Epigenetic inheritance mechanisms play fundamental roles in maintaining cellular memory of gene expression states. Histone modification patterns, associated with epigenetic ON and OFF states of gene expression, are established by sequence-specific initiators such as site-specific DNA-binding proteins or small RNAs. We recently demonstrated that ectopically induced domains of histone H3 lysine 9 methylation (H3K9me), a conserved marker of heterochromatin, can be inherited during several mitotic and meiotic cell divisions, independently of sequence-specific recruitment, in cells that lack the putative JmjC domain H3K9 demethylase, Epe1. However, how native epigenetic states are stably maintained in *epe1*$^{+}$ cells remains unknown. I will present our recent results on how specificity factors, such as transcription factors and small noncoding RNAs, work together with histone H3K9 methylation to promote stable inheritance of epigenetic states.