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Environmentally induced epigenetic plasticity in the human parasite *Schistosoma mansoni*

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Environmentally induced epigenetic plasticity in the human parasite *Schistosoma mansoni*

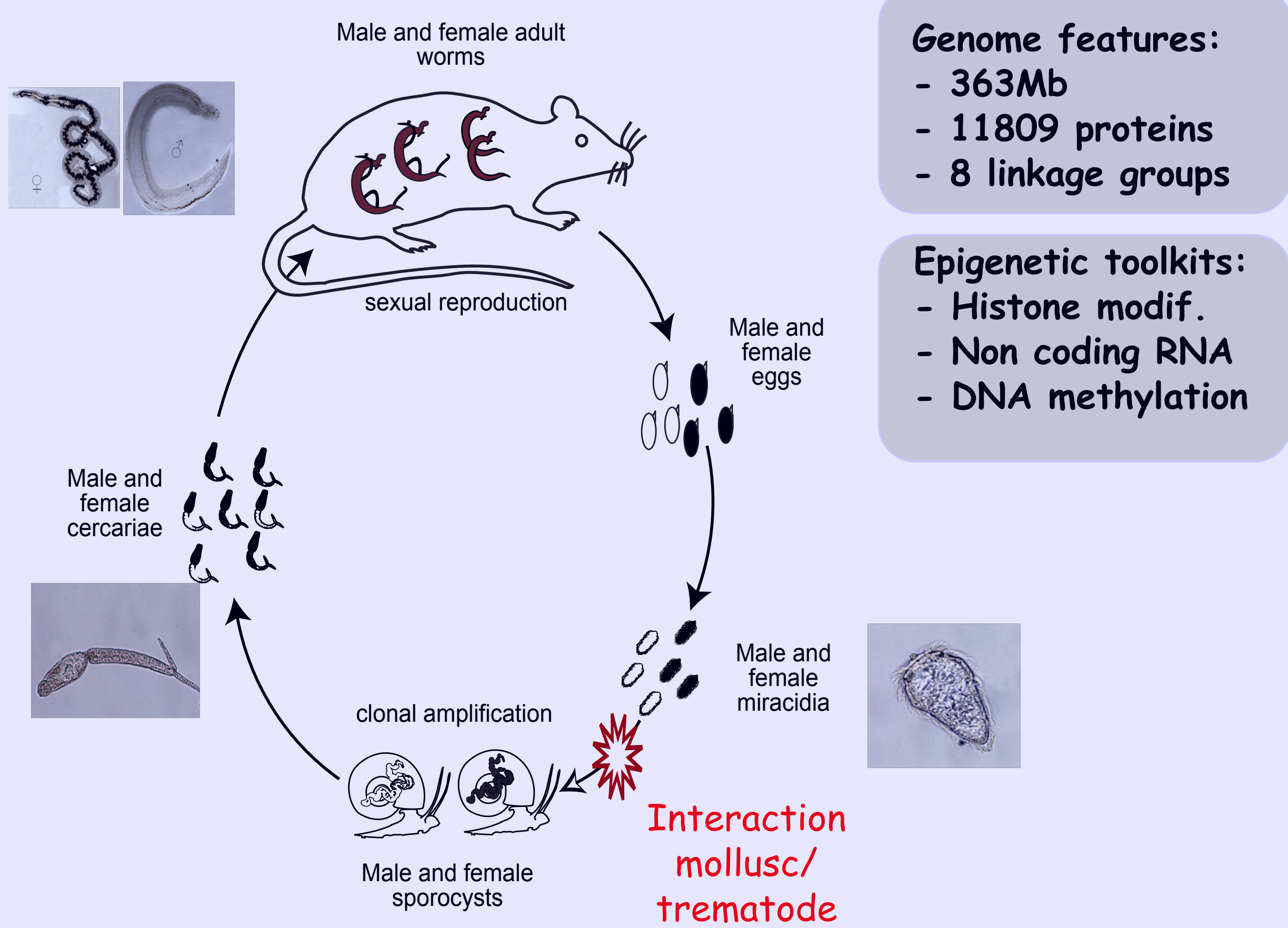
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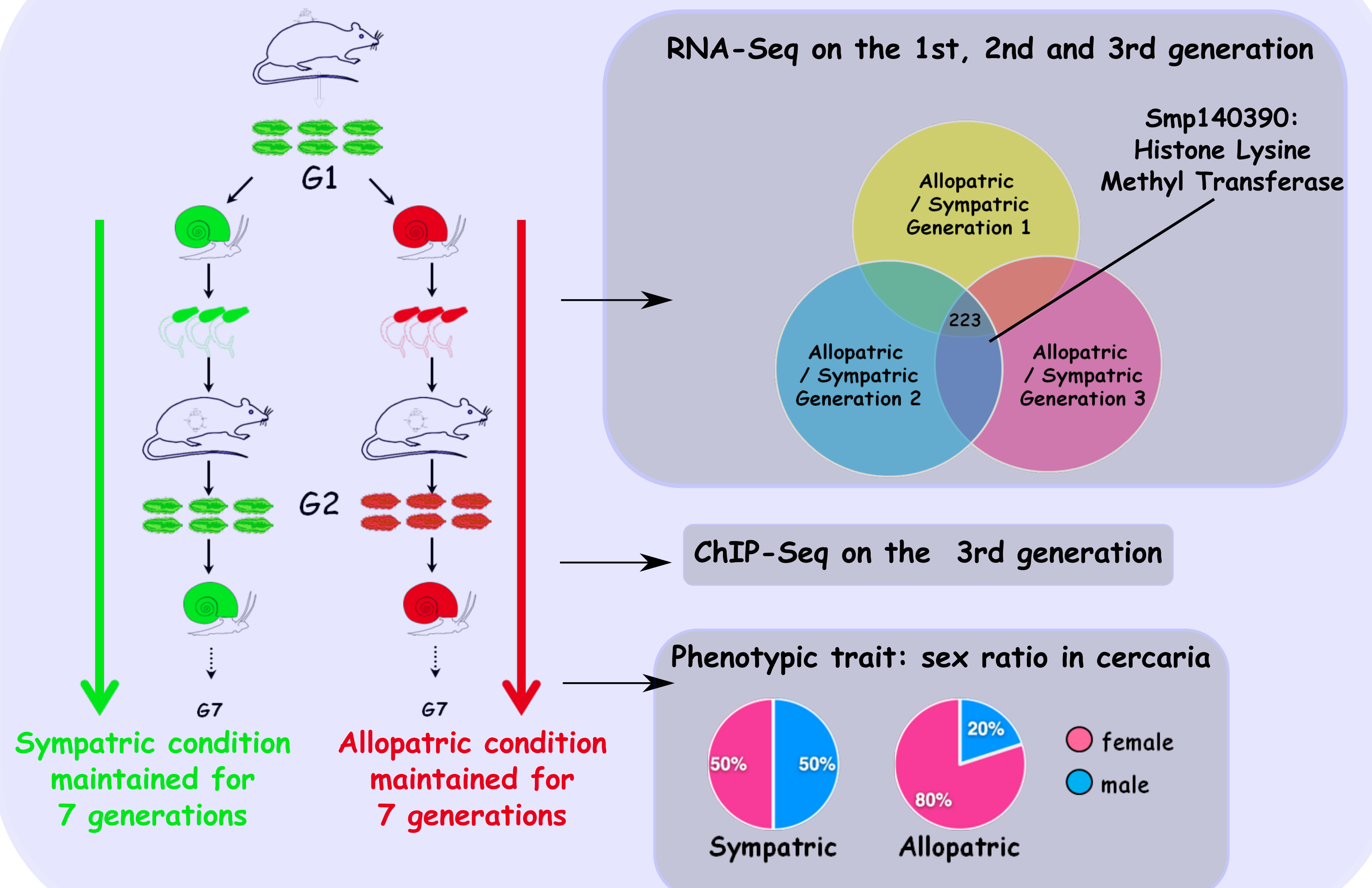


Can the environment influence the epigenome ?

Schistosoma mansoni life cycle



Data production



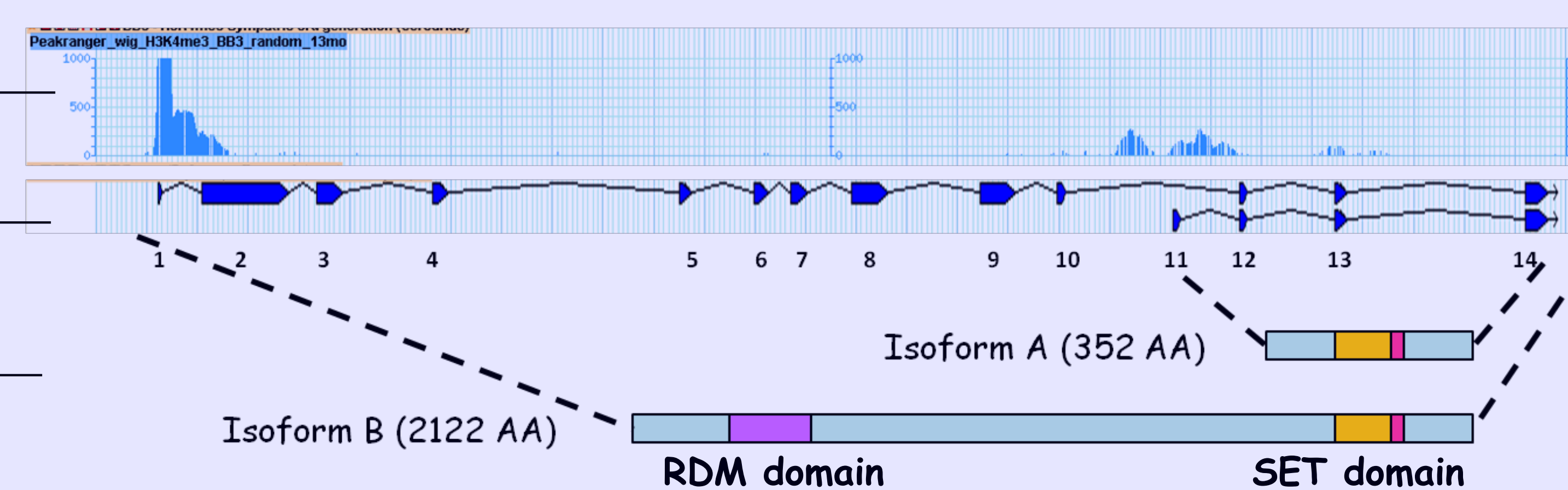
Schistosoma mansoni is a platyhelminth parasite that uses the mollusc *Biomphalaria* as intermediate host and rodents or human as definitive host. We exposed *S. mansoni* populations to a stressful but ecological realistic environment: the interaction with an allopatric *B. glabrata* host in which the parasite develops into human-infecting cercaria. We then studied phenotypic traits, epigenetic and transcriptional changes that the parasite engages in response to this stressful environment.

Histone methyl transferase: A link with the epigenome?

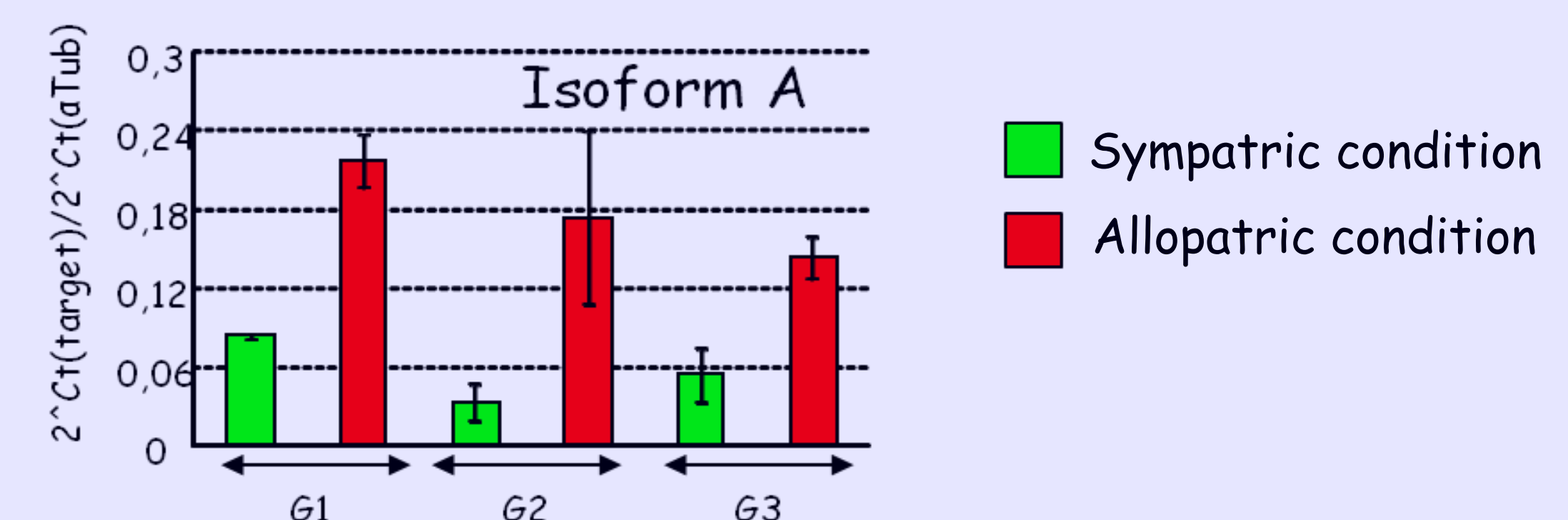
Peak enrichment for the mark H3K4me3 on the smp140390 locus

Exon structure of smp140390

Protein domain of Smp140390 suggesting a HKMT function



qPCR expression analysis on isoform A

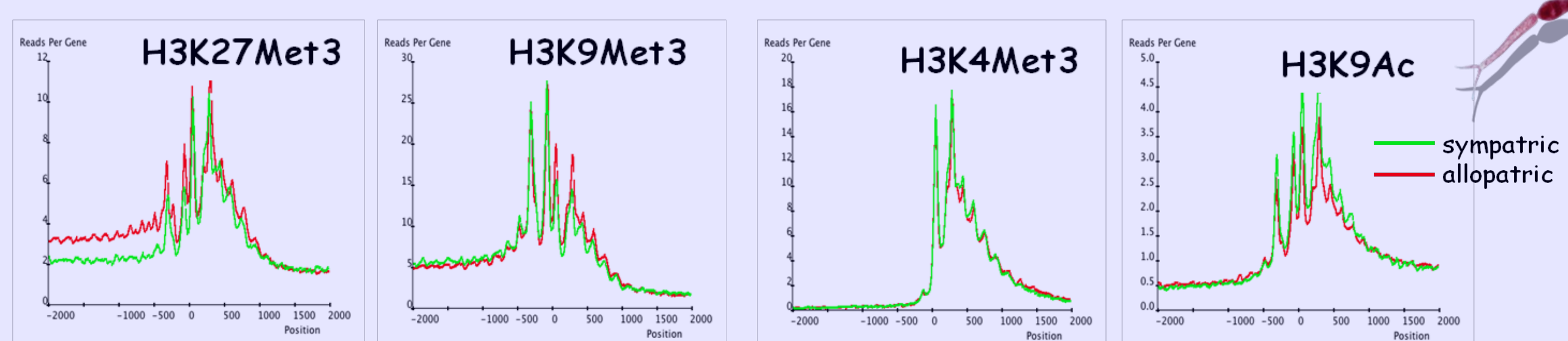


Smp140390 encodes a 2 isoform HKMT (Histone Lysine Methyl Transferase). Both isoforms are expressed in cercaria and isoform A is differentially expressed between allopatric and sympatric conditions in the first 3 generations.

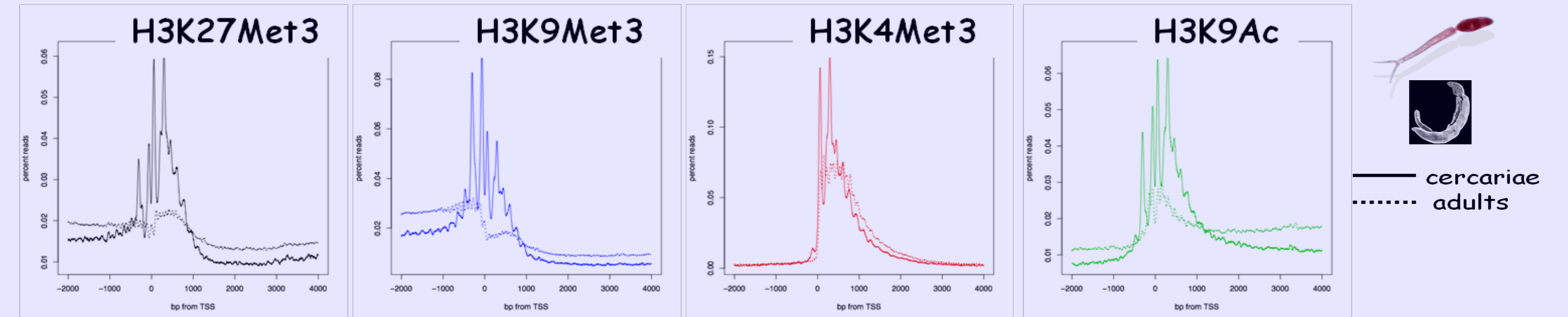
The epigenetic response to environm. changes is restricted to specific loci

Epi-ChIP analysis

Environmental change: Epi-ChIP comparison of cercaria after an allopatric or sympatric interaction.



Developmental plasticity: Epi-ChIP comparison of cercaria and adults



Enrichment for different histone marks were obtained doing ChIP analysis. Average peak intensity was measured around the transcription start site and compared between the allopatric and sympatric conditions. The difference in peak intensity is weak compared to what is observed doing the same kind of comparison but between two different life cycle stages (cercaria and adults). This suggests that epigenetic implication for environmental plasticity is weak compared to its implication for developmental plasticity. However, 150 differences in peak intensity (out of 8000 peaks) were observed, suggesting loci specific changes.