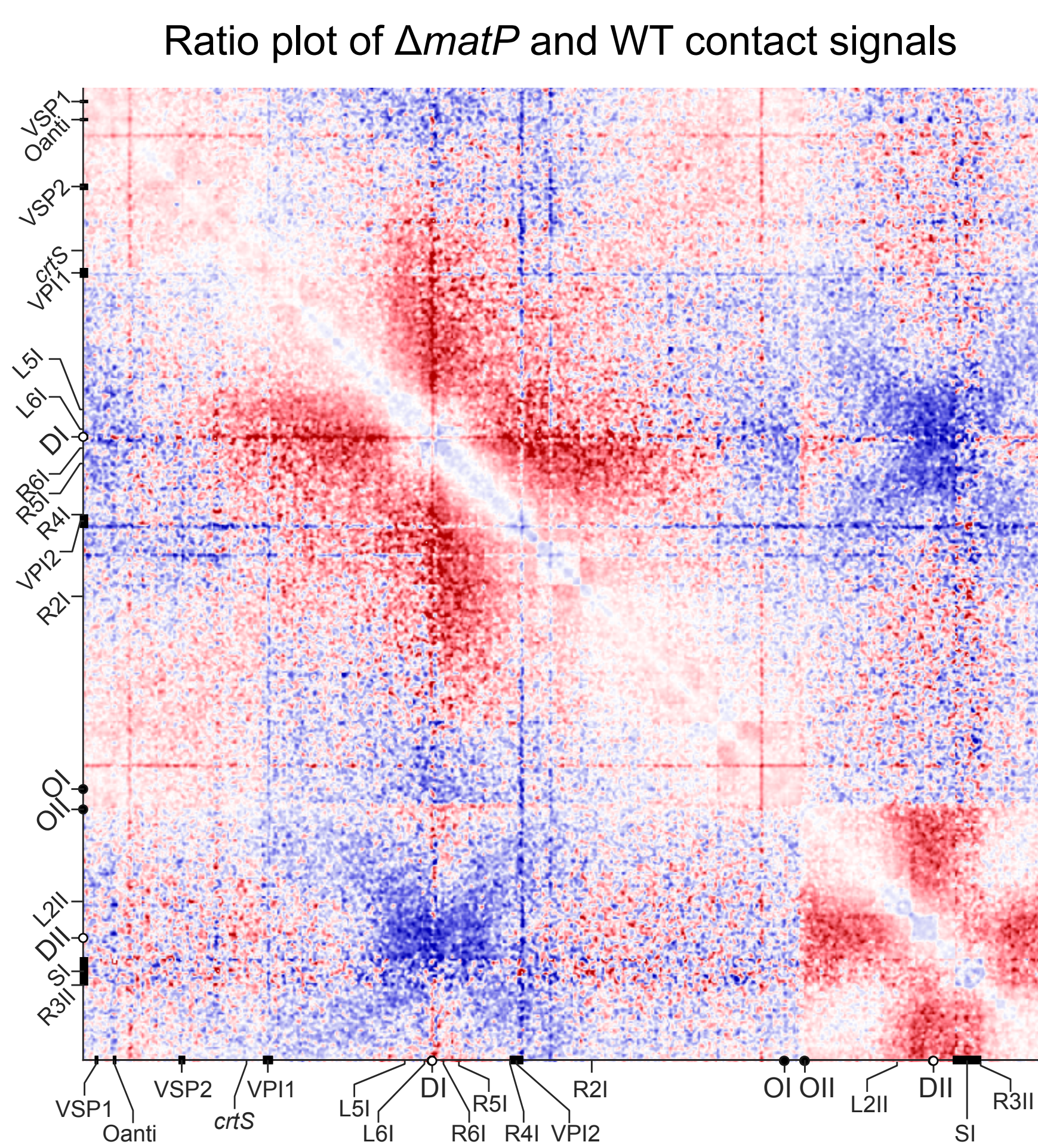
*terI* and *terII* positioning is key to SImA-mediated control of cell division. ChrI encodes a homologue of the *Escherichia coli* MatP protein. *E. coli* MatP insulates the *ter* domain of the *E. coli* chromosome and dictate the positioning of sister *ter* copies at the centre of the cell by connecting them to the FtsZ-ring.



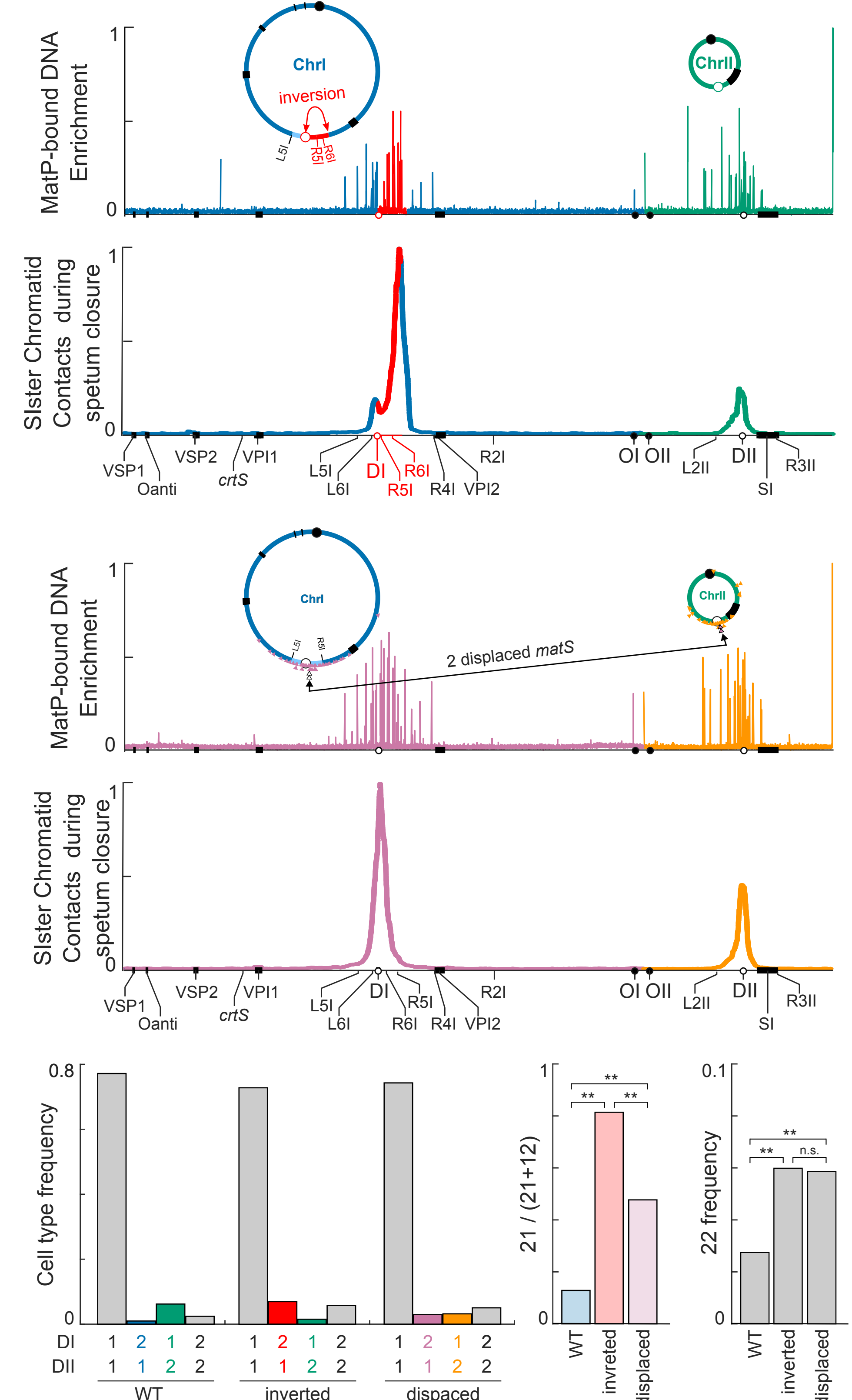
## 1. MatP dictates *terI* positioning



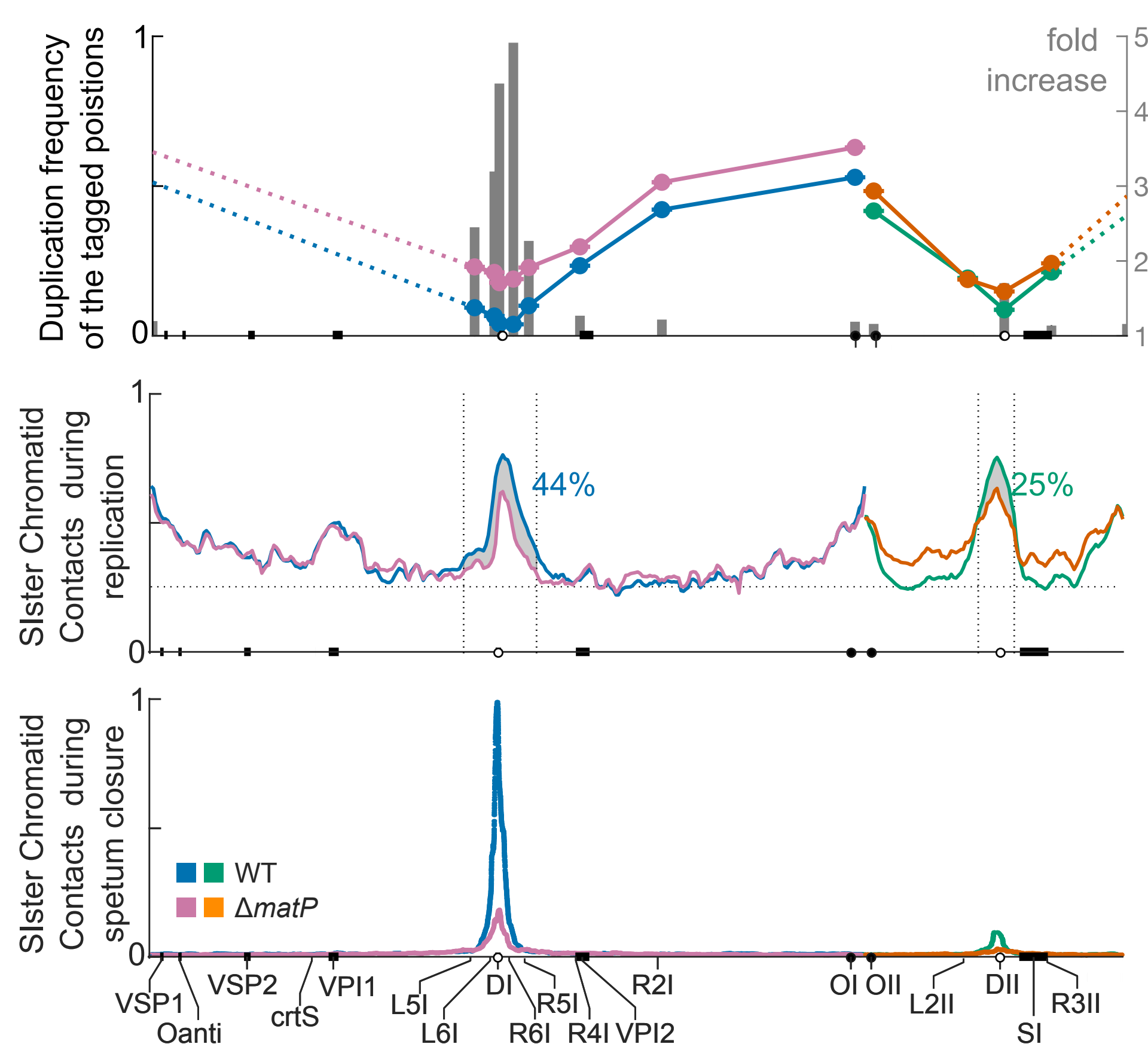
## 4. MatP insulates *terI* and *terII*



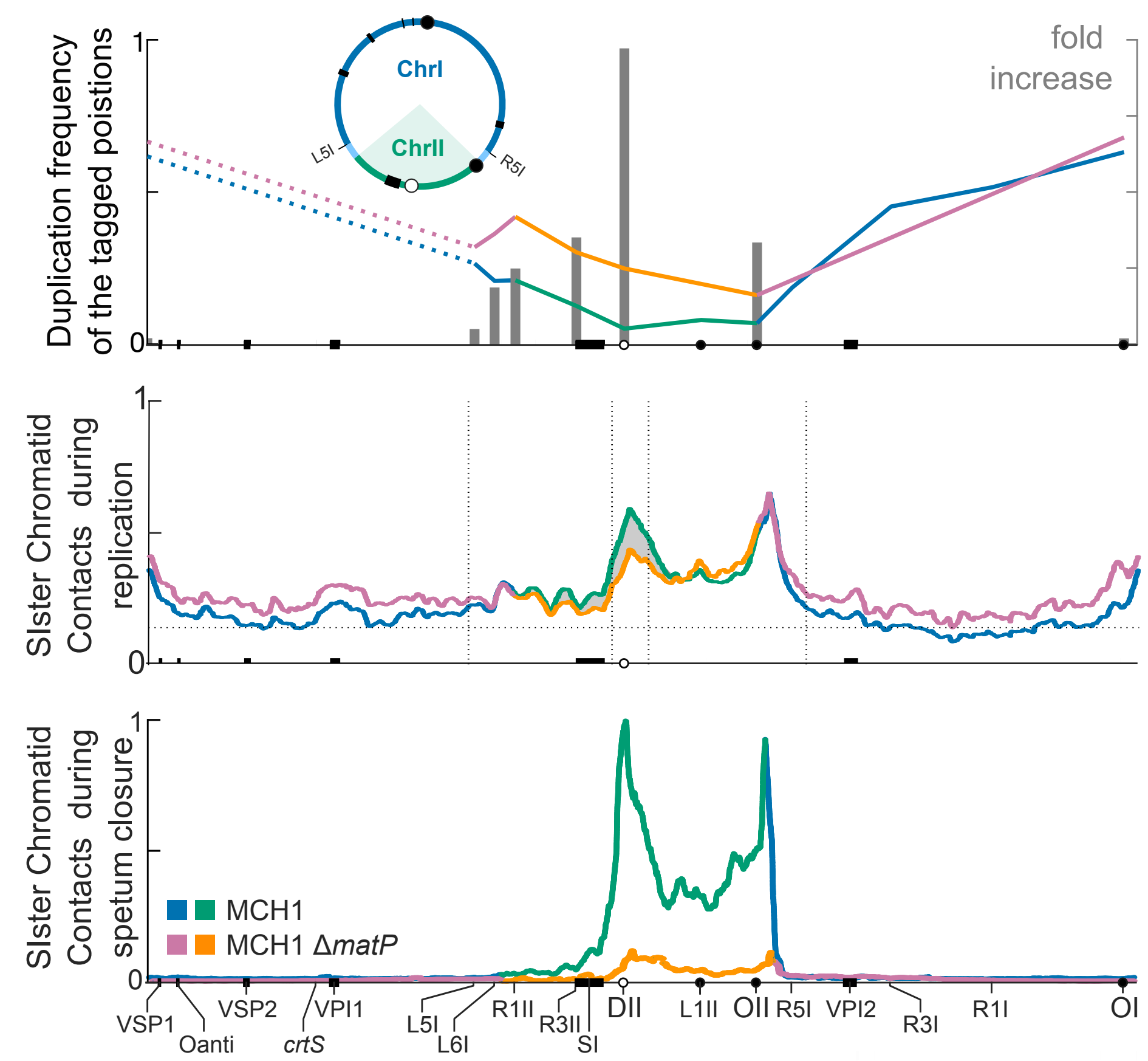
## 7. *matS* density increases cohesion



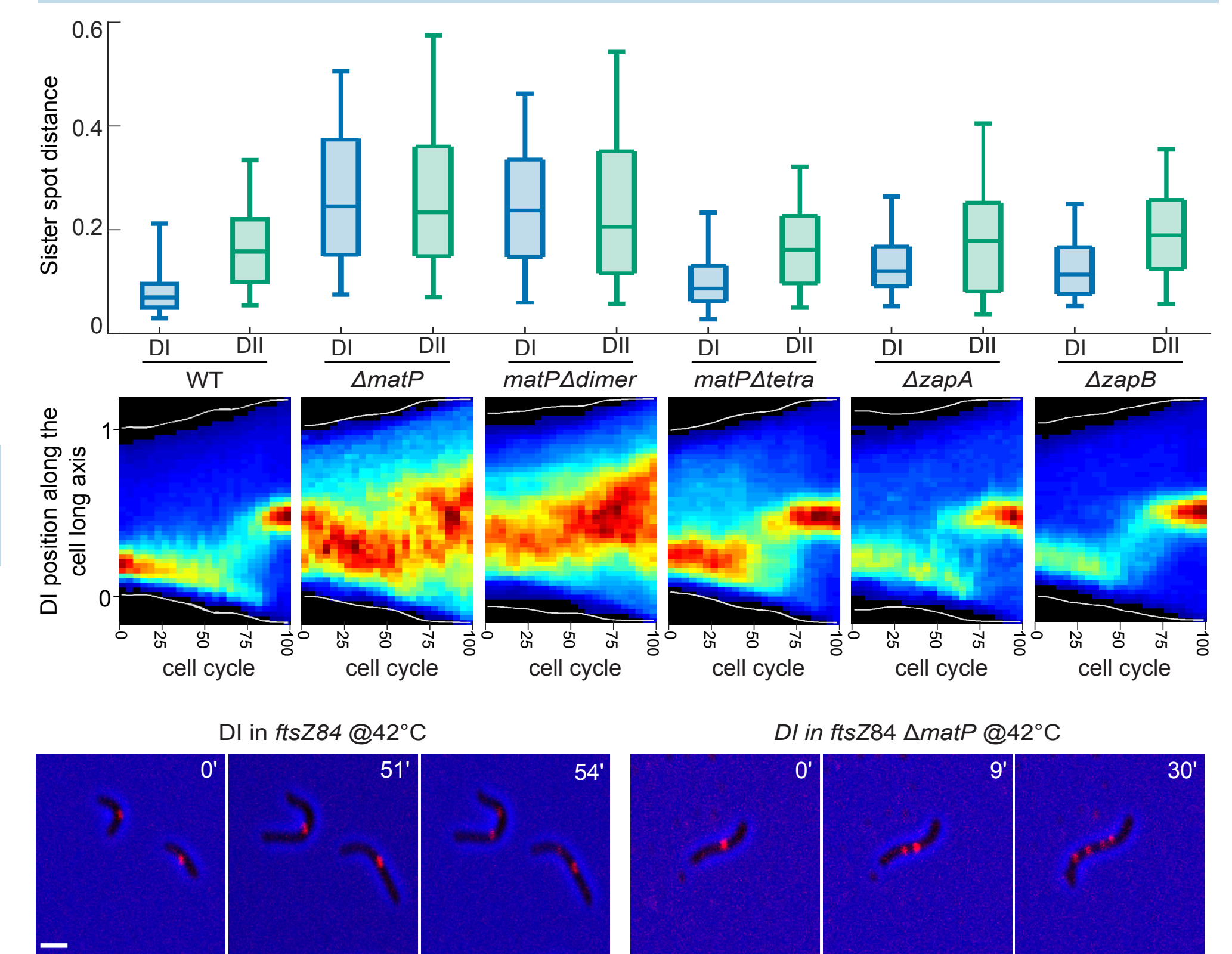
## 2. MatP prolongs *terI* cohesion



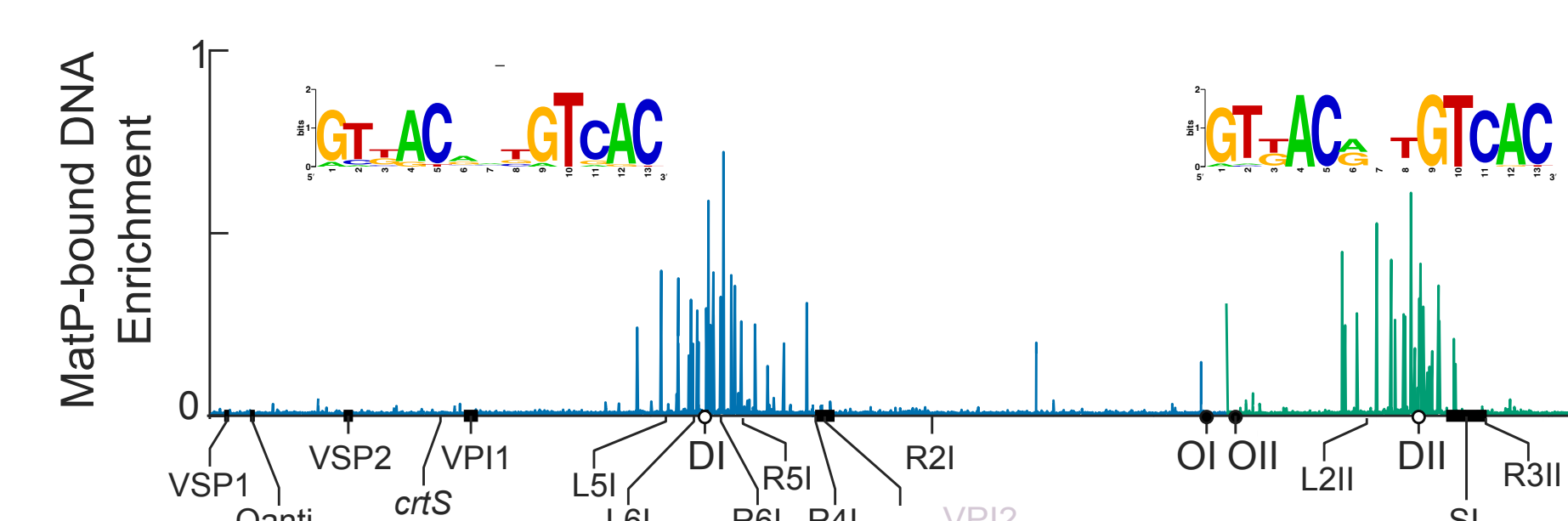
## 5. *terII* *matS* sites can induce cohesion



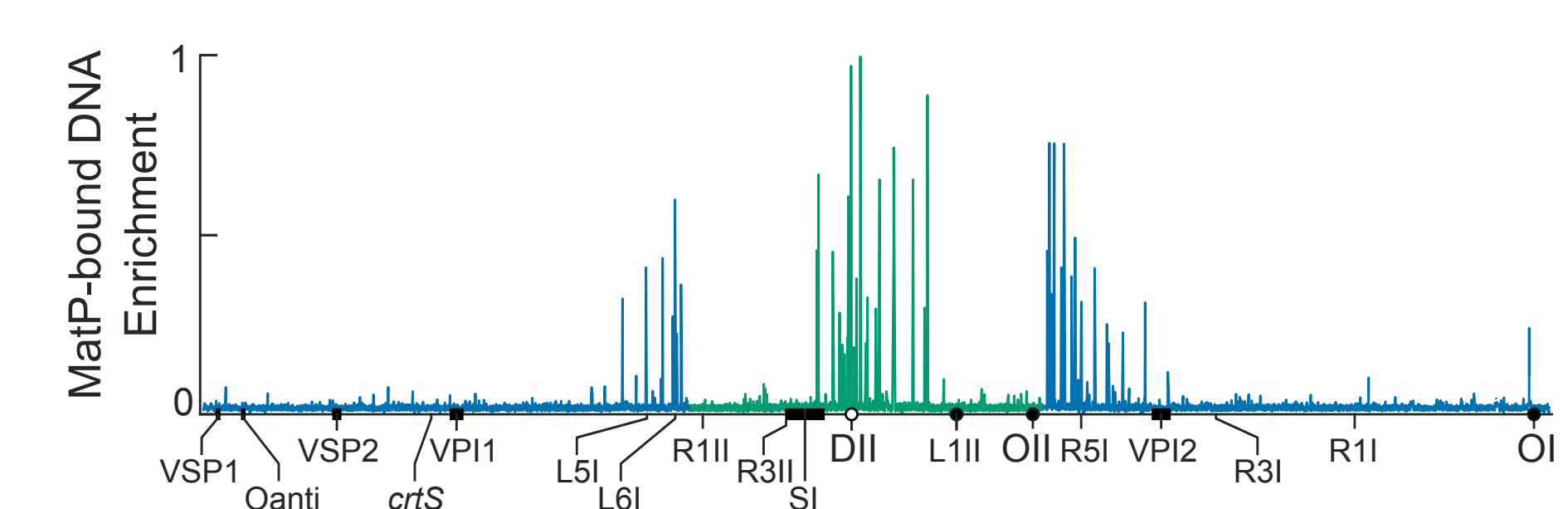
## 8. Cohesion is cell division independent



## 3. ChrII harbours *matS* sites



## 6. Density increases occupancy



## Conclusions

- MatP ensures the polar positioning (1) and ordered segregation of *terI* loci, with *dif1* being segregated last (2), as previously observed in *E. coli*.
- *terI* and *terII* both harbour numerous *matS* sites (3) and are organised in macrodomains by MatP (4). Yet, the deletion of MatP had little effect on the positioning (1) and ordered segregation of ChrII loci (2).
- MatP binds to *matS* sites even when they are far from the replication terminus and the FtsK activity zone (3, 6, 7). Its local enrichment depends on the the local density of *matS* sites (3, 6, 7), which dictates the possibility for MatP to position loci and prolong their cohesion (5 & 7).
- MatP-mediated cohesion does not depend on tetramerisation, nor any interaction with a cell division protein (8).

## Perspectives

- Study the interplay between MatP, MukBEF, ParAB1/*parS1* and ParAB2/*parS2* in ChrI/ChrII organisation and segregation.
- Search for the factor that is responsible for the MatP-independent cohesion of sister copies of *terI* and *terII* loci behind replication forks.