



**Supplementary information, Figure S10** The model for AP2 $\gamma$  functions in ectodermal patterning of chick embryo.

During ectodermal patterning, BMPs were expressed mainly in non-neural ectoderm, which emits BMP protein to the medial epiblast to pattern the ectoderm development. BMP inhibitors chordin and noggin were sequentially expressed, resulting in medial to lateral clearance of BMP activity. At HH stage 4- to 4, AP2 $\gamma$  expression shifts progressively from the whole epiblast to non-neural ectoderm and inhibits excessive neural expansion by suppressing *cSox2* extension. Through HH stage 4, in the putative epidermal ectoderm where the expression of *cKer14* (*K14*), *cGata2* and *cAP2 $\gamma$*  partially overlaps, AP2 $\gamma$  might initiate the earliest step of epidermal determination by induction of *Ker14* and *Gata2* expression. AP2 $\gamma$  expression is temporarily present in the transition territory named neural crest (NC) or pre-placodal region (PPR), suggesting that AP2 $\gamma$  might be also involved in the NC/PPR specification.