

# FlyBase Updates: Exploring the spectrum of Experimental Tools on FlyBase



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Boston Area Drosophila Meeting  
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[flybase.org](http://flybase.org)

# What are Experimental Tools?

Experimental tools are genetic constructs that allow you to:

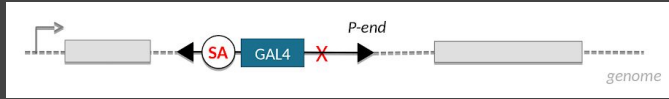
- label gene products
- express/misexpress genes
- design and produce mutations
- track cell lineages
- visualize protein-protein interactions *in vivo*
- and more!

# How do Experimental Tools reports help me?

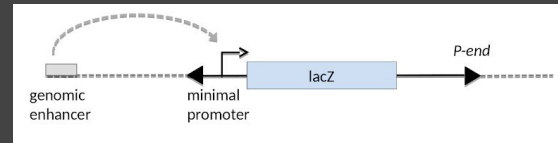
- Reports describe 501 unique tools, most combined with other tools & genes = more than 200,000 constructs
- Can help you find tools that you don't know about yet, but that could be a better fit for your experiments
- w\* P{hs(KDRT.stop)FLP}attP18,  
P{dpn(FRT.stop)cre.PEST}su(Hw)attP8;  
P{Act(loxP.GAL80.stop)lexA::p65}attP40,  
P{lexAop-rCD2::RFP-p10.UAS-mCD8::GFP-p10}su(Hw)attP5;  
TM3, Sb<sup>1</sup>/TM6B, Tb<sup>1</sup>

# What gene + tool combinations are in FlyBase?

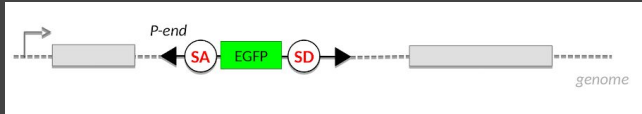
15,693 gene traps



21,293 enhancer traps



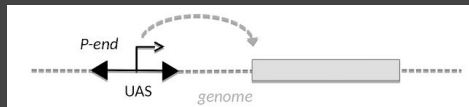
2,177 protein traps



126,784 promoter fusion transgenes



34,697 misexpression elements



2,833 mutations/insertions introduced directly into the genome, through homologous recombination or CRISPR/Cas9

# Anatomy of a Experimental Tool report: UAS

General Information			
Symbol	UAS	FlyBase ID	FBto0000180
Name	Upstream activation sequence		
Description			
Description	<p>The UAS upstream activation sequence contains varying numbers of a 17bp repeat that is specifically bound by the DNA-binding domain of the <i>Saccharomyces cerevisiae</i> GAL4 gene ( SGDID:S000006169 ) (PMID:3886158). GAL4 binds as a dimer to the UAS regulatory sequence, resulting in transcriptional activation of a downstream gene (reviewed in FBrf0233764). This property can be utilized to form a binary expression system to control the spatial and temporal expression of a gene of interest: a transgene or modified endogenous locus in which the target gene of interest is downstream of UAS sequences can be combined with a transgene or modified endogenous locus encoding any 'driver' that includes the GAL4 DNA-binding domain plus a transcriptional activation sequence (FBrf0064375, also reviewed in FBrf0233764, FBrf0216478).</p>		
Uses	binary expression system - regulatory region		

## Related experimental tools

Compatible tools (13)	Tool	Uses
	GAL4	binary expression system - driver
	GAL4::ER	binary expression system - small molecule-regulated driver
	GAL4::GCN4	binary expression system - driver
	GAL4::GS	binary expression system - small molecule-regulated driver
	GAL4::LBD	binary expression system - small molecule-regulated driver small molecule sensor
	GAL4::p65	binary expression system - driver
	GAL4::QF	binary expression system - driver
	GAL4::Sp1	binary expression system - driver
	GAL4::VP16	binary expression system - driver
	GAL4(DBD)::CaMTP	split driver - DNA-binding fragment calcium ion sensor
	GAL4(DBD)::Zip-	split driver - DNA-binding fragment
	GAL4(GTD-b)	split driver - DNA-binding fragment
	GAL4(II-9)	binary expression system - driver
Other related tools (3)	Tool	Uses
	UASp	binary expression system - regulatory region
	UASt	binary expression system - regulatory region
	UASz	binary expression system - regulatory region

Transgenic Constructs

Has tool as regulatory region (26314)

Export to HitList

Transgenic construct(s)	Component allele	Reg. region	Encoded product / tool <a href="#">Hide Uses</a>	Tagged with <a href="#">Hide Uses</a>	Also carries <a href="#">Hide Uses</a>	Stocks
P{10XUAS-Chronos-mVenus}	Zzzz\ChR <sup>Chronos.10xUAS.Venus</sup>	UAS	Zzzz\ChR	Venus yellow fluorescent protein		2
P{UAS-EGFP-Or67d.T262A.T263A}	Or67d <sup>T262A.T263A.UAS.EGFP</sup>	UAS	Or67d	EGFP green fluorescent protein		0
P{UAS-EIk.RNAi.U}	EIk <sup>dsRNA.UAS.cUa</sup>	UAS	EIk			0
P{UAS-FLAG-Ubqn.W}	Ubqn <sup>UAS.cWa.Tag.FLAG</sup>	UAS	Ubqn	Tag:FLAG epitope tag		0
P{UAS-Flo2.U}	Flo2 <sup>UAS.cUa</sup>	UAS	Flo2			0
P{UAS-fmt.M}	fmt <sup>UAS.cMa</sup>	UAS	fmt			0
P{UAS-GFP.Act57B.A295S}	Act57B <sup>A295S.UAS.GFP</sup>	UAS	Act57B	GFP green fluorescent protein		0
P{UAS-GFP.Wdfy2}	Wdfy2 <sup>UAS.GFP</sup>	UAS	GFP green fluorescent protein			0
P{UAS-GFP-vkg}	vkg <sup>UAS.GFP</sup>	UAS	vkg	GFP green fluorescent protein		0
P{UAS-glo.RNAi.U}	glo <sup>dsRNA.UAS.cUa</sup>	UAS	glo			0







**GAL4, GAL80, QF**

**UAS, QUAS, tetO**

**GFP, dsRed, HRP, APEX**

**Tag:NLS, Tag:ER(KDEL)**

**GCaMP, phTomato**

**attP, FRT, FLP, loxP**

**P{EPgy2}, P{lacW}**

**split C-YFP & N-YFP**

descriptor

```
|_experimental_tool_descriptor 1217 rec.
|  |_binary_expression_system_component 51 rec.
|    |_binary_expression_system - driver(+) 35 rec.
|    |_binary_expression_system - regulatory_region 10 rec.
|    |_binary_expression_system - repressor(+) 6 rec.
|  |_engineered_regulatory_region 11 rec.
|    |_engineered_transcription_regulatory_region(+) 11 rec.
|  |_gene_product_activity_regulation_tag 4 rec.
|    |_conditional_activity_regulation_tag(+) 4 rec.
|  |_gene_product_cleavage_tag 4 rec.
|    |_protein_cleavage_tag 4 rec.
|  |_gene_product_degradation_tag 10 rec.
|    |_cell_cycle_regulated_gene_product_degradation_tag 3 rec.
|    |_small_molecule_dependent_gene_product_degradation_tag 3 rec.
|  |_gene_product_detection_tool 293 rec.
|    |_protein_detection_tool(+) 293 rec.
|    |_RNA_detection_tool
|  |_gene_product_localization_tag 124 rec.
|    |_protein_localization_tag(+) 124 rec.
|  |_genetically_encoded_sensor 149 rec.
|    |_mechanical_force_sensor 2 rec.
|    |_pH_sensor 8 rec.
|    |_redox_state_sensor 4 rec.
|    |_small_molecule_sensor(+) 93 rec.
|    |_voltage_sensor 23 rec.
|  |_genome_engineering_tool 340 rec.
|    |_integrase 49 rec.
|    |_integrase_target_site 4 rec.
|    |_nuclease(+) 4 rec.
|    |_nuclease_target_site
|    |_recombinase 261 rec.
|    |_recombinase_target_site 23 rec.
|  |_insertional_mutagenesis_tool 323 rec.
|    |_enhancer_trap 86 rec.
|    |_gene_trap 97 rec.
|    |_misexpression_element 22 rec.
|    |_polyA_trap 7 rec.
|    |_promoter_trap 25 rec.
|    |_protein_trap 107 rec.
|  |_purification_tag 11 rec.
|  |_split_system_component 38 rec.
|    |_split_driver - DNA-binding_fragment 5 rec.
|    |_split_driver - transcription_activation_fragment 9 rec.
|    |_split_fluorescent_protein 20 rec.
|    |_split_reporter_enzyme 2 rec.
```

# Features Coming Soon:

- expanded search for a tissue-specific tool by:
  - body part (anatomy CV term)
  - gene whose expression it mirrors
- tools that work at the cell level (coming this August):
  - neuron activators and inhibitors
  - cell ablation tools

# The FlyBase Consortium is:

**FlyBase help:**

<http://flybase.org/contact/email>

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**flybase.org > About > FlyBase Presentations contains:**

**ADRC 2019 presentation** - [https://wiki.flybase.org/mediawiki/images/d/dc/FlyBase\\_updates\\_2019.pdf](https://wiki.flybase.org/mediawiki/images/d/dc/FlyBase_updates_2019.pdf)

**Experimental Tools poster** - [https://wiki.flybase.org/mediawiki/images/8/88/ISB2019\\_experimental\\_tools.pdf](https://wiki.flybase.org/mediawiki/images/8/88/ISB2019_experimental_tools.pdf)