



Figure 7. Models for the regulation of random X inactivation. (A) Autosomally encoded blocking factor (yellow shapes) is produced in sufficient quantities to occupy a single Xic. Binding of blocking factor to the Xic inhibits *Xist* transcription, thus defining a single active X chromosome. *Xist* transcription occurs on any additional X chromosomes leading to X inactivation (dark green dots). Blocking factor binds to either the maternal (Xm) or paternal (Xp) X chromosome with equal probability and in a cell-autonomous manner. (B) The two-factor model invokes an X-encoded competence factor (purple triangle) and an autosomally encoded blocking factor (yellow shapes). Blocking factor titrates away competence factor (purple triangle). In cells with a single X chromosome, there is insufficient available competence factor to activate *Xist*, but in cells with additional X chromosomes, competence factor can activate all X chromosomes except the single X chromosome bound by blocking factor. (C) The stochastic model invokes that autosomally encoded repressors (yellow circles) and X-encoded activators (purple circles) compete with one another. All *Xist* alleles have an equal probability of being activated and this is increased in cells with more than one X chromosome (higher levels of *Xist* activators). By chance, some cells with two X chromosomes will initiate inactivation of either both or no X chromosomes. This may be dealt with by checkpoint mechanisms or cell death.