



Figure 2

Overview of the network of intersecting regulatory circuits controlling timing, number, and distribution of meiotic double-strand breaks (DSBs). Circuit 1: Cell cycle regulatory kinases tie DSB formation to meiotic progression. Circuit 2: DNA replication influences the spatial and temporal patterning of DSBs (*green arrow*), and replication stress inhibits DSB formation (*red inhibitory arrow*). Circuit 3: Progression through prophase closes a window of opportunity for DSB formation. Problems in recombination and/or certain other chromosome behaviors invoke signaling pathways that extend the DSB-permissive period. Circuit 4: DSBs activate the damage-responsive kinase ATM/Tel1, which then restrains SPO11 activity via a negative feedback loop. Circuit 5: Engagement of homologous chromosomes leads to changes in chromosome structure that inhibit further DSB formation. Circuit 6: Local DSB patterning is shaped by communication between potential DSB sites, both in *cis* along the same DNA molecule and in *trans* between sister chromatids or homologous chromosomes. Abbreviations: CDK, cyclin-dependent kinase; DDK, Dbf4-dependent kinase.