

## B VANC: sequence-specific anti-silencing protein

Plants silence transposons by DNA methylation<sup>1</sup>. On the other hand, some transposons have activity to counteract the silencing. *VANDAL21* transposon encodes a protein named VANC, which induces DNA methylation loss, transcriptional de-repression and mobilization of *VANDAL21*<sup>2</sup>. The loss of DNA methylation occurs in entire length of *VANDAL21* (Fig 1). However, the hypomethylation was very specific; other transposons are not affected. Currently we are studying evolution and anti-silencing mechanism of this protein.

ChIP-seq for VANC revealed that this protein is localized in non-coding regions of *VANDAL21* (Fig 3). VANC also specifically binds these target sequences in vitro. Interestingly, effect of VANC on DNA methylation spread from the binding regions to the entire *VANDAL21* region (but not outside of *VANDAL21*). Currently we are trying to understand molecular mechanisms of anti-silencing effect of VANC and its evolution.

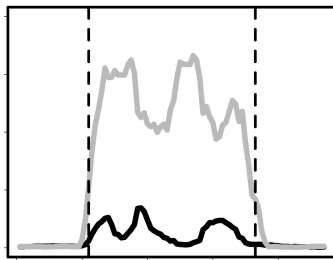


Fig 1 Introduction of *VANDAL21* transgene induces loss of DNA methylation in entire length of *VANDAL21*. Methylation level is shown for *VANDAL21*. Black and gray show the transgenic and control lines, respectively.

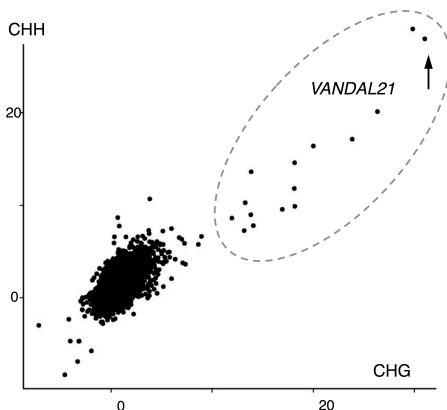


Fig 2 The loss of DNA methylation was specific for *VANDAL21*.

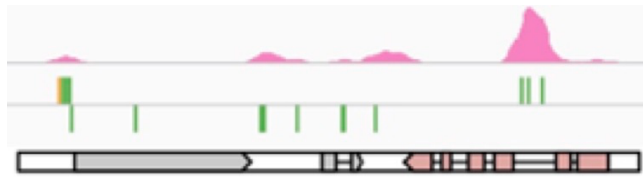


Fig 3 Localization of VANC protein within VANDAL21 (top). Econ/Intron structure of VANDAL21 is shown in bottom

## References

1. Tsukahara S, Kobayashi A, Kawabe A, Mathieu O, Miura A, and Kakutani T (2009) Bursts of retrotransposition reproduced in Arabidopsis. *Nature* 303, 423-426.
2. Fu Y, Kawabe A, Etcheverry M, Ito T, Toyoda A, Fujiyama A, Colot V, Tarutani Y, Kakutani T (2013) Mobilization of a plant transposon by expression of the transposon-encoded anti-silencing factor. *EMBO J.* 32, 2407-2417
3. Hosaka A, Saito R, Takashima K, Sasaki T, Fu Y, Kawabe A, Ito T, Toyoda A, Fujiyama A, Tarutani Y, Kakutani T. (2017) Evolution of sequence-specific anti-silencing systems in Arabidopsis. *Nat Commun.* 8, 2161