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Juvenile hormone-mediated chromatin remodeling: insights into synergistic action of downstream transcription factors, Hairy and Krüppel homolog 1

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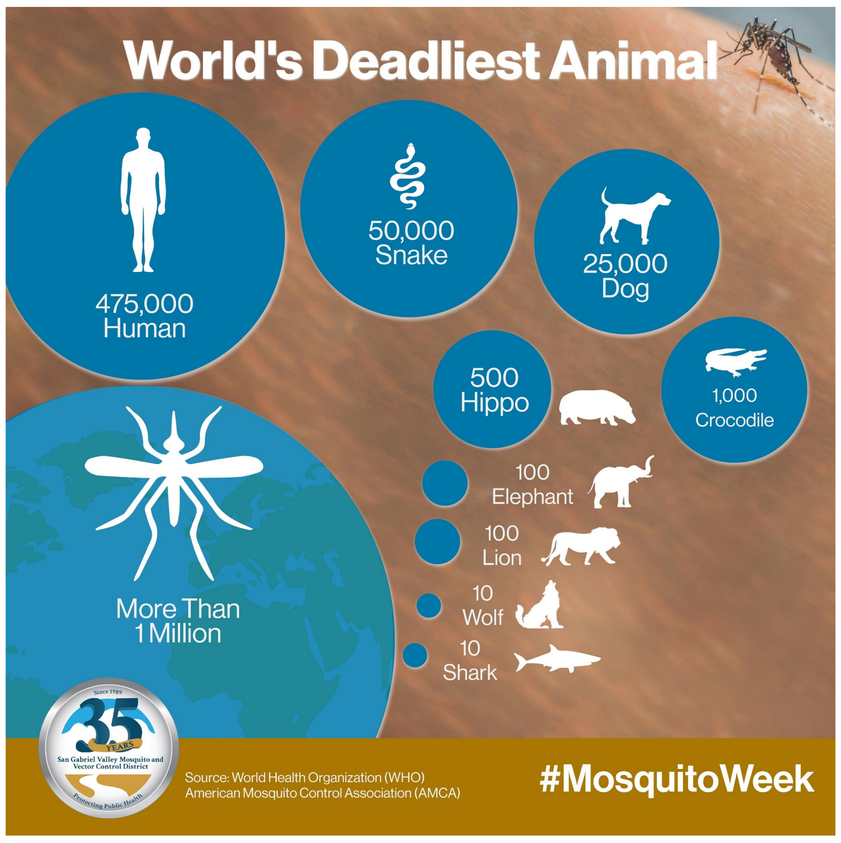
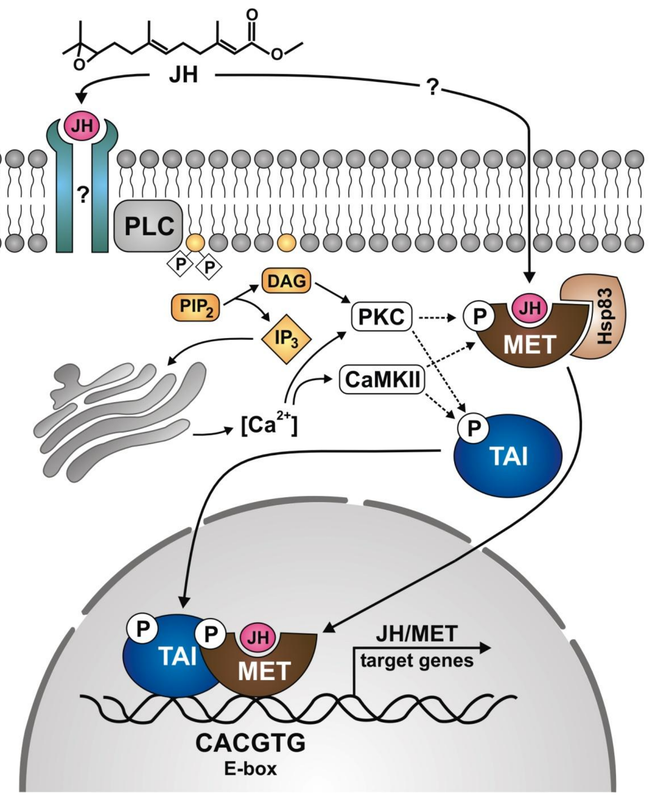
Introduction

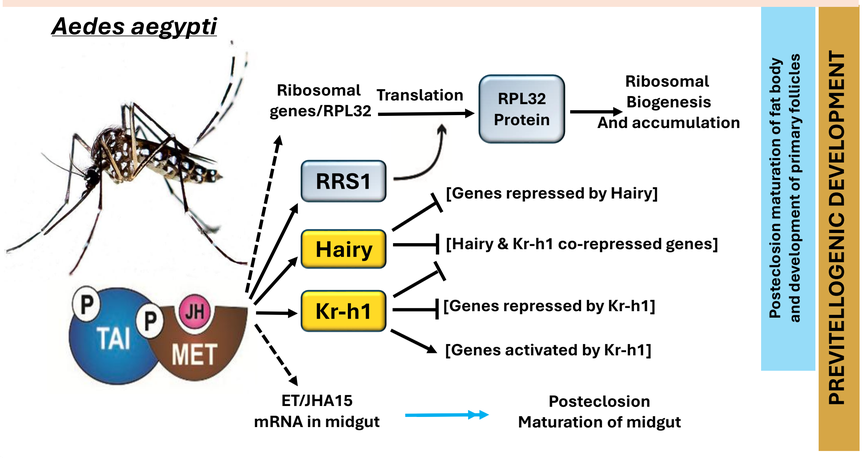


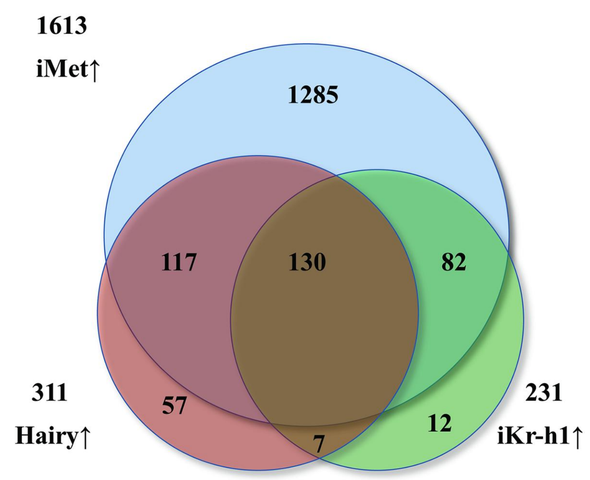
JH Signaling Pathway of Gene Activation



Wang et al., 2023

JH REGULATES PRE-VITELLOGENIC PREPARATORY PHASE





Saha et al., 2019

Aims & Objectives

- The role of JH-Met and its downstream factors, Hairy and Kr-h1, in the chromatin remodeling of JH-repressed genes in the adult female *Ae. aegypti* mosquito.
- Understanding the synergistic mode of action of Hairy and Kr-h1 downstream of JH-Met.

Methodology

Chromatin Immunoprecipitation (ChIP) Assay [H4 Acetylation, H3K9 Trimethylation]

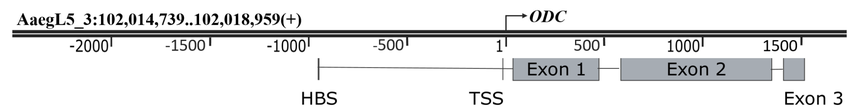
Micrococcal Nuclease (MNase) Protection Assay

Post Eclosion Developmental Timepoints (Low JH titer vs High JH titer)

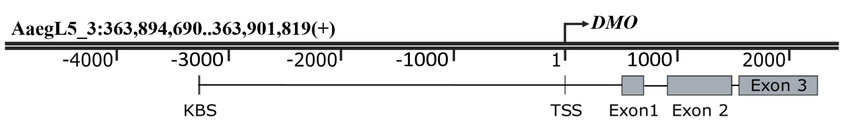
Ectopic JH treatment

Knockdown Experiment (iMet, iHairy, iKr-h1)

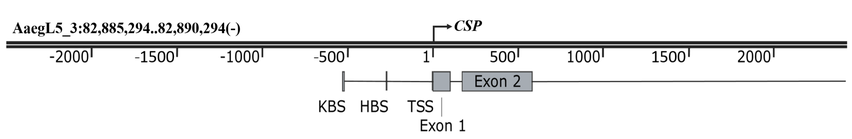
- **Ornithine decarboxylase-** a crucial enzyme involve in polyamine biosynthesis, vital for mosquito survival, nitrogen metabolism, oviposition, and overall fecundity.



- **Dimethylaniline monooxygenases-** a flavin-containing monooxygenase, play a role in the metabolism of xenobiotics and may be involved in insecticide resistance.

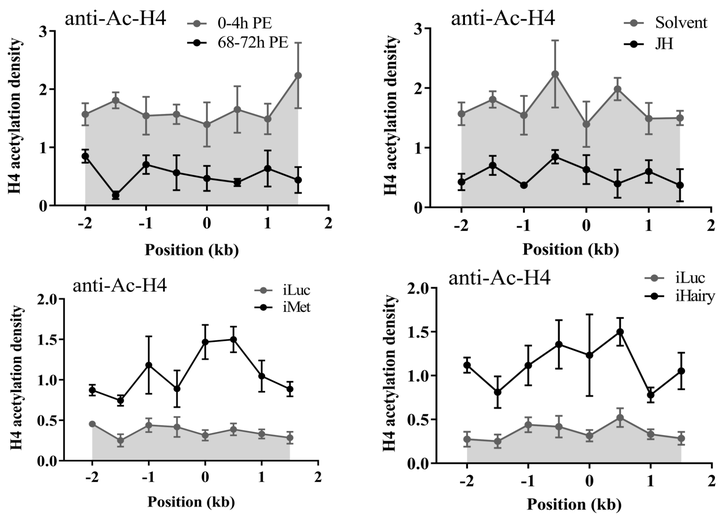


- **Clip Domain Serine Protease-** a crucial enzymes in the innate immune response of mosquitoes.

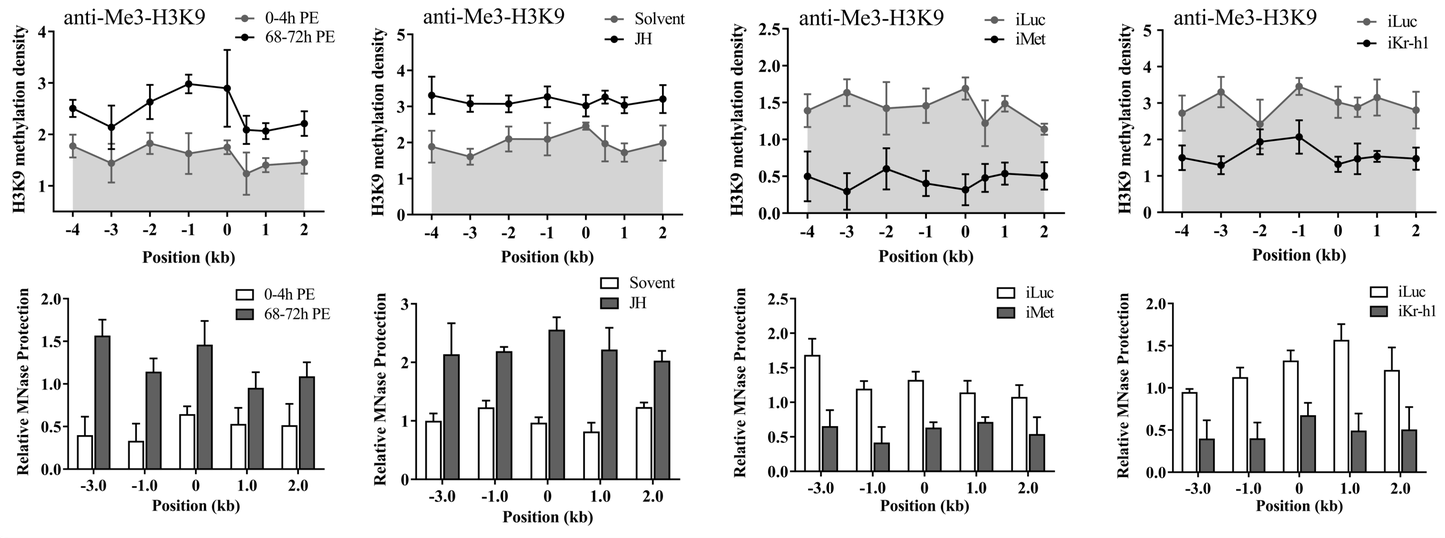


Results

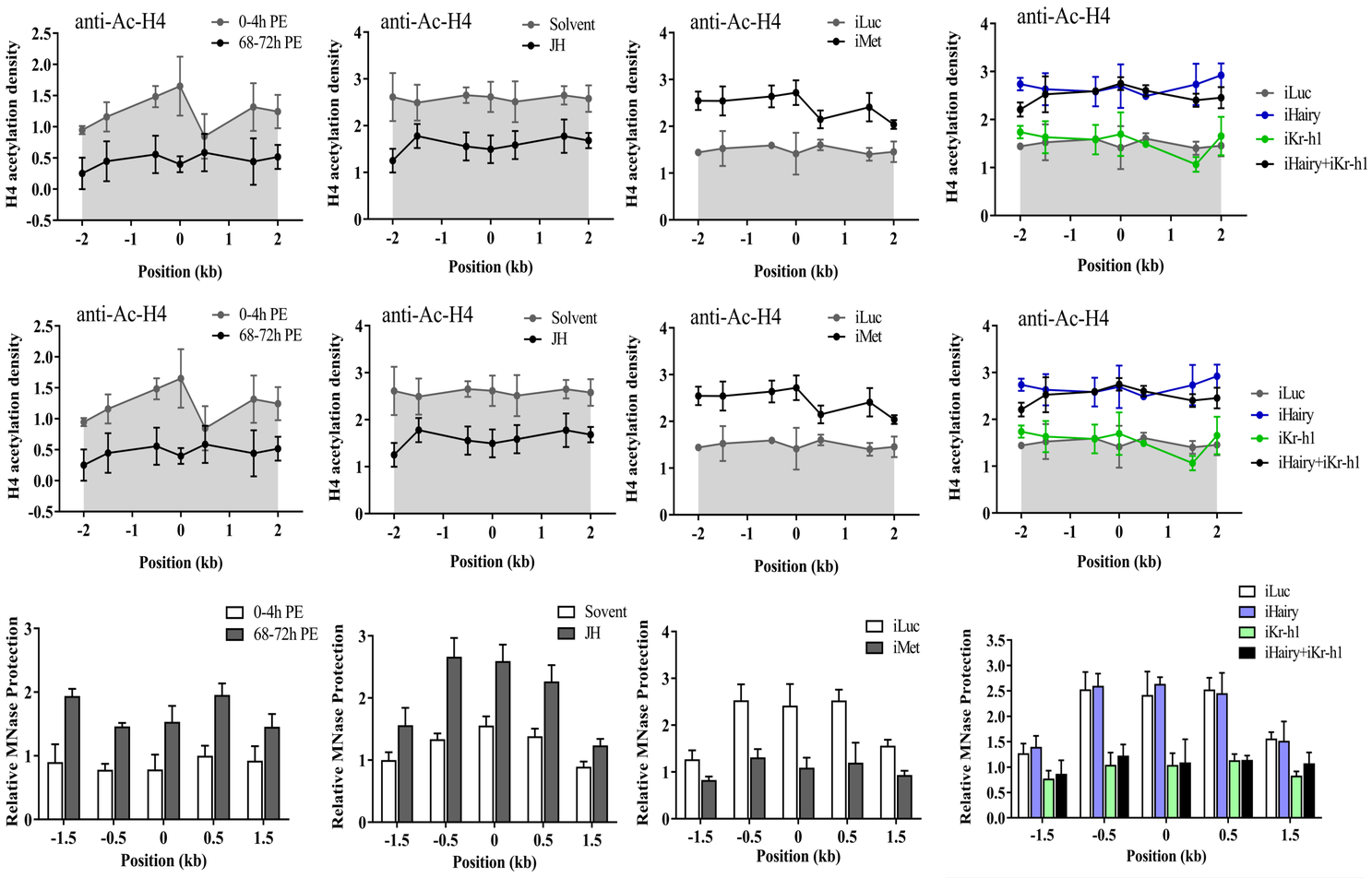
Ornithine Decarboxylase : JH-Met-Hairy mediated gene repression



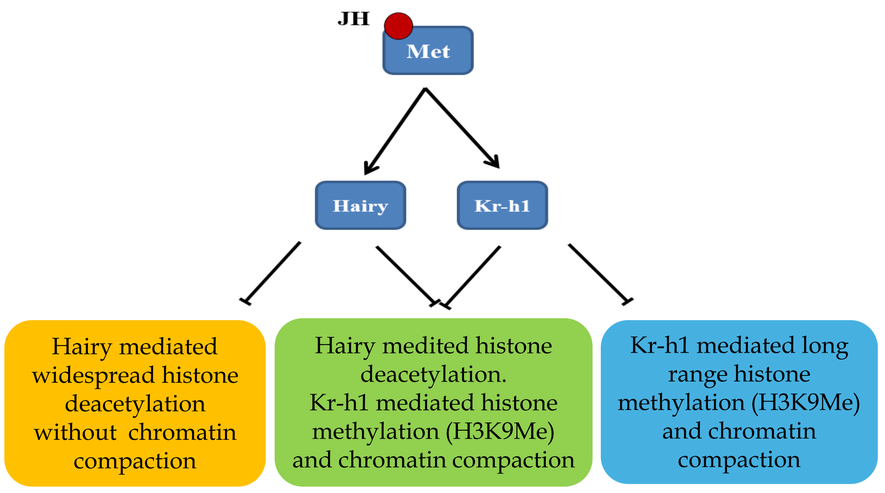
Dimethylaniline monooxygenase : JH-Met-Kr-h1 mediated gene repression



Clip Domain Serine Protease : JH-Met-Hairy-Kr-h1 mediated gene repression



Outcomes: Summary



Conclusions

- JH induce widespread histone H4 deacetylation via intermediate factor Hairy whereas it induces histone H3K9 trimethylation and chromatin compaction via Kr-h1 for the repression of target genes.
- Hairy and Kr-h1, also have a cumulative effect on the chromatin modification of the target genes, function synergistically downregulating their expression.

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