

► Introduction

Sleeping Beauty (SB) is a DNA transposon, member of the Tc1/*mariner*-superfamily of transposable elements. It contains a single open reading frame encoding the SB transposase flanked by the Inverted Terminal Repeats (IRs), which are the recognition sites for the SB protein that catalyzes the transposition reaction via a “cut & paste” mechanism. Transposition expression is the potential control point in the regulation of SB transposition. We used the SB transposon system as a tool to study the transcriptional control of transposase expression in vertebrates.

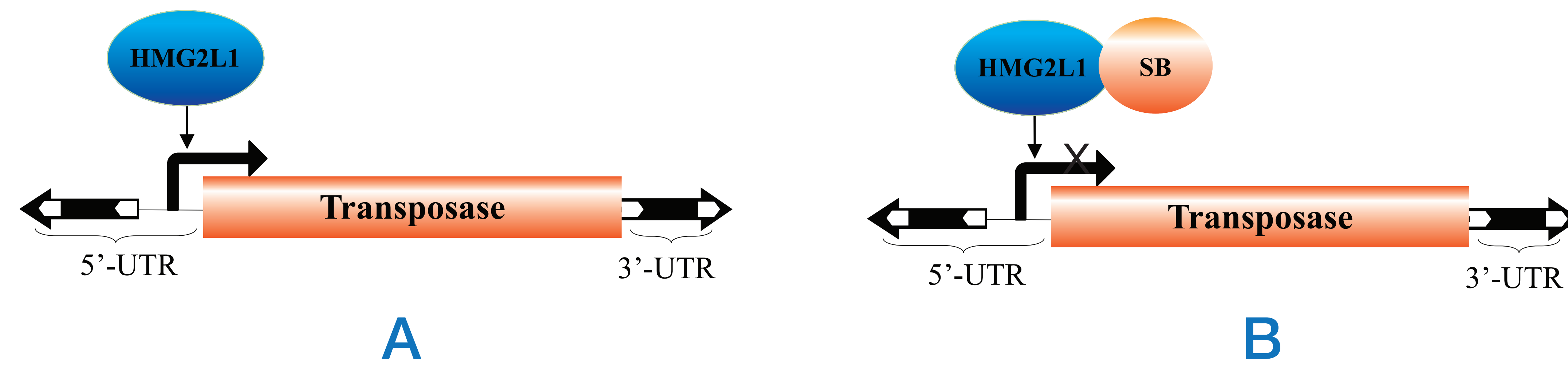


Figure 1. (A) and (B) Model depicting the regulation of SB transposase by HMG2L1

► Host factor HMG2L1 regulates SB transcription

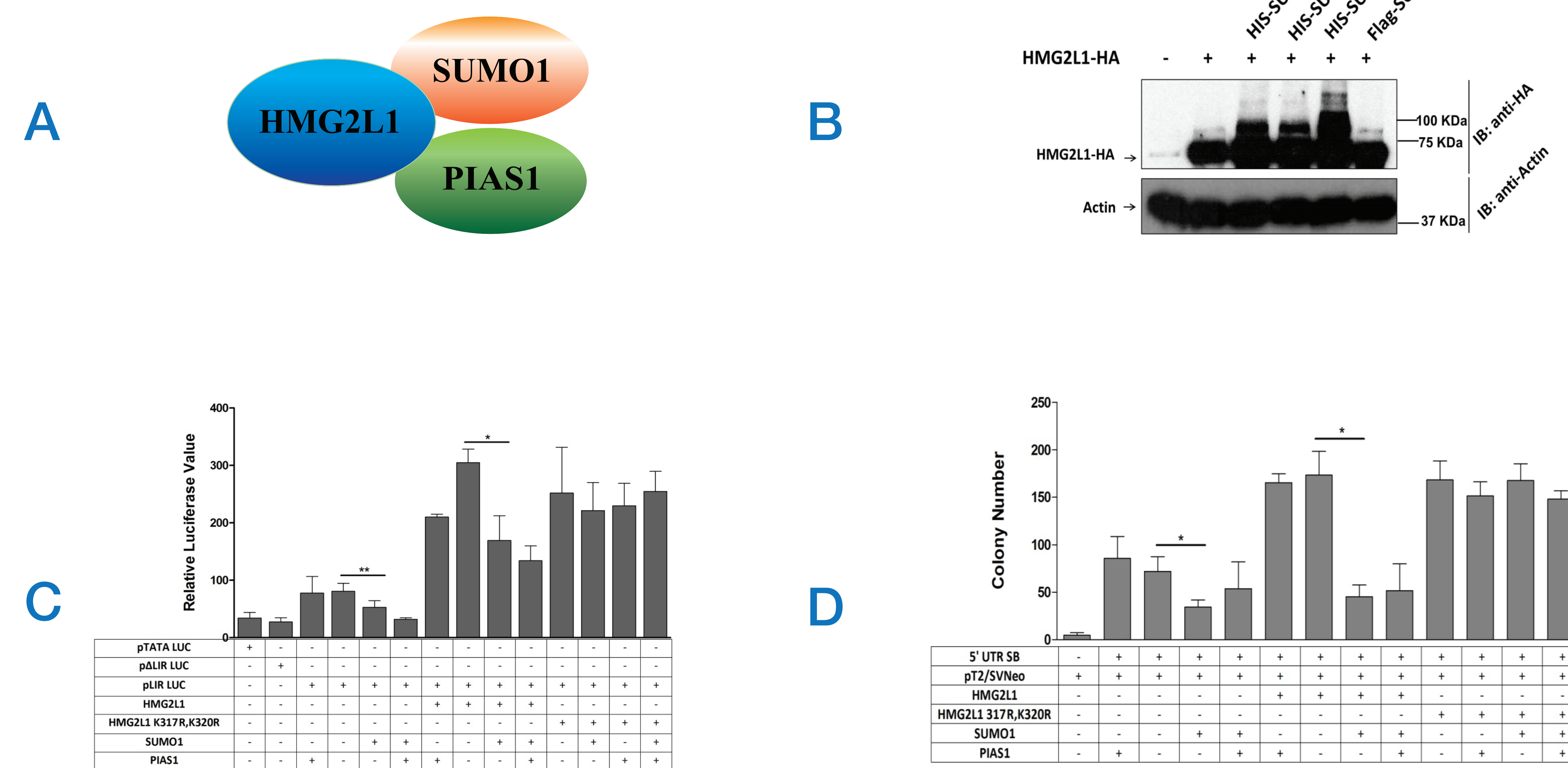


Figure 2. SUMOylated HMG2L1 attenuates SB transcription (A) Schematic illustration of HMG2L1 interacting proteins (B) *In vitro* SUMOylation assay of HMG2L1 in HeLa cells (C) Relative luciferase units (RLU) measurements for SB 5' UTR fused to a luciferase reporter (D) SB mediated transposition driven by its own promoter.

► Developmental regulation of SB transposase by HMG2L1

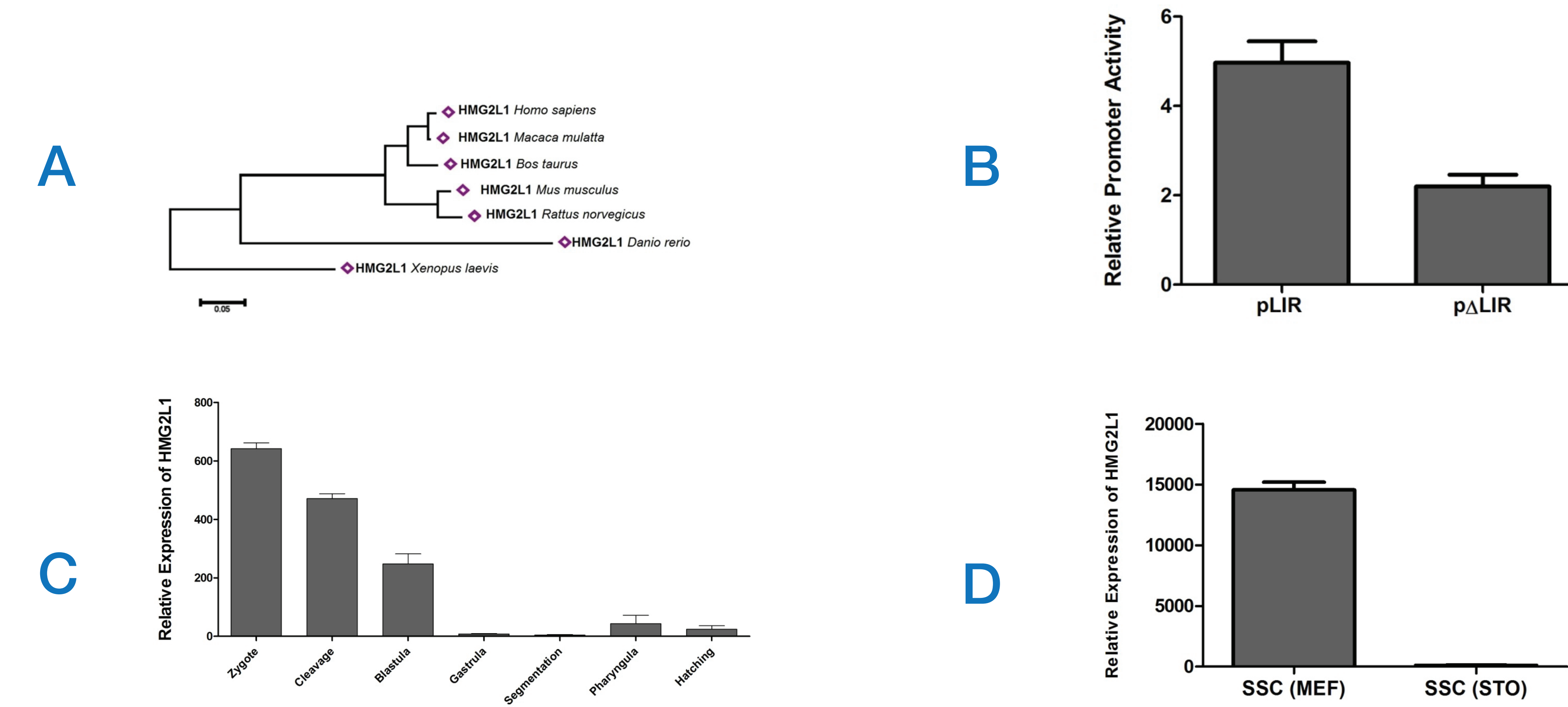


Figure 3. HMG2L1 is expressed in germ cells and early embryogenesis (A) Phylogenetic analysis of HMG2L1 proteins across different species (B) Analysis of 5'UTR promoter activity of SB in whole zebrafish embryos (C) HMG2L1 expression in zebrafish embryo development (D) Expression of HMG2L1 in germ cells.

► HMG2L1, an inhibitor of Wnt signalling, targets *Sleeping Beauty* transposition to stem cells

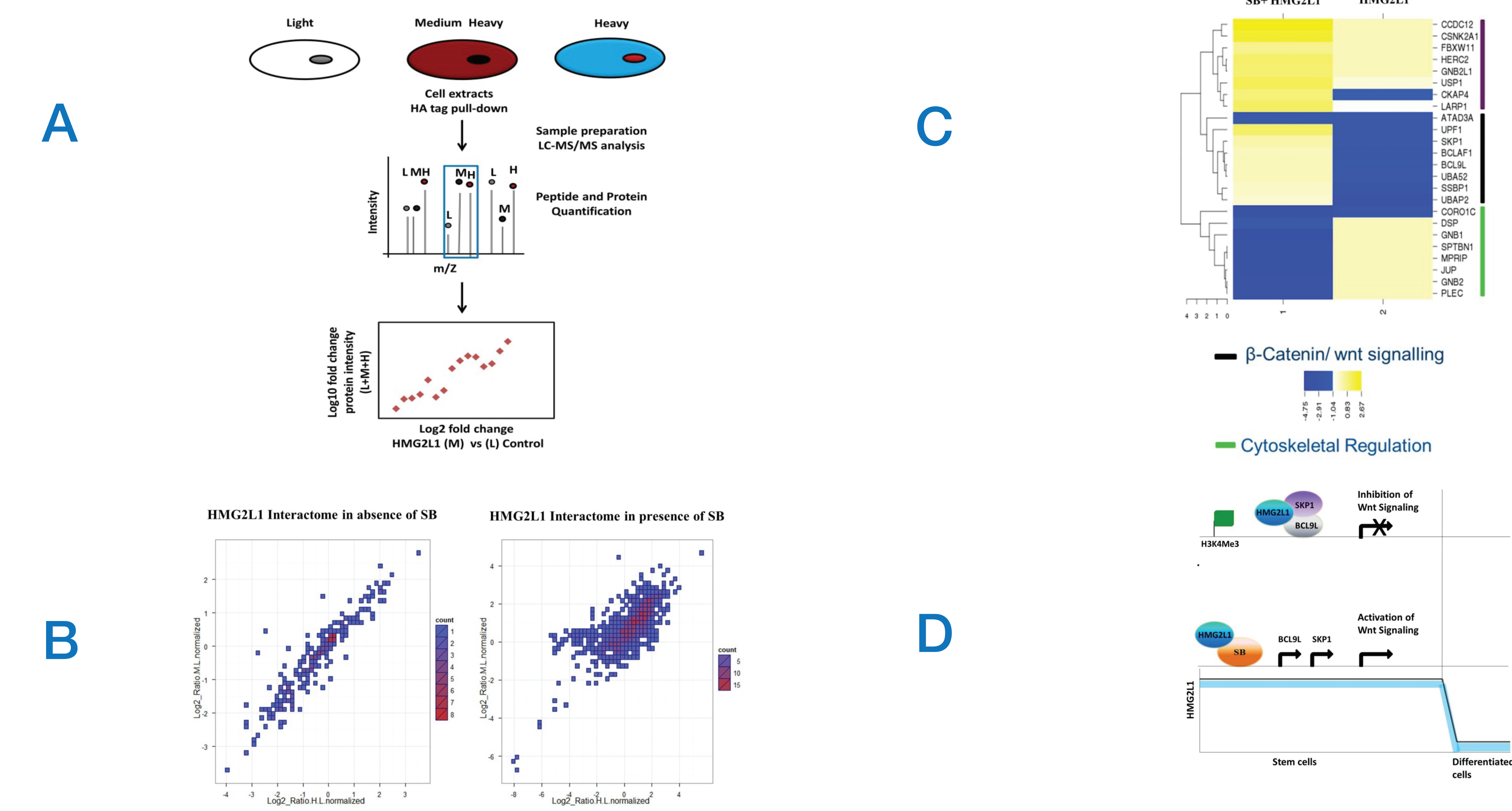


Figure 4. HMG2L1 interactome is influenced by the presence of SB (A) Schematic representation of SILIAC labeling of proteins and analysis (B) HMG2L1 interactome in the presence and absence of SB (C) Heat map of the identified proteins associated with HMG2L1 (D) Model explaining the role of HMG2L1 in targeting SB in stem cells.

► Conclusion

- The role of HMG2L1 is to target *Sleeping Beauty* (SB) transposition to the germ line and to an early phase of embryogenesis.
- This study highlights the importance of host cellular factors for the successful propagation of transposons and provided an example of dynamic relationship between the transposons and host in evolution