

P023 Control of meiotic recombination in *Arabidopsis*: the role of the MutL/S homologues

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Chiasma frequency in an *Atmsh4* mutant is dramatically reduced from 9.86 in wild type to 1.55 (n=60) in the mutant. In contrast to wild type the distribution of residual crossovers in *Atmsh4* closely fits a Poisson distribution. This is consistent with a two-pathway model for meiotic crossing over whereby most crossovers (COs) occur via an *AtMSH4* dependent pathway that is subject to interference, with the remaining COs occurring via an interference-independent pathway. We are analysing the chiasma frequency in an *Atmus81* mutant and an *Atmus81 x Atmsh4* double mutant to determine if AtMUS81 activity accounts for the remaining COs. Loss of AtMLH3 results in a ~60% reduction in COs. This suggests double Holliday junction (dHj) resolution can occur, but in contrast to wild type where most or all dHjs are directed to form COs with the outcome biased in favour of a non-CO outcome by a ratio of ~2 to 1. Immunocytochemistry reveals co-localization of AtMLH3 and AtMLH1 foci at pachytene. The number of foci is in good agreement with the estimated chiasma frequency. AtMLH3 foci are not detected in *Atmsh4*. Whereas localization of AtMSH4 is normal in *Atmlh3*, suggesting that double Holliday junctions (dHjs) are formed, AtMLH1, which forms a heterocomplex with AtMLH3, fails to localize normally. The data are compatible with a model whereby the MutL complex maintains/imposes a dHj conformation that ensures CO formation.