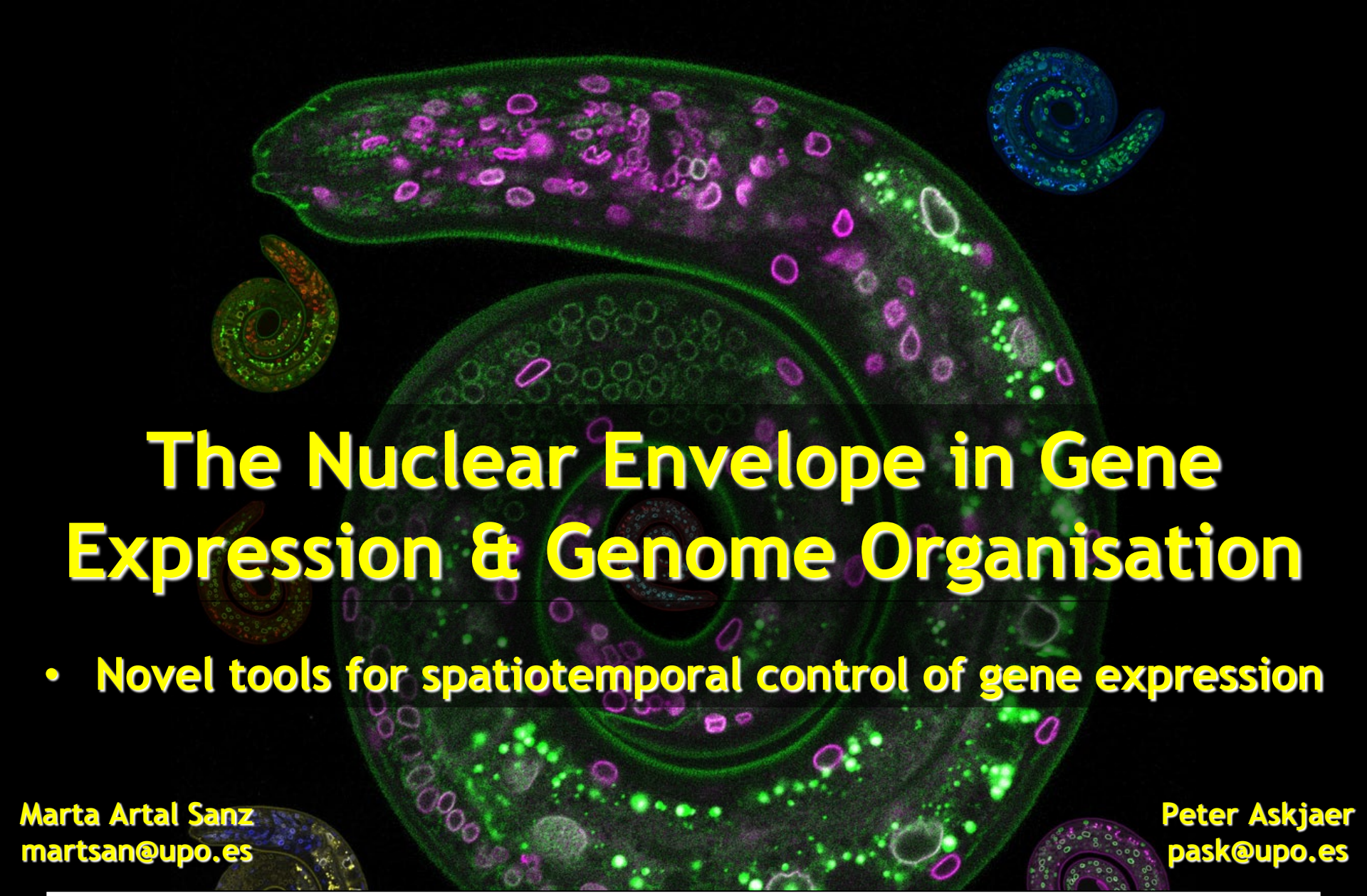

The Nuclear Envelope in Gene Expression & Genome Organisation

- Novel tools for spatiotemporal control of gene expression

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Temporal and spatial control of gene expression

Genetics 2017, μPub 2018, μPub 2019, PLoS One 2020, Genetics 2023

TFG 2023: Novel tools for spatiotemporal control of gene expression

Scientific objectives:

- *New FLP drivers to induce recombination in additional specific tissues*
- *Auxin and/or light-regulated FLP*
- *Combinatorial recombination with multiple FRTs*

Training objectives:

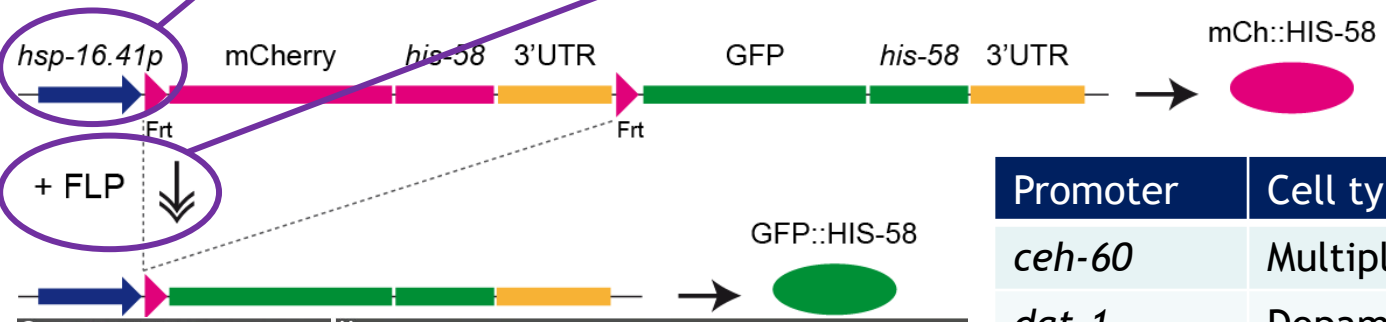
- Molecular cloning
- Genome engineering
- Genetics
- High-resolution light microscopy

Interested in
❑ knowing more?
❑ joining us?

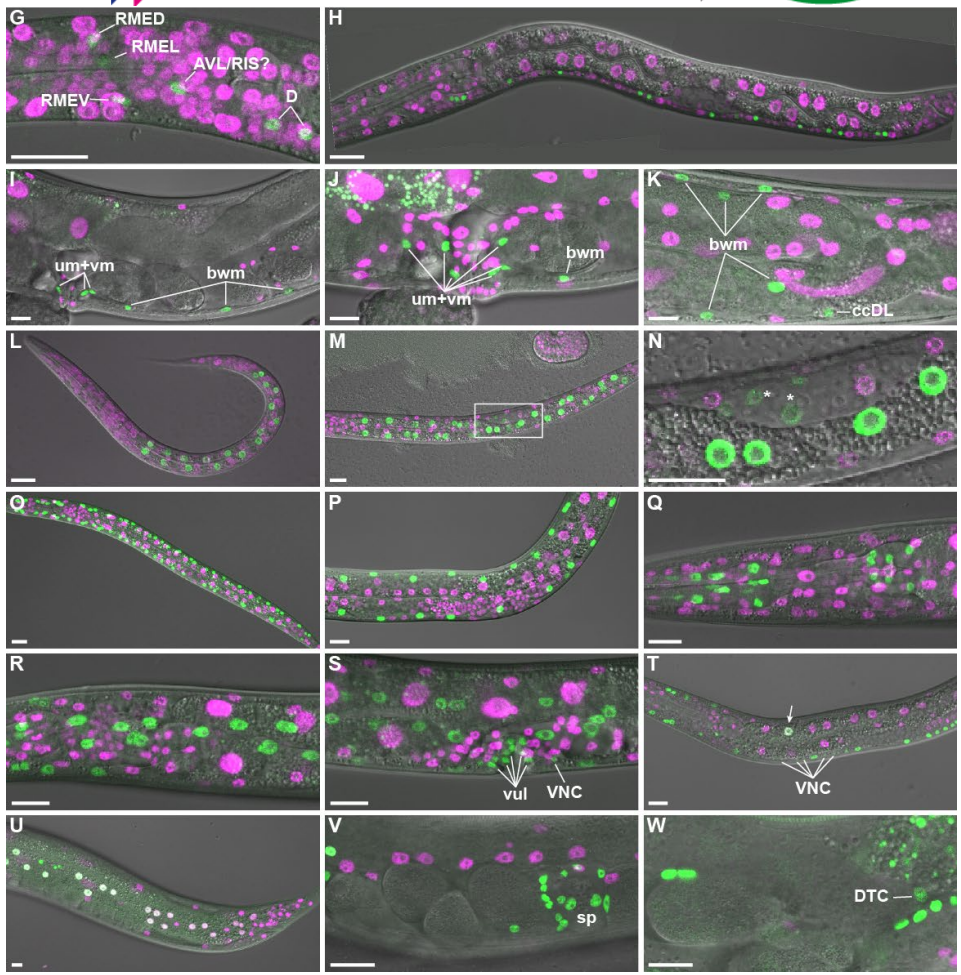
pask@upo.es

The following slides show examples of recent achievements

Temporal and spatial control of gene expression



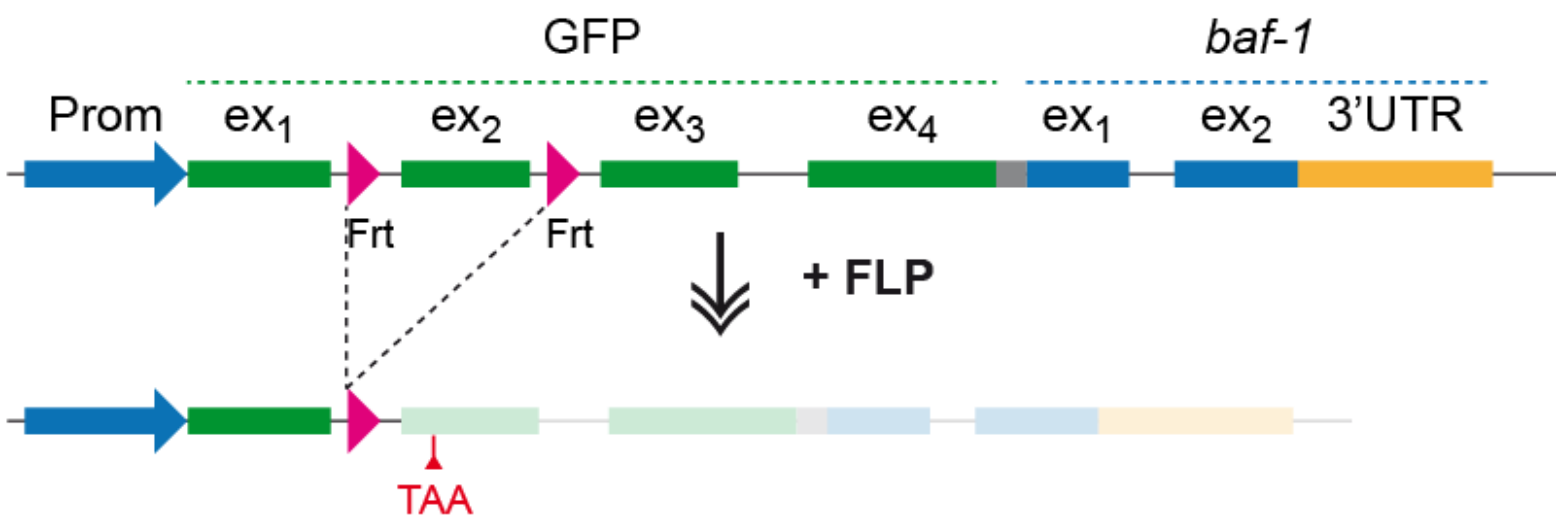
Genetics 2017, μPub 2018, μPub 2019, PLoS One 2020, Genetics 2023



Promoter	Cell type
ceh-60	Multiple
dat-1	Dopaminergic neurons
dpy-7	Hypodermis
elt-2	Intestine*
hlh-8	M lineage
hsp-16.41	Ubiquitous; inducible
lag-2	Multiple
mec-7	Mechanosensory neurons
mex-5	Germ line
myo-2	Pharyngeal muscle
myo-3	Body wall muscle
nhr-82	Seam cell lineage
rgef-1	Pan-neuronal
tph-1	Serotonin-producing neurons
unc-47	GABAergic motor neurons
UAS	cGAL compatible

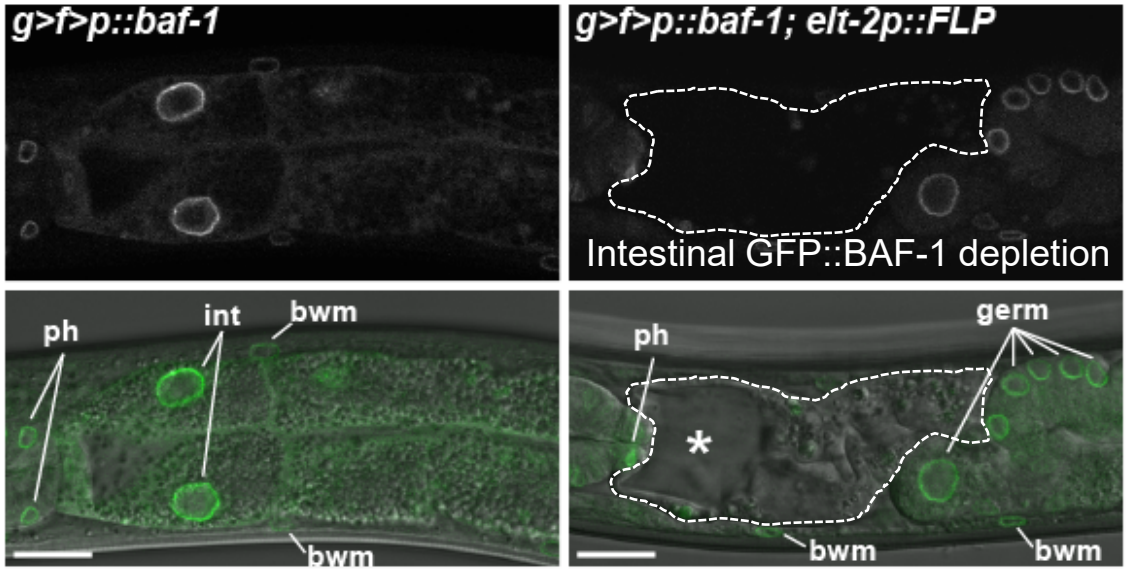
Combined visualisation and knockout CRISPR cassette

(a)



Frame shift and nonsense-mediated mRNA decay

(b)



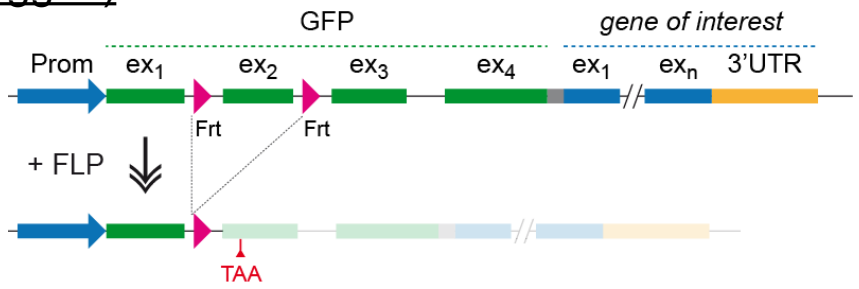
Muñoz-Jiménez et al,
Genetics 2017

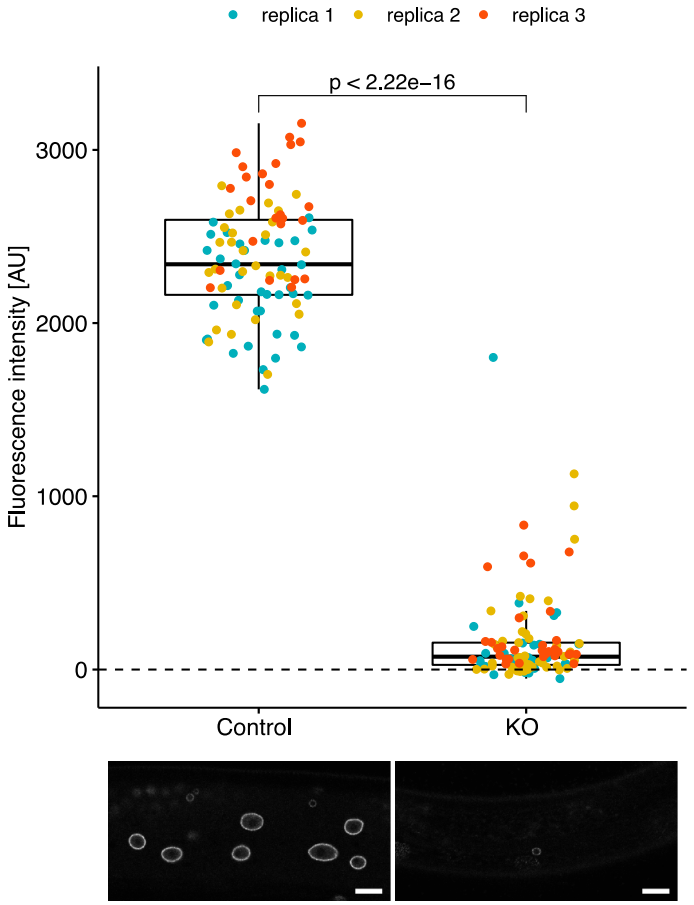
Hypodermal NPP-2 depletion shortens lifespan

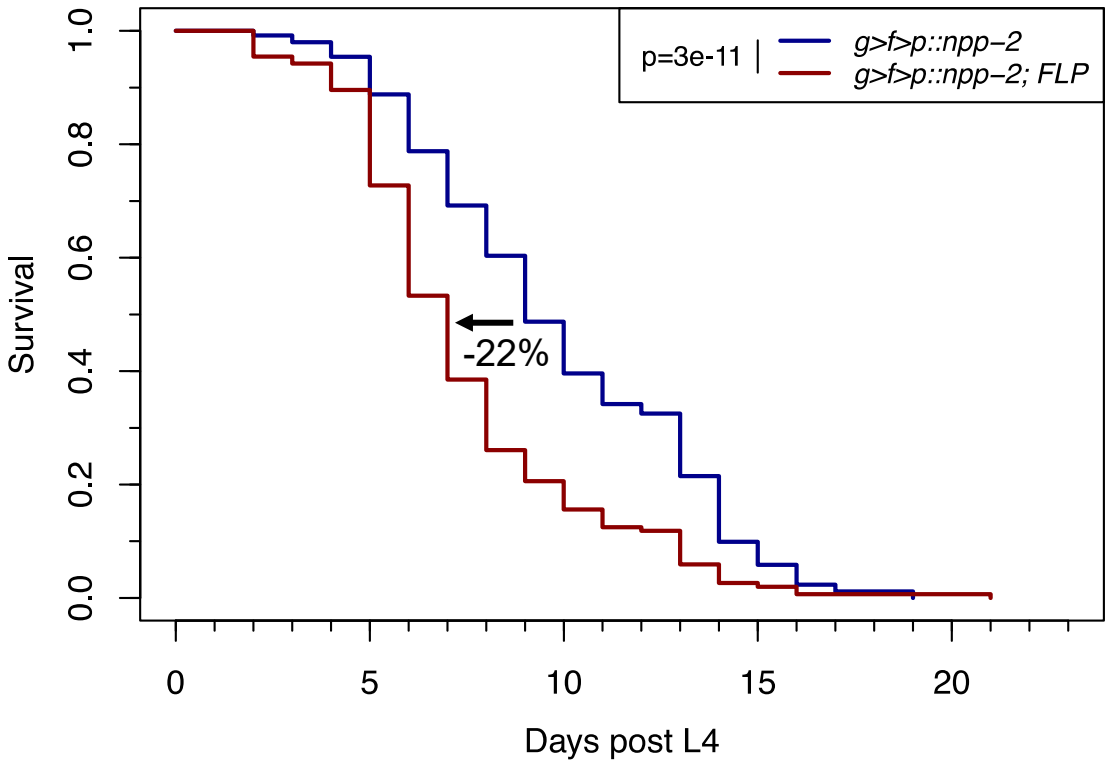
Hypodermal GFP::NPP−2 depletion (endogenously tagged)

Control: *npp-2(bq38[g>f>p::npp-2])*

KO: *npp-2(bq38[g>f>p::npp-2])*; *dpy-7p::FLP*

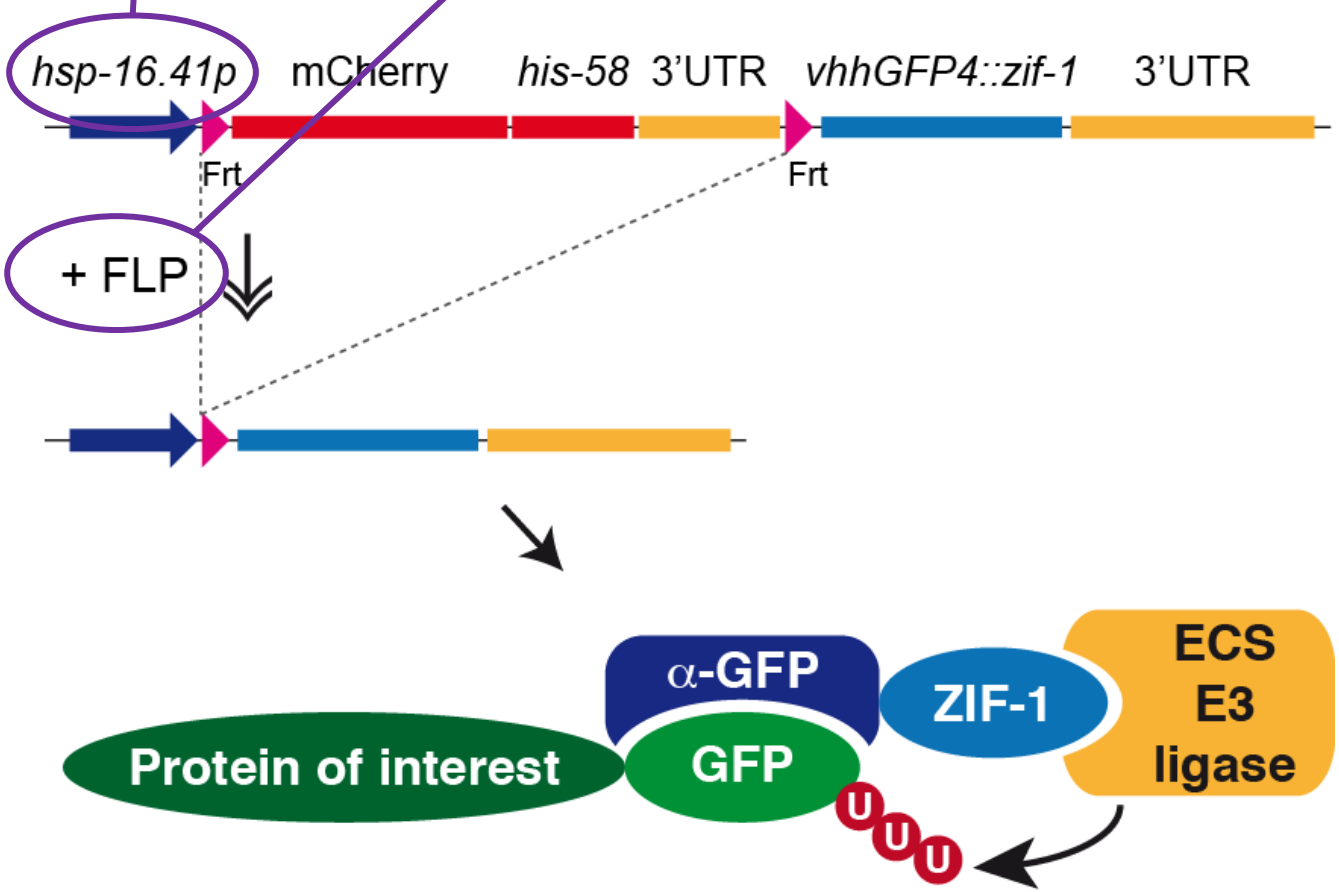


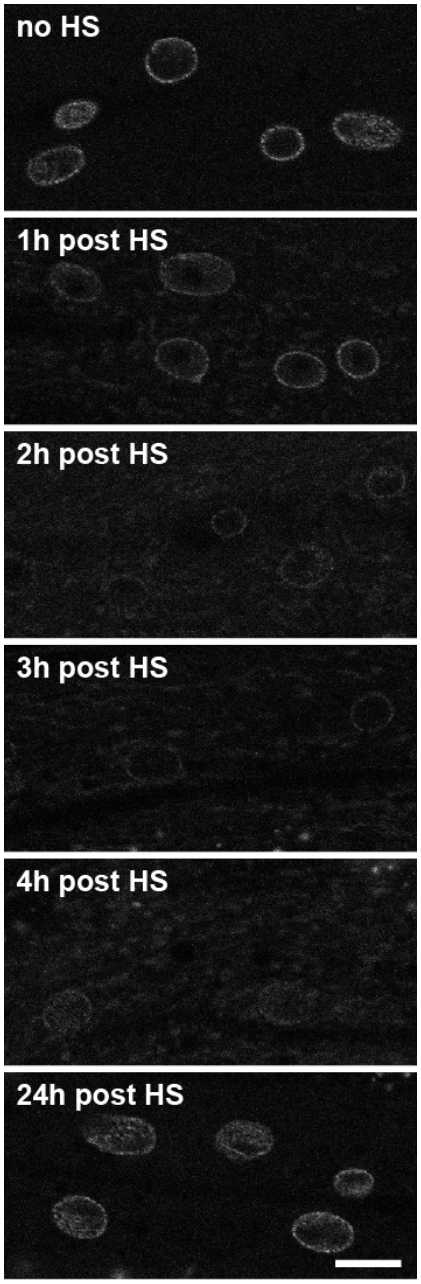




Fragoso-Luna et al,
Genetics 2023

Temporal and spatial control of protein degradation





"deGradFP" = GFP nanobody + ZIF-1
Wang et al, Dev 2017

Hypodermal GFP::MEL−28 degradation
mel-28(bq5[gfp::mel-28]);
hsp16.41p>mCh::his-58>vhhGFP4::zif-1;
dpy-7p::FLP

Fragoso-Luna et al,
Genetics 2023