

Zwint-1 is required for homologous chromosome segregation by regulating kinetochore-microtubule attachment and spindle assembly checkpoint during meiosis of mouse oocytes

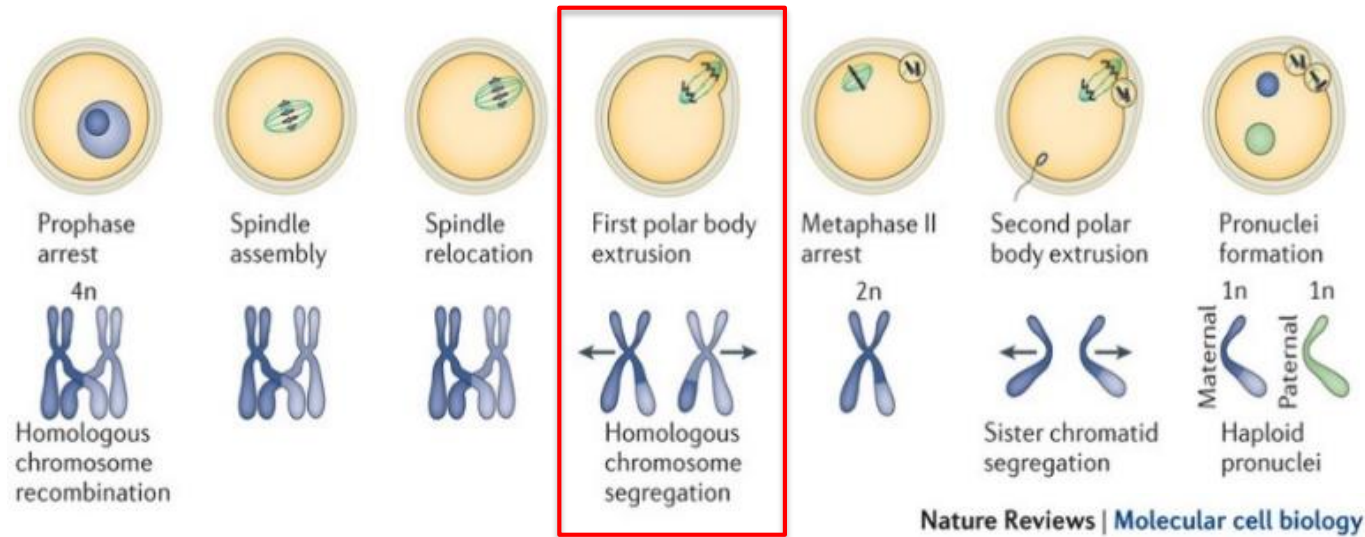
Seo Dong-Woo

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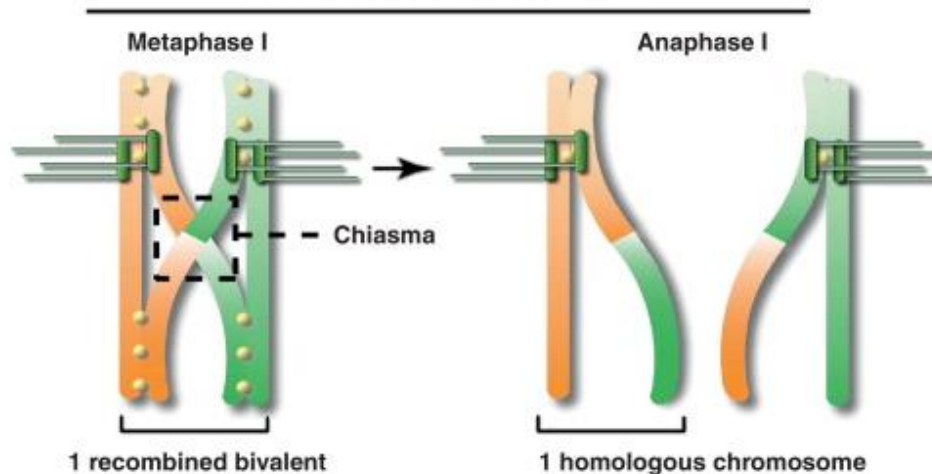
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Introduction

Chromosomes segregation during meiosis I



Meiosis I/reductional segregation



Defects in chromosome segregation : aneuploidy



- ✓ **Aneuploidy:** condition that results when there is a missing or extra chromosome, resulting in changes to the normal chromosome number
- ✓ **Mistakes during meiosis:** improper kinetochore-microtubule (kMT) attachments at metaphase

CPC is a key regulator of chromosome segregation

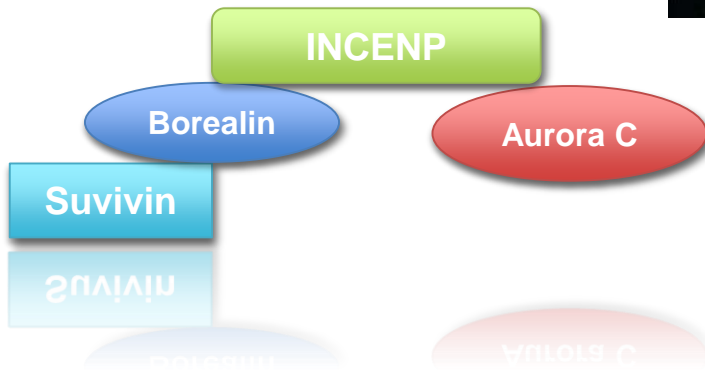
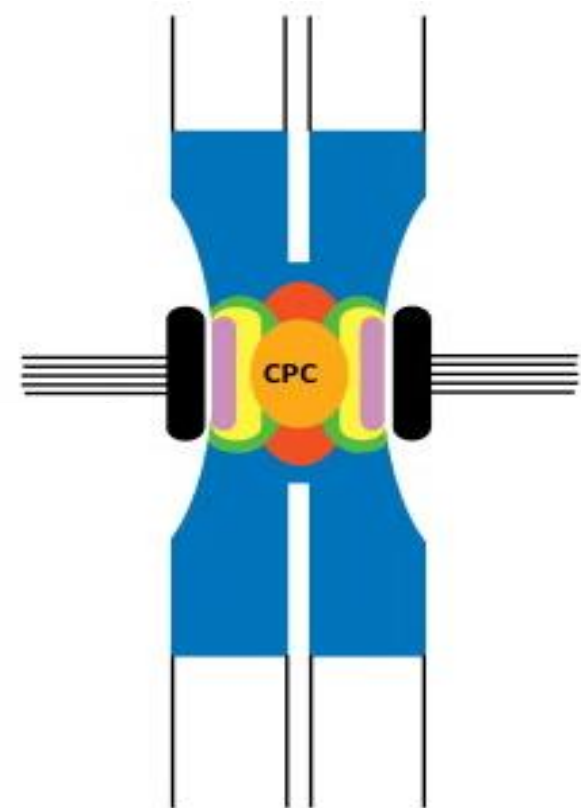
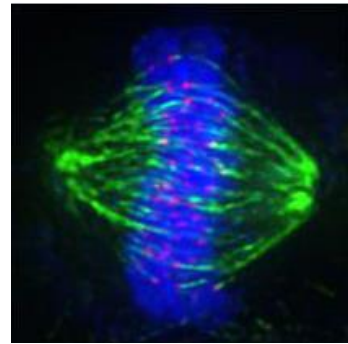
CPC (chromosomal passenger complex)

Aurora B/C kinase

INCENP

Survivin

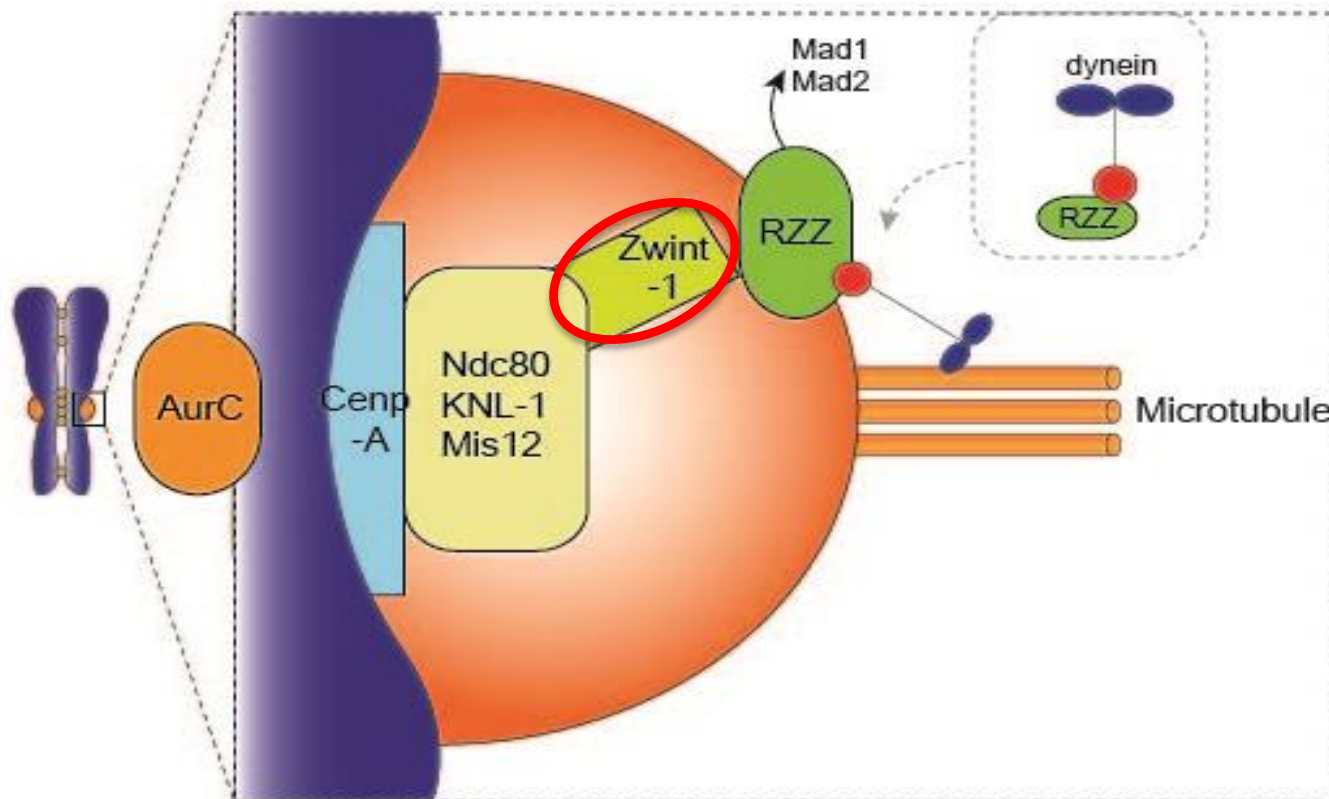
Borealin



Error correction of kinetochore-microtubule (kMT) attachment

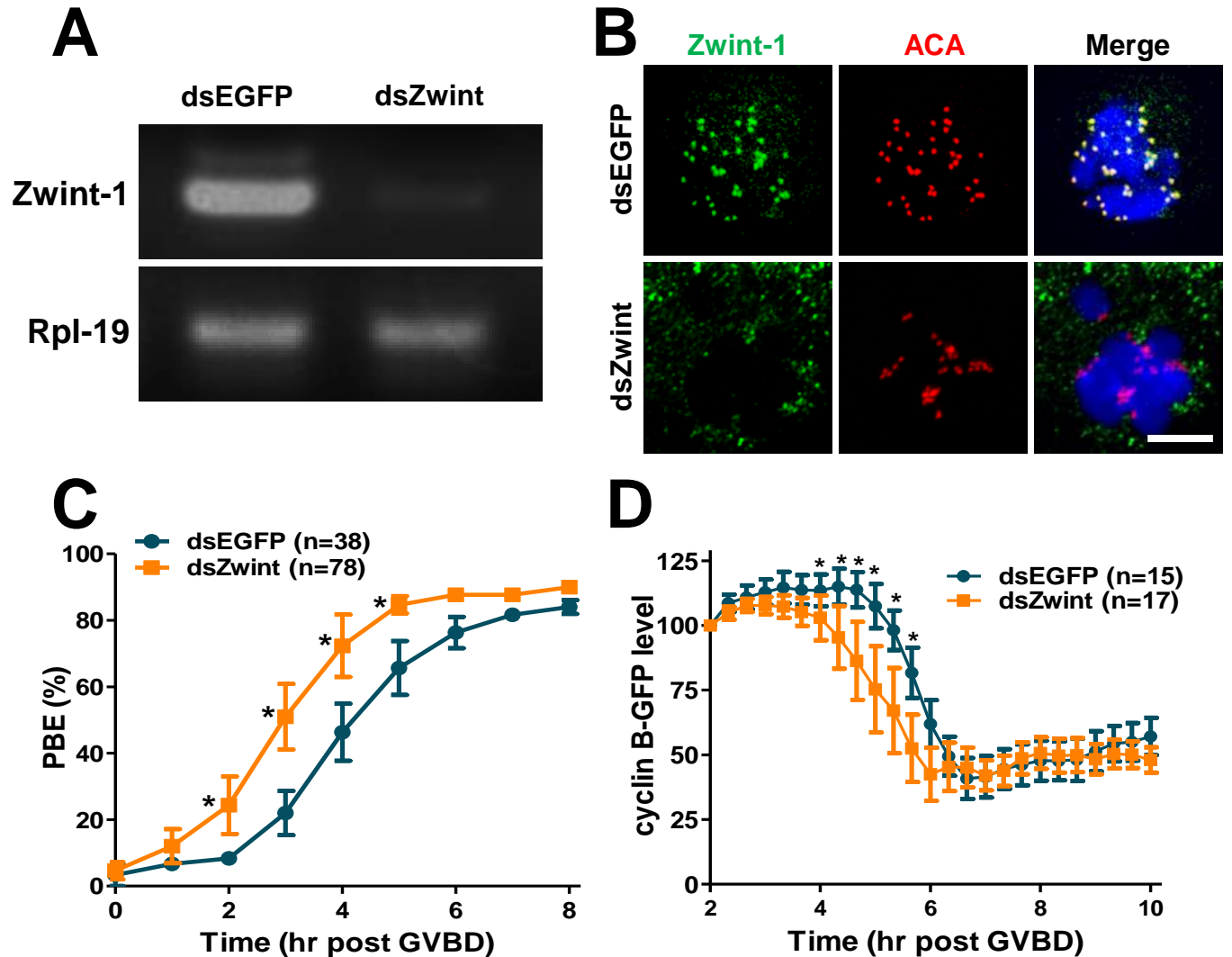
Kinetochores are a key place for Aurora B/C function

- Inner kinetochore : Aurora B/C
- Outer kinetochore : Spindle assembly checkpoint (SAC)
- Mediators between inner kinetochore and outer kinetochore



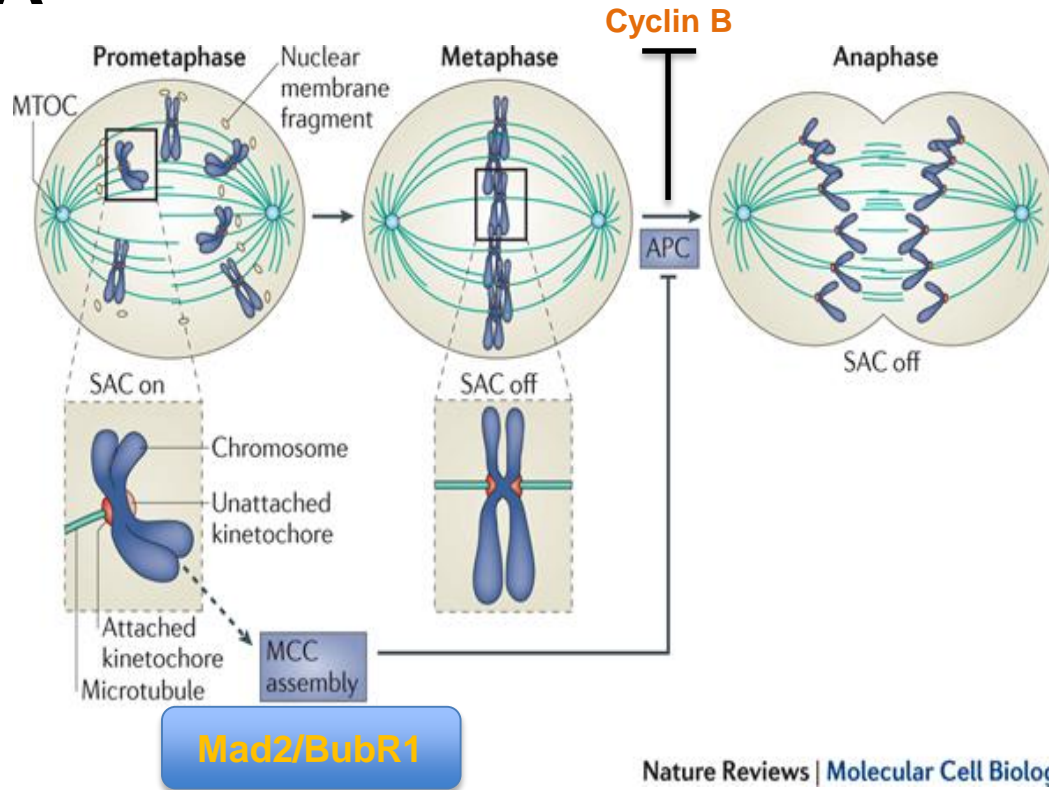
2 Results

Premature polar body extrusion in Zwint-1 KD oocytes



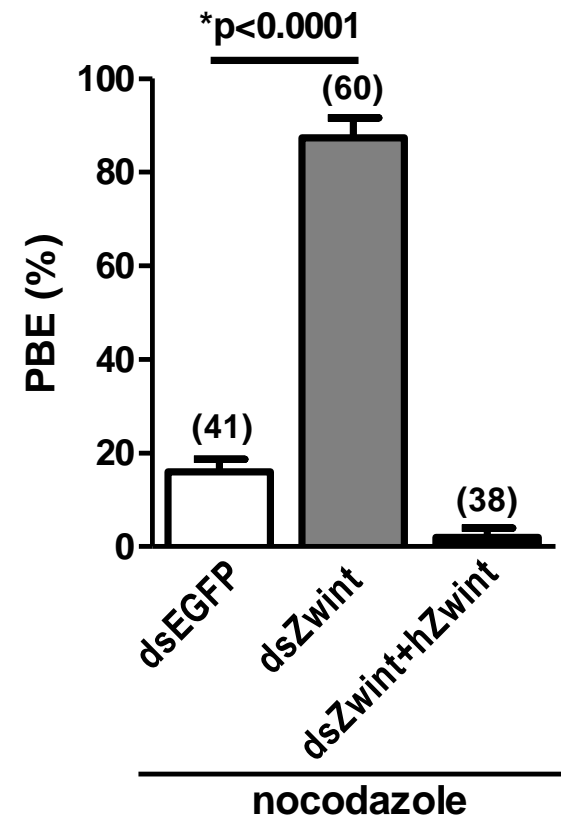
Inactivation of SAC in Zwint-1 KD oocytes

A

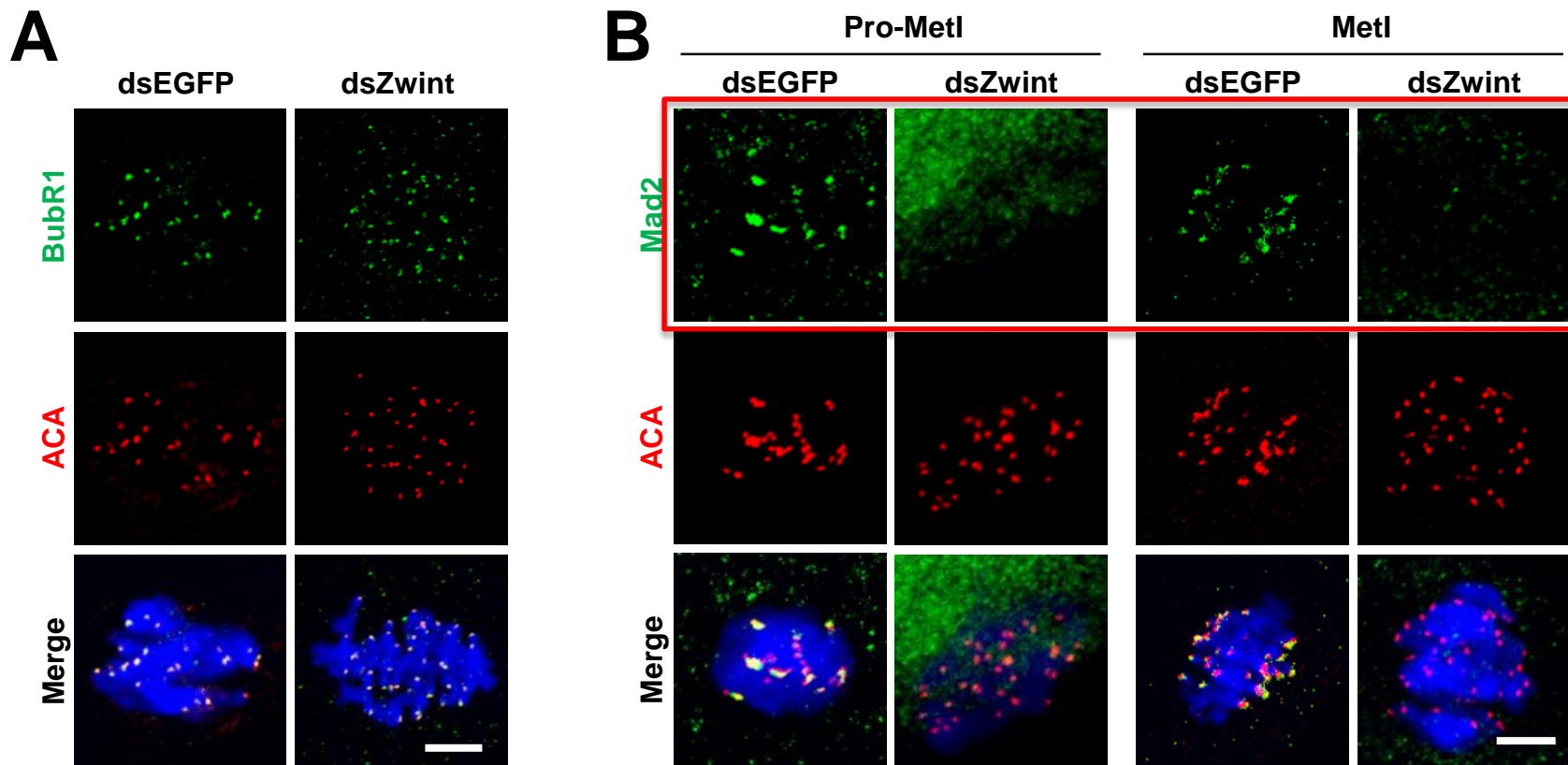


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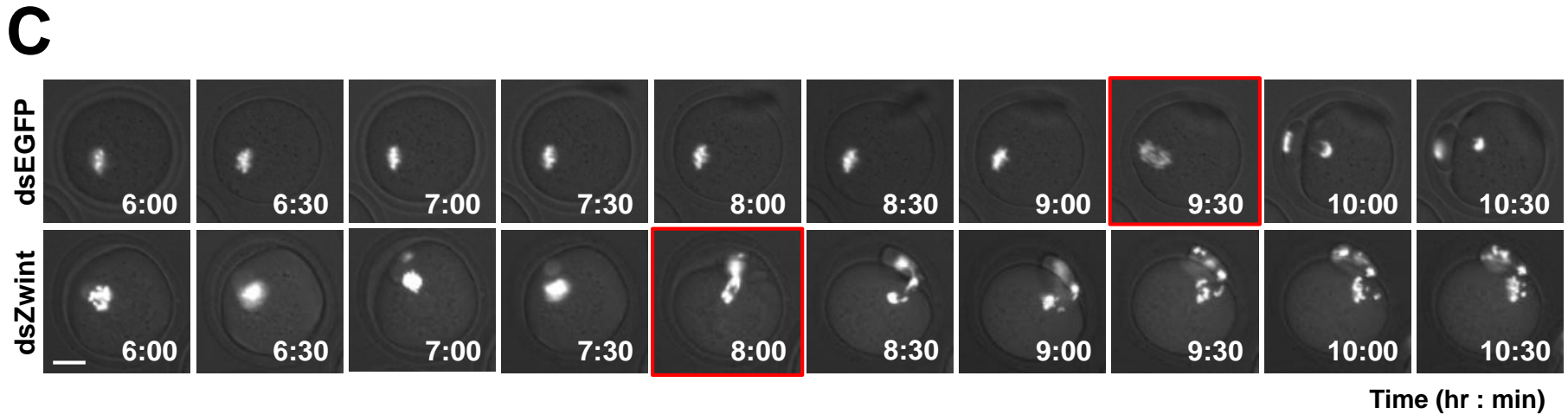
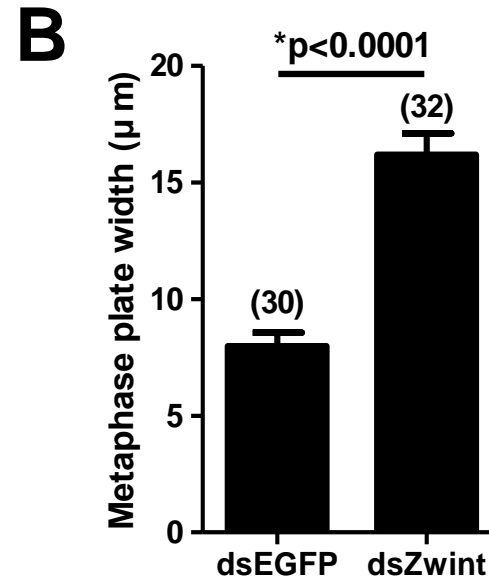
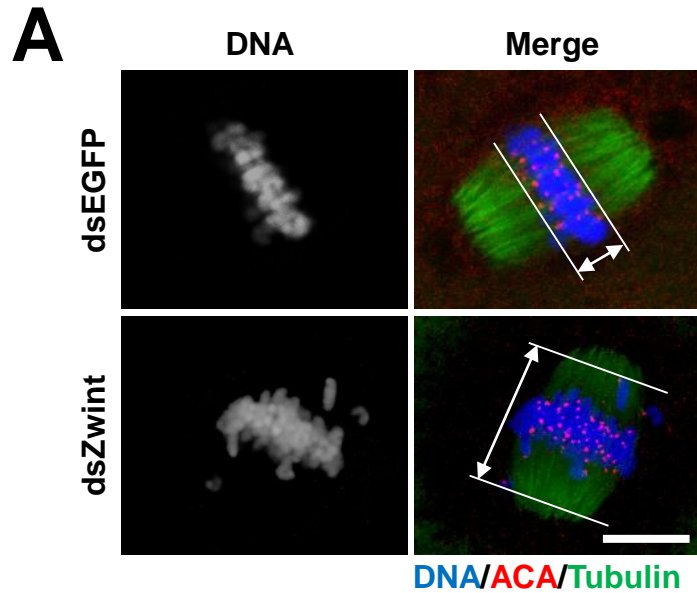
B



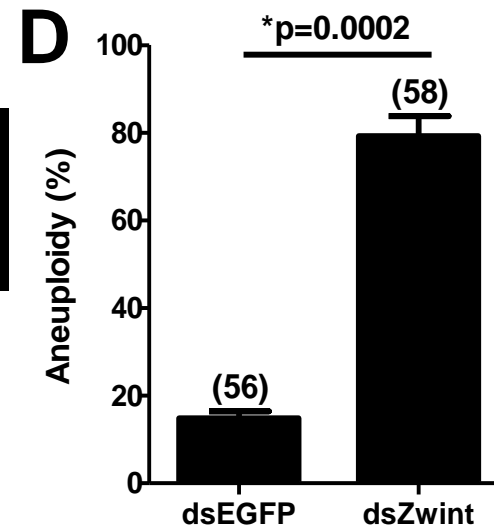
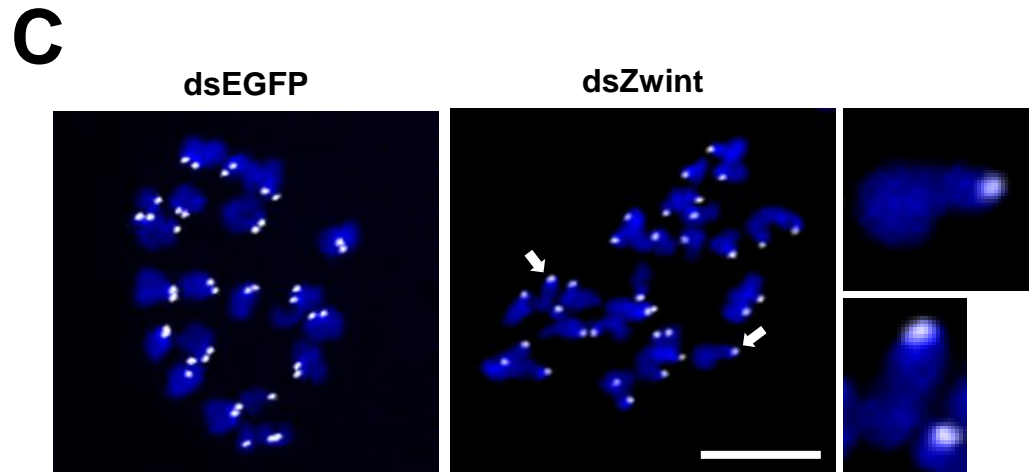
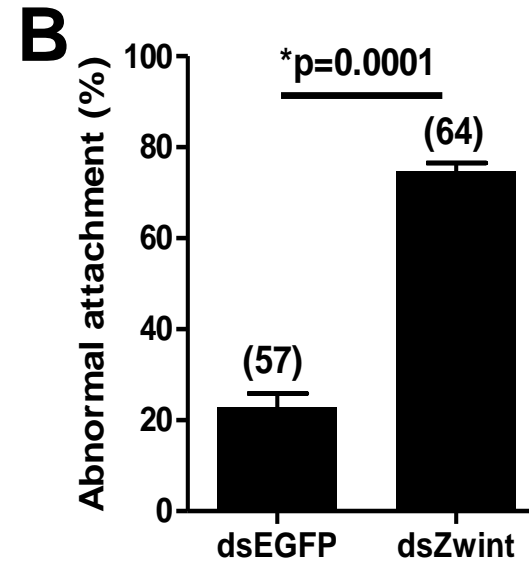
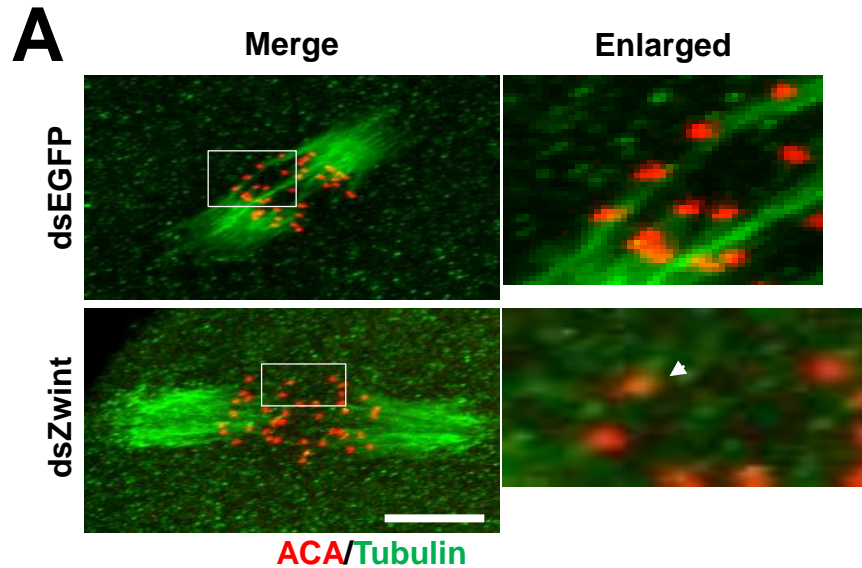
Failure of Mad2 recruitment but not BubR1 in Zwint-1 KD



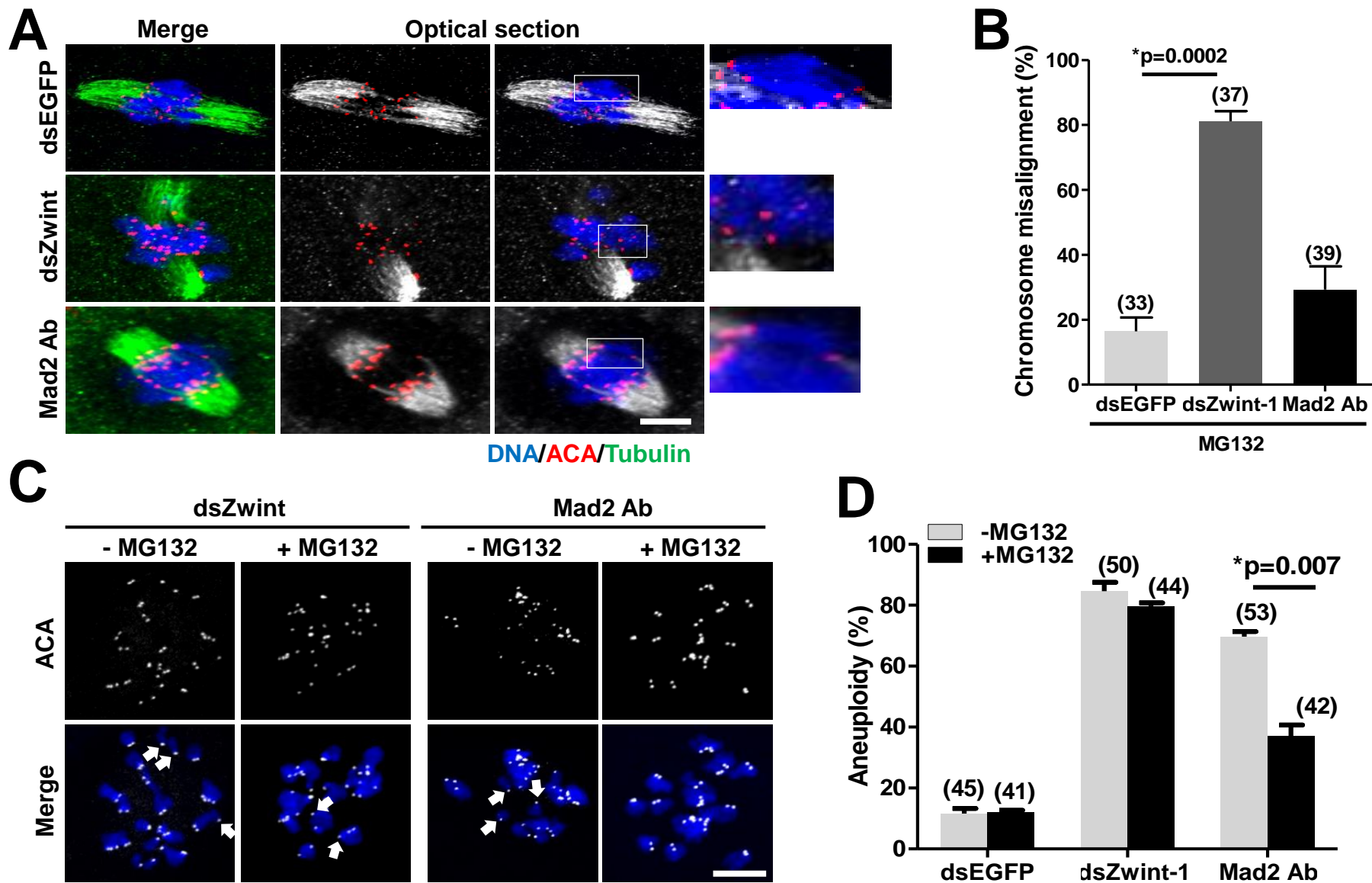
Defects in chromosome alignment in Zwint-1 KD



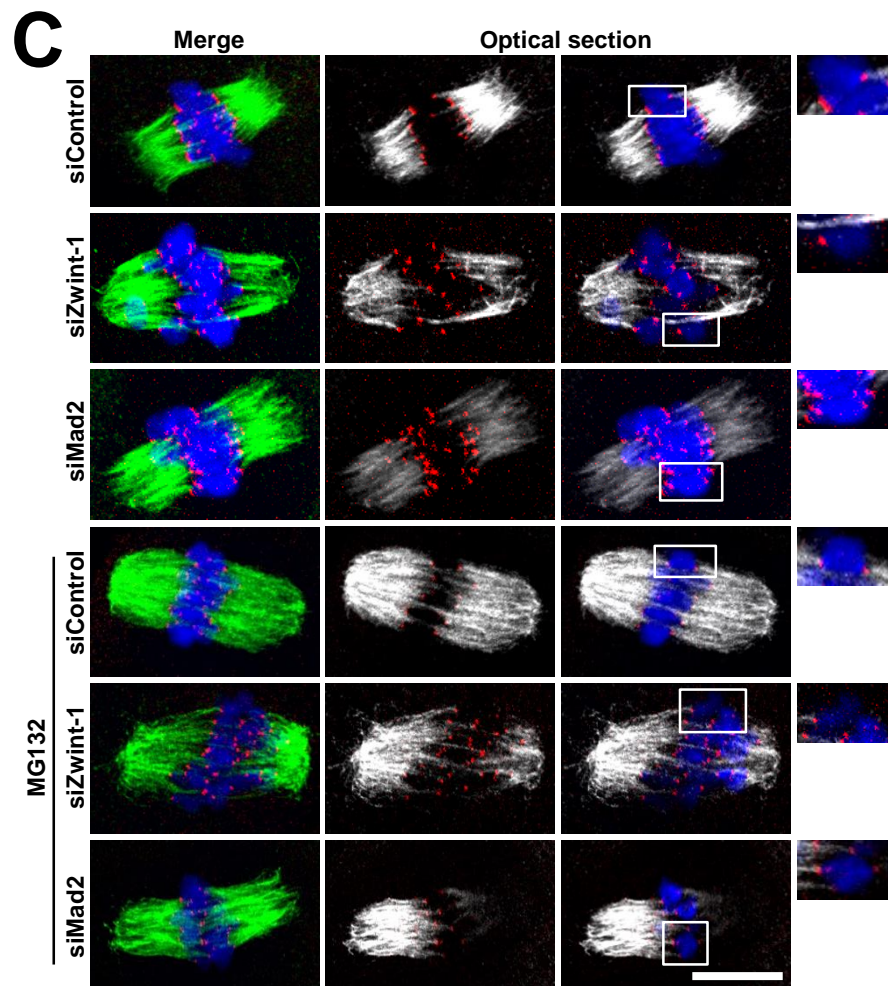
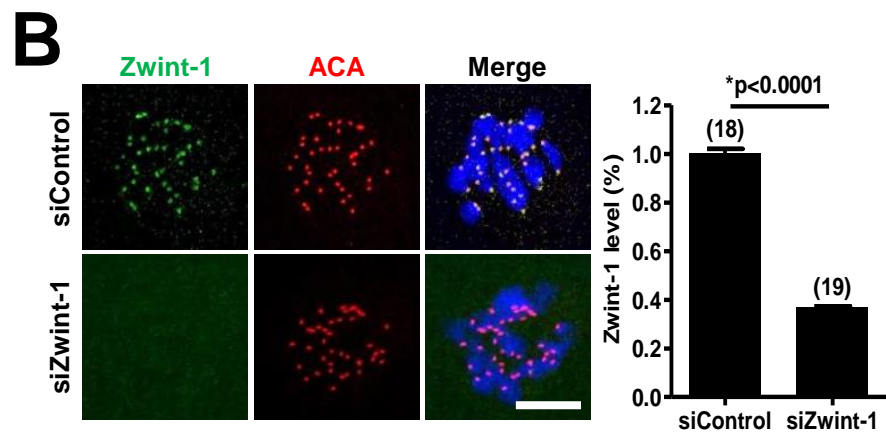
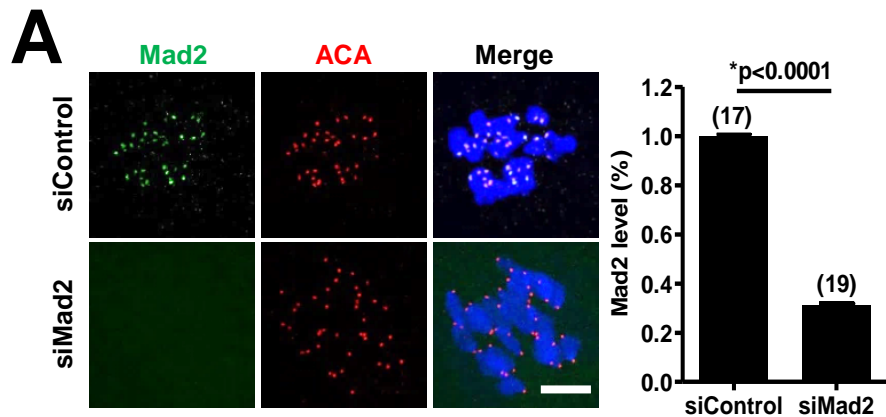
Abnormal kMT attachment and aneuploidy in Zwint-1 KD



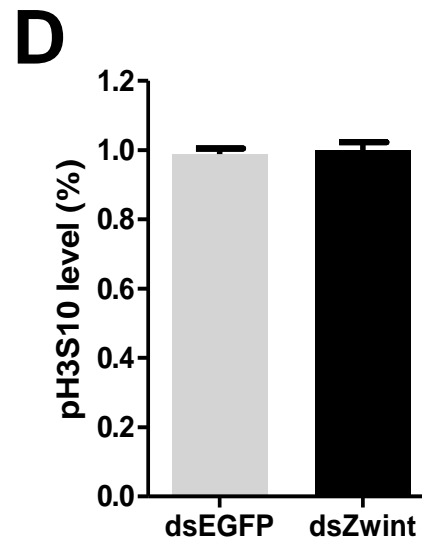
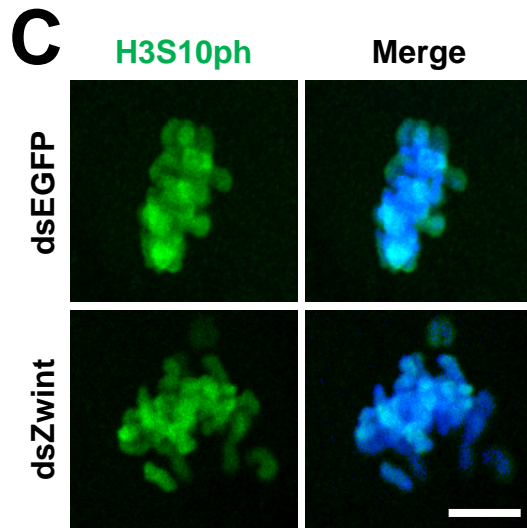
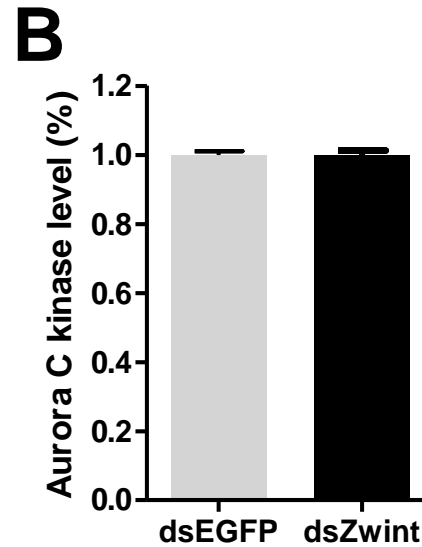
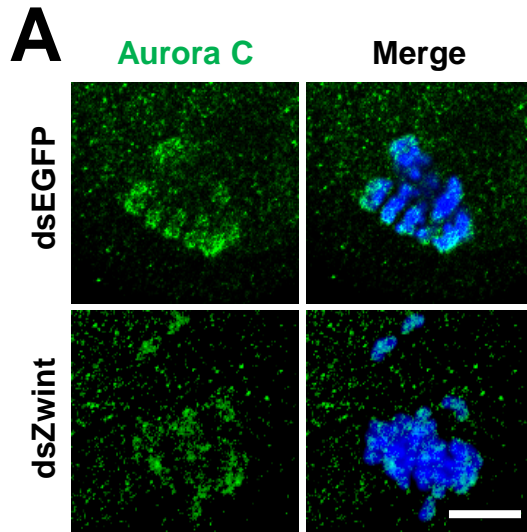
Zwint-1 KD phenotype is not due to Mad2 deficiency



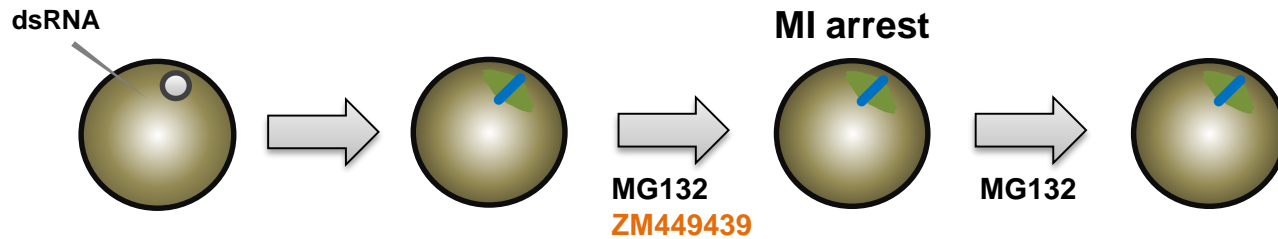
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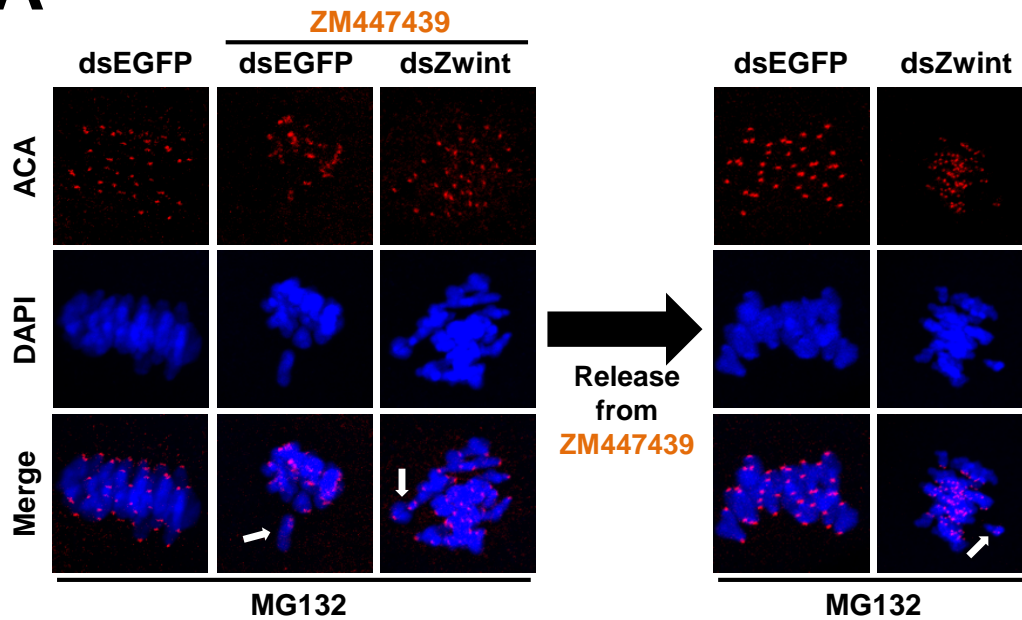
Activity of Aurora C kinase remains intact in Zwint-1 KD



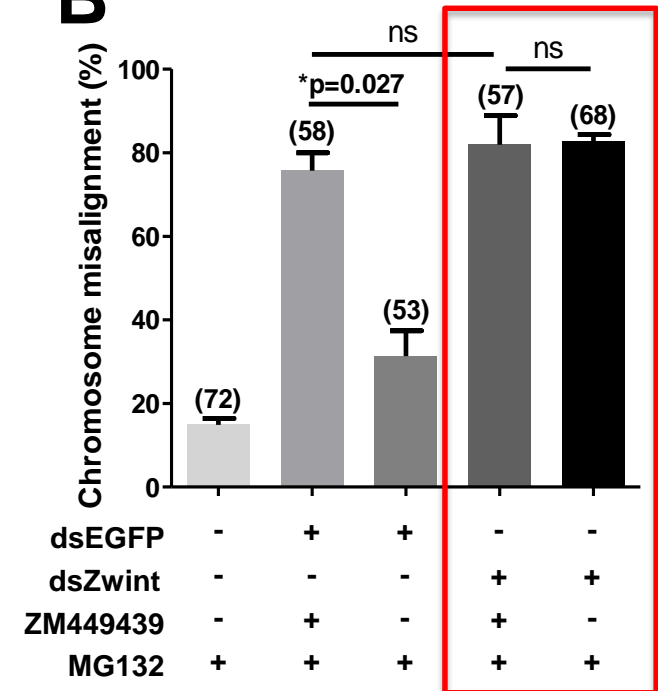
Zwint-1 is an essential effector of Aurora C kinase



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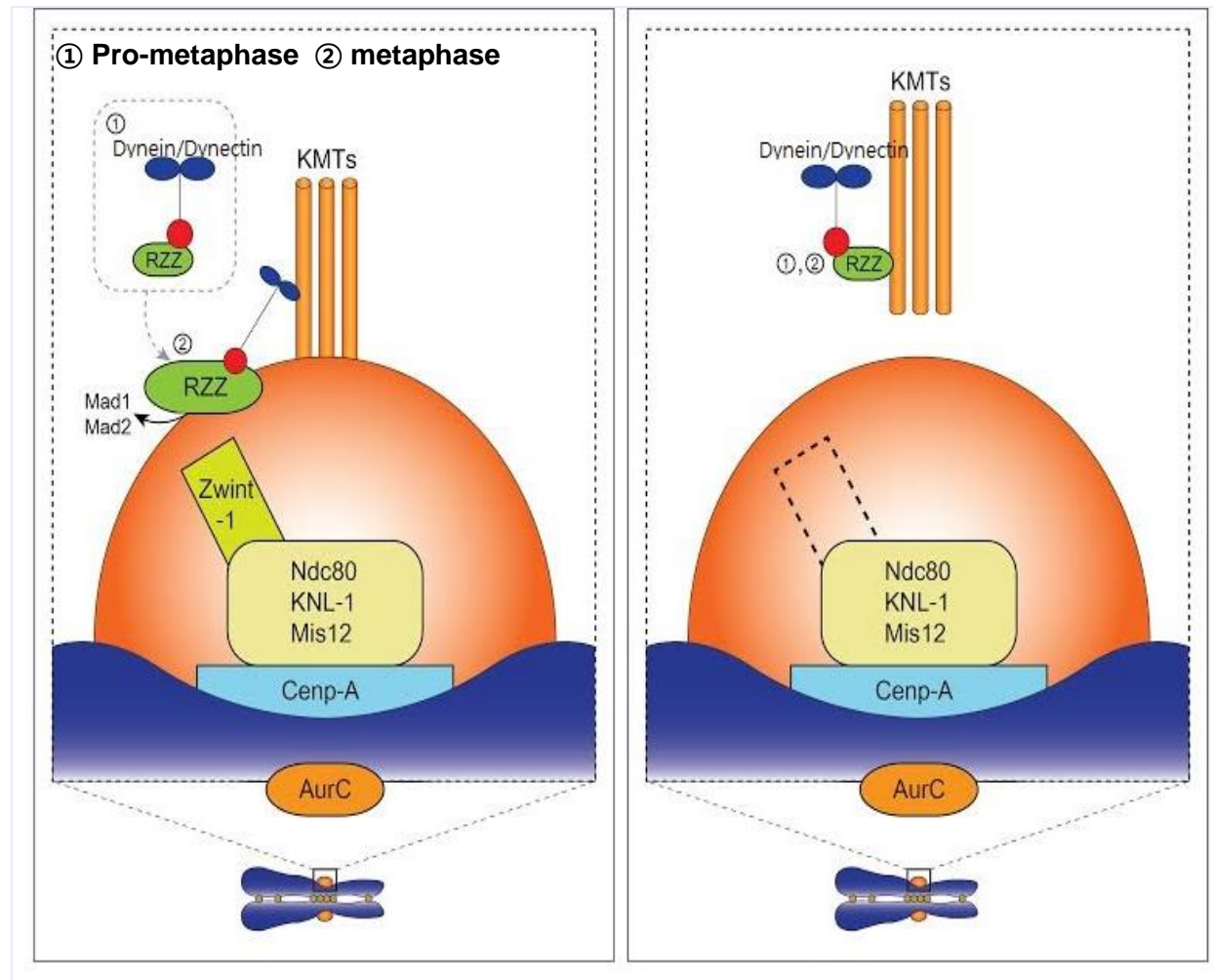
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Conclusion

Zwint-1 is Aurora C mediator during meiosis



4 Acknowledgment



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