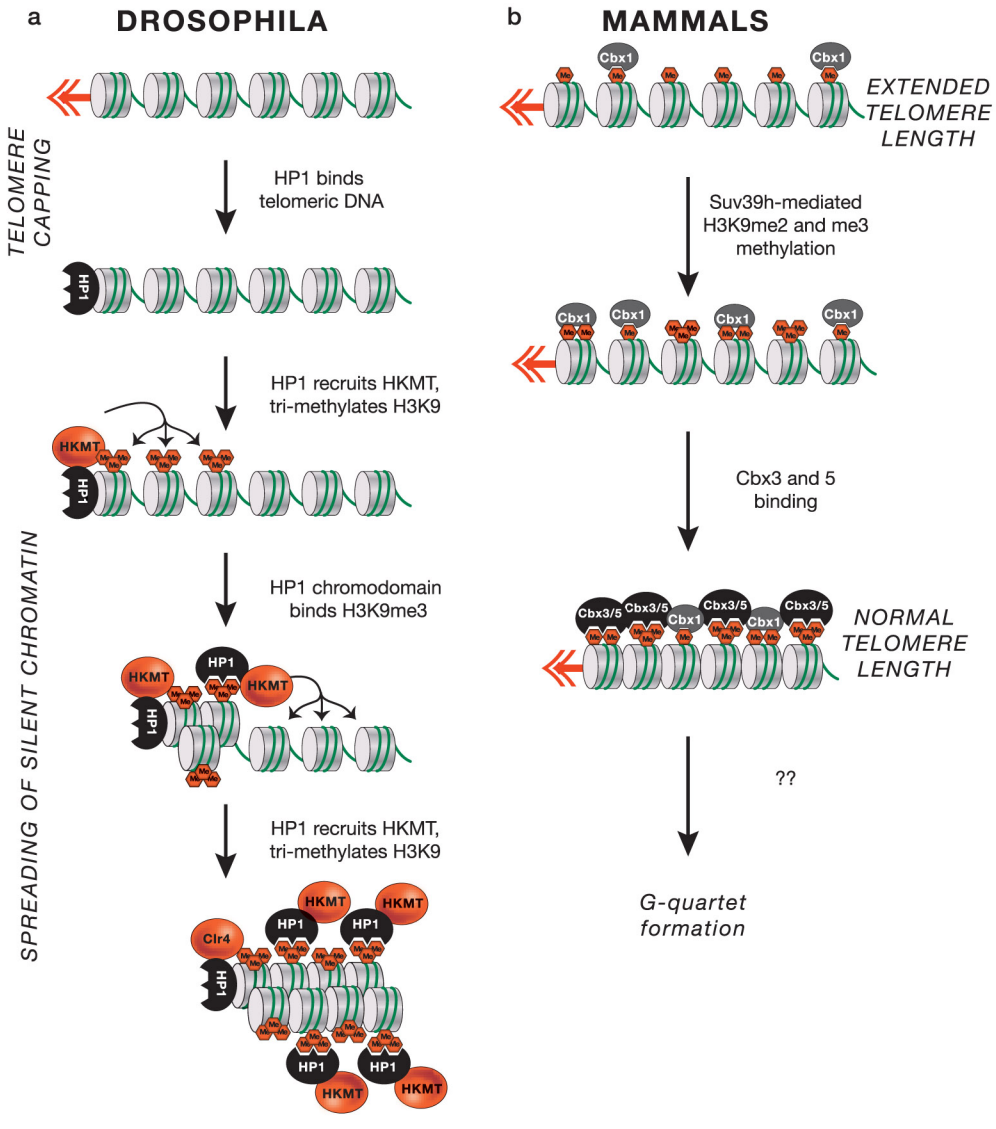

Figure 4. Telomere Function Is Epigenetically Regulated in Flies and Mammals

(*a*) In *Drosophila*, Heterochromatin Protein 1 (HP1) binds telomeric DNA independent of its chromodomain, and "caps" telomeres, which ensures normal segregation by blocking telomere fusions (Fanti et al. 1998; Perrini et al. 2004). HP1 then recruits an unknown histone methyltransferase (HKMT; not *Su(var)3-9*) that tri-methylates H3K9 on nearby nucleosomes; HP1 binds H3K9me3 through its chromodomain, which in turn recruits more HKMT, and successive rounds of HP1 binding/HKMT recruitment promote spreading of silent chromatin through subtelomeric regions. (*b*) In mice, knock-outs of both *Suv39* HKMT loci results in reduced levels of H3K9me3 and me2, and increased H3K9me modifications, altered chromatin structure, and changes in levels of proteins that bind di- and tri-methylated H3K9 (↓ Cbx 3 and 5), H3K9me (↑Cbx 1), and TERFs 1 and 2 (not shown) at telomeres (Garcia-Cao et al. 2004). These changes are correlated with extended telomere length, suggesting that tri-methylation of H3K9 by *Suv39hs* is required for normal telomerase function and regulation of telomere size.