Supporting Information

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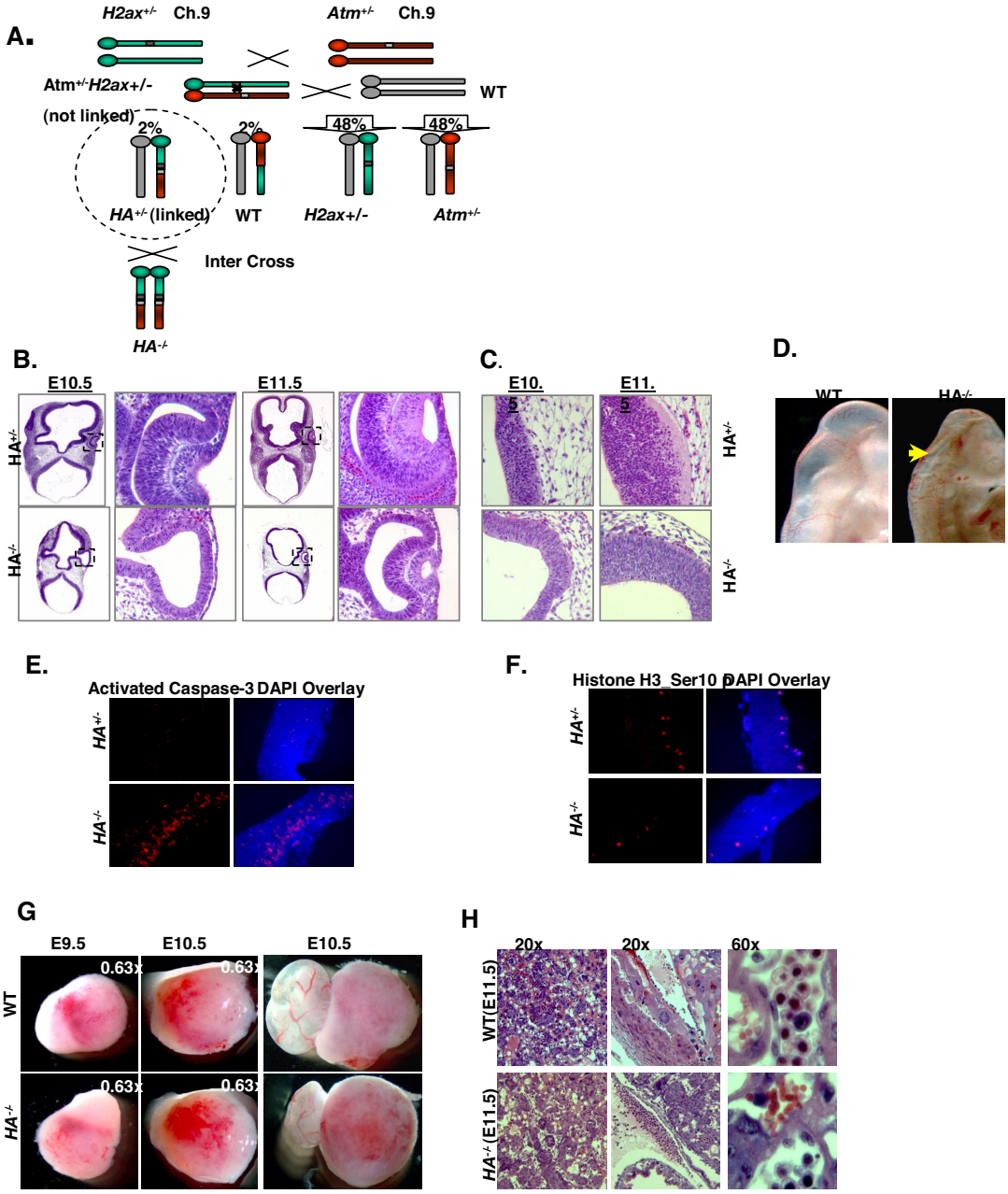

Fig. S1. Generation and characterization of $HA^{-/-}$ mice. (*A*) Breeding scheme used to generate $HA^{+/-}$ and $HA^{-/-}$ mice. Briefly, $H2ax^{+/-}$ and $Atm^{+/-}$ mice were bred together to generate $H2ax^{+/-}Atm^{+/-}$ mice containing the *Atm* and *H2ax* mutations on different alleles (not linked) of chromosome 9. These founder mice were then crossed with multiple WT females. Because the two genes are 4 cm apart, this cross would genetically predict a 4% cross-over frequency of which half (2%) of the cross-overs would link the two mutant alleles and half (2%) would link the two WT alleles. As predicted, this breeding yielded 328 progeny of which 6 had the linked mutations (≈2%), consistent with the predicted cross-over frequency of 4% as outlined above. The founder $HA^{+/-}$ mice were used to generate the cohort of $HA^{+/-}$ and $HA^{-/-}$ mice. Six initial $HA^{+/-}$ mice were generated from three independent $H2ax^{+/-}Atm^{+/-}$ (not linked) parents. (*B*) Hematoxylin/eosin (H&E)-stained transverse sections of E10.5 and E11.5 $HA^{+/-}$ and $HA^{-/-}$ embryos (littermates). The dashed box indicates the optical cup region that is shown at the *Right*. The overview and the magnified pictures were taken used 4× and 20× objective lens, respectively. (*C*) Forebrain (20×) sections of E10.5 and E11.5 $HA^{+/-}$ and $HA^{-/-}$ embryos. (*D*) Posterior views of E10.5 WT and $HA^{-/-}$ embryos. The $HA^{-/-}$ embryo shown has open neuronal tube (2× objective lens). (*E* and *F*) Formalin-fixed, paraffin-embedded forebrain sections (20×) are stained with rabbit anti-cleaved Cap3 (*E*; Upstate) or rabbit anti-phosphorylated Ser-10 histone H3 antibody (*F*; Upstate) and Cy3-conjungated anti-Rabbit IgG secondary antibody. (*G*) Images of E9.5 and E10.5 WT and $HA^{-/-}$ placentas with or without the yolk sac. (*H*) Histology analyses of the placentas from WT and $HA^{-/-}$ embryos.