

AGES: An auxin-inducible, GAL4-compatible, gene expression system for *Drosophila*

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Highlight article:

Drosophila melanogaster is the most commonly used model organism to study genetics and animal behaviour. Thus, several genetic tools have been developed and tested in this organism. One of these tools is the inducible GAL4/UAS system, which allows for spatial control of transgenes. However, GAL4 activity is controlled by GAL80, a thermosensitive protein. Since flies are highly dependent on ambient temperature - due to its effect on a wide range of physiological and behavioural traits - temperature is one of the limitations of this system. Other conventional tools for temporal control are drug-inducible systems, which have the disadvantages of being leaky, toxic, or incompatible with GAL4 lines.

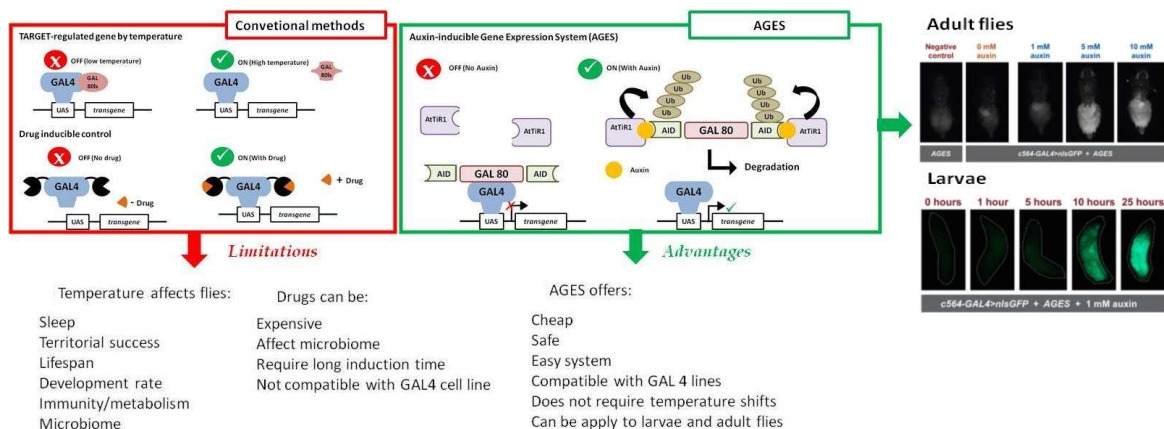


Figure 1 – AGES is a new method that overcomes limitations of conventional methods to control transgene expression in *Drosophila*.

In this paper, the authors provide a new tool to overcome those limitations by combining the Auxin-inducible Gene Expression System (AGES) with GAL4/UAS in *Drosophila*. This new system is based on the degradation of GAL80 in the presence of auxin, enabling tunable and stringent gene expression control of the introduced transgene. The authors tested the system both in larvae and adult flies using a range of different concentrations of auxin, showing that AGES effectively induces GAL4 in different fly stages. Moreover, survival assays across developmental stages showed optimal auxin concentrations that don't impact developmental and survival of the flies.

In conclusion, this study provides the fly community a better, non-lethal, cost-effective and easy system for temporal transgene expression using existing GAL4 lines. AGES is a particularly promising tool for research fields where researchers want to avoid using temperature shifts. This new system will undoubtedly have a wide range of benefits for multiple fields, in particular for aging, behavioural genetics and neuropathology.

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