The oviposition behavior in *Drosophila*

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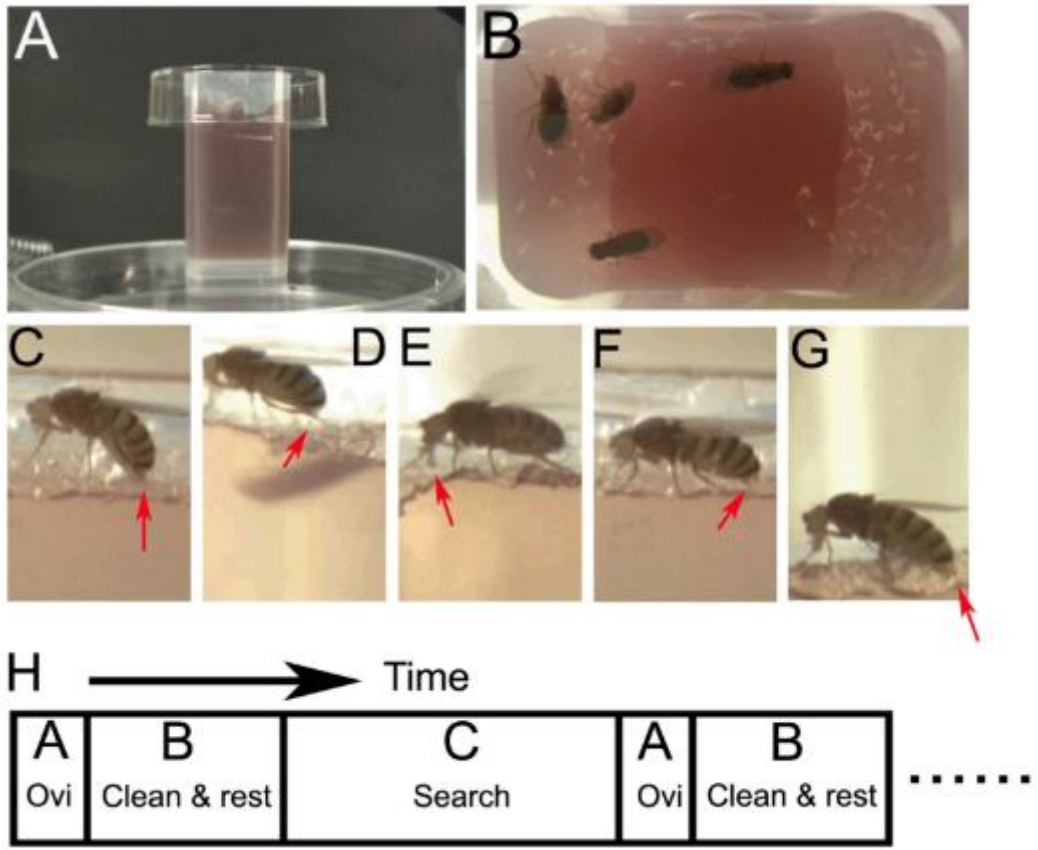
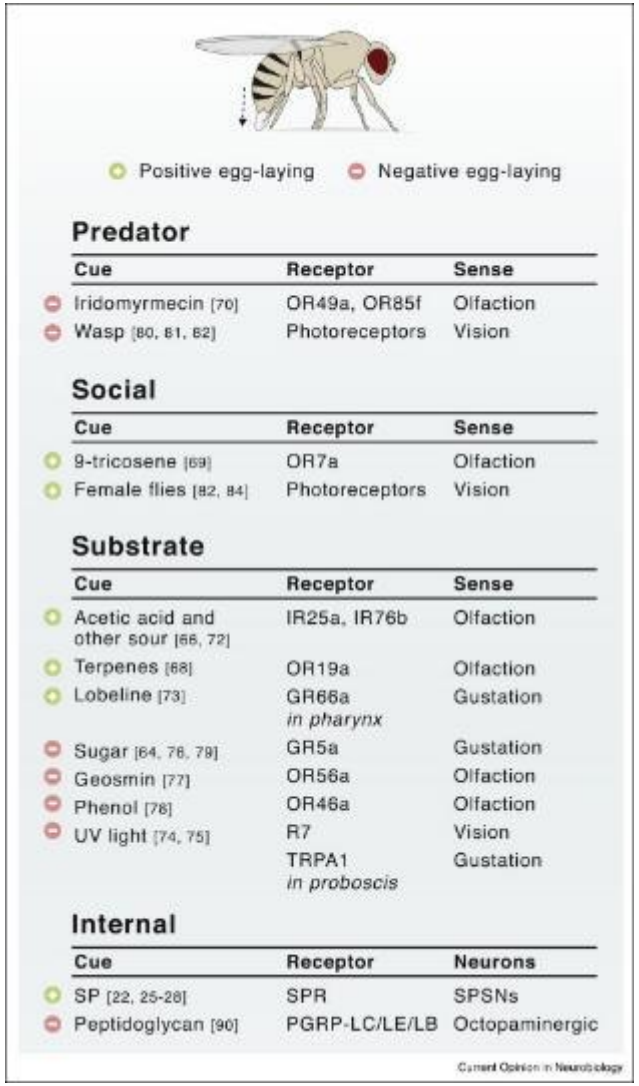
2020-09-24

Reproduction is the first priority of animals

The egg-laying behavioral sequence of *Drosophila* females



Chung-hui Yang et al. Science. 2008



Positive egg-laying Negative egg-laying

Predator

Cue	Receptor	Sense
Iridomyrmecin [70]	OR49a, OR85f	Olfaction
Wasp [80, 81, 82]	Photoreceptors	Vision

Social

Cue	Receptor	Sense
9-tricosene [69]	OR7a	Olfaction
Female flies [82, 84]	Photoreceptors	Vision

Substrate

Cue	Receptor	Sense
Acetic acid and other sour [66, 72]	IR25a, IR76b	Olfaction
Terpenes [68]	OR19a	Olfaction
Lobeline [73]	GR66a *in pharynx*	Gustation
Sugar [64, 76, 79]	GR5a	Gustation
Geosmin [77]	OR56a	Olfaction
Phenol [78]	OR46a	Olfaction
UV light [74, 75]	R7	Vision
	TRPA1 *in proboscis*	Gustation

Internal

Cue	Receptor	Neurons
SP [22, 25-28]	SPR	SPSNs
Peptidoglycan [90]	PGRP-LC/LE/LB	Octopaminergic

Current Opinion in Neurobiology

Aranha and Vasconcelos, 2018

Fundamental questions

1, Formation, transport and deposition processes of fly’s eggs.

2, How are these steps executed correctly?

3, The influencing factors of *Drosophila* oviposition.

4, How is oviposition affected?

Outline

- The physiological basis for flies to lay eggs.
  —Su XB
- Negative modulation of egg-laying in *Drosophila.*
  —Jin SH
- Positive modulation of egg-laying in *Drosophila*
  —Xing LM
- Discussion

The physiological basis for flies to lay eggs

—Su XB

1, Structural basis of oviposition behavior in female flies

2, From mating to laying eggs

i)ovulation

ii)egg activation

3, Storage and release of sperm

A major contributor to this report

Mariana F. Wolfner

Cornell University

Mariana Wolfner

Professor

Mariana Federica Wolfner is the Goldwin Smith Professor of molecular biology and genetics at Cornell University. Her research investigates sexual conflict in the fruit fly Drosophila melanogaster. She was elected a member of the National Academy of Sciences in 2019 in recognition of her distinguished and continuing achievements in original research.

Wikipedia Official site

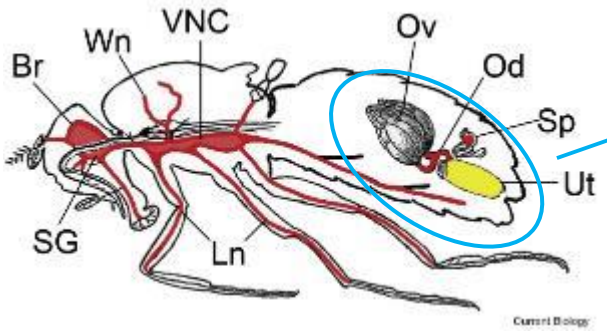
Education: Stanford University · Cornell University

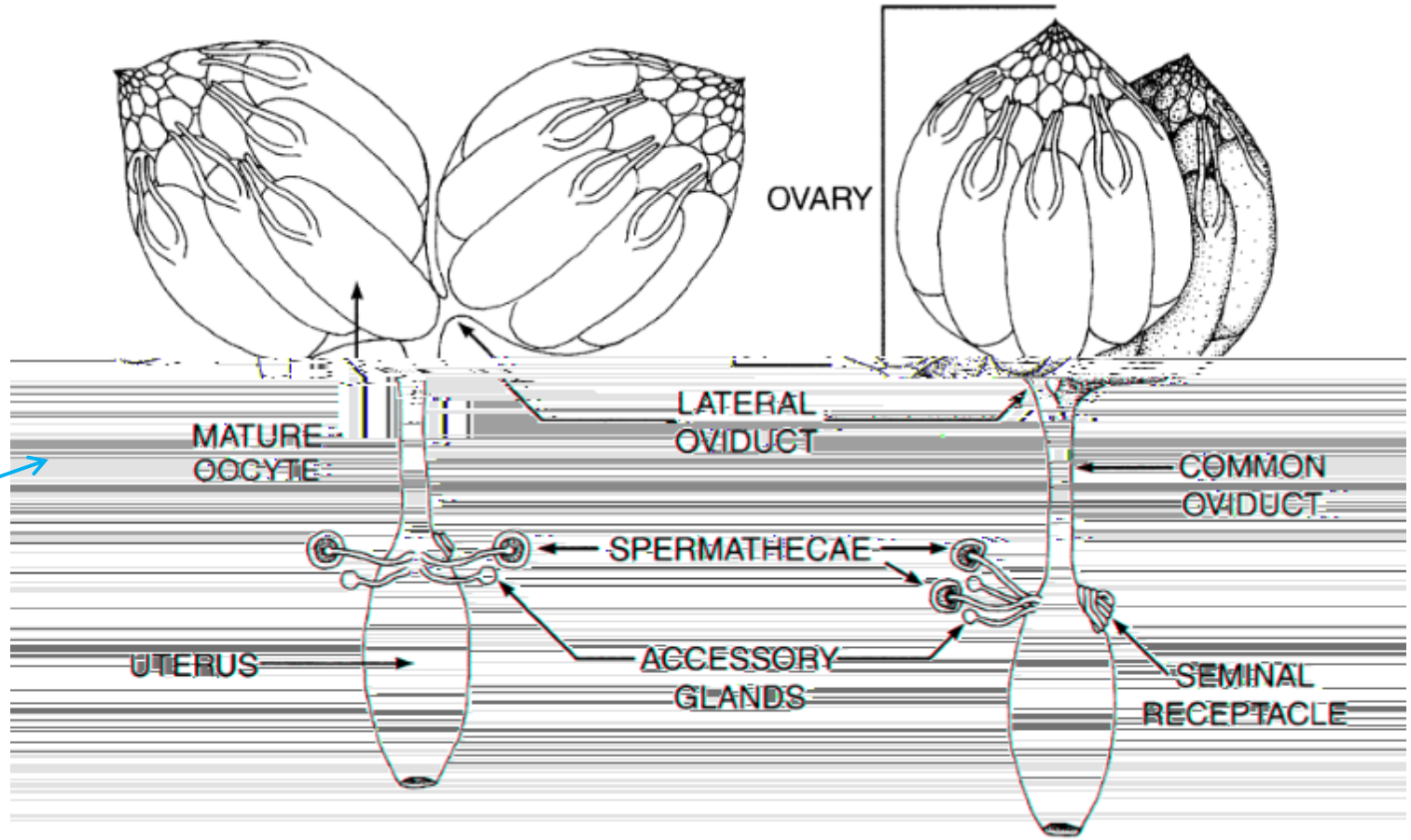
Data from: Wikipedia

Suggest an edit

1 Structural basis of oviposition behavior in female flies

Cartoon of the anatomy of the female *D. melanogaster* reproductive tract shown from dorsal and lateral perspectives

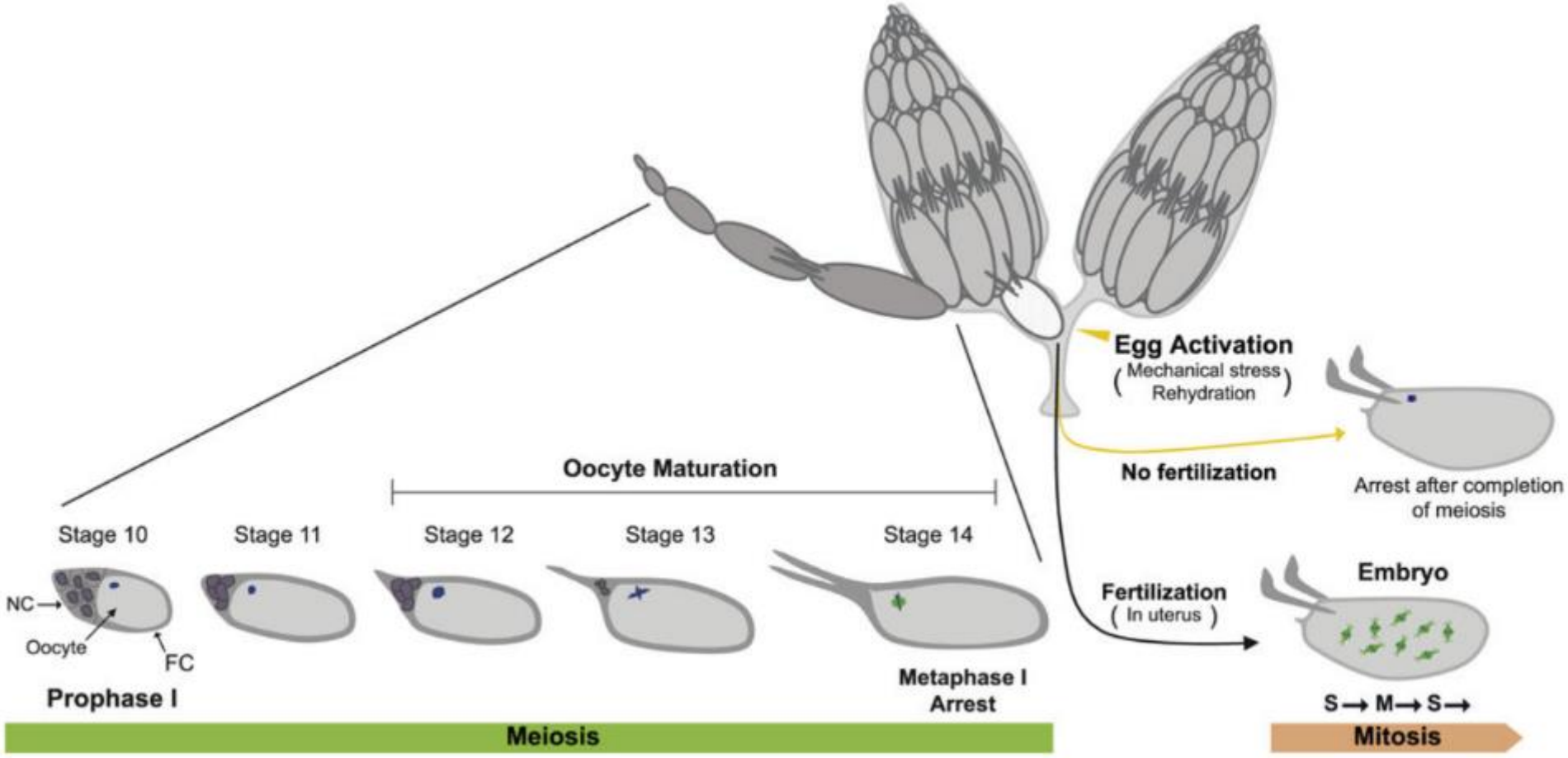




Eric Kubli. Curr Biol. 2008

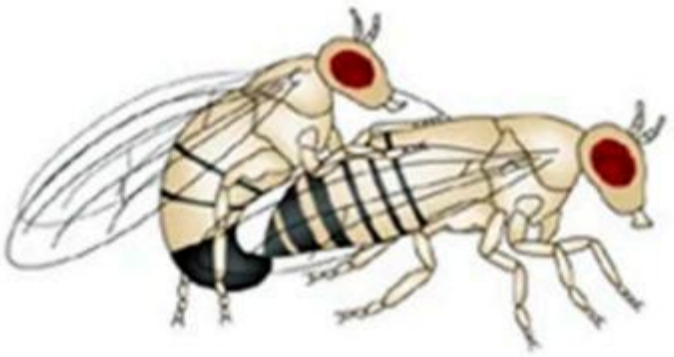
Margaret C Bloch Qazi, et al. Dev Biol. 2003

Overview of *Drosophila* oogenesis and early development



Emir E. Avilés-Pagán and Terry L. Orr-Weaver. Semin Cell Dev Biol. 2018

2 From mating to laying eggs



Drosophila male-derived polypeptides whose functions are known or hypothesized to affect ovulation and sperm storage

Seminal protein	Origin in male	Function in female	Protein class
Acp26Aa (ovulin)	AG	Stimulates ovulation	Peptide hormone precursor[a]
Acp70A (sex peptide)	AG	Stimulates oogenic progression Increases number of uterine eggs	Peptide
Dup99B	ED	Stimulates egg production	Peptide
ED-OSS	ED	Stimulates ovulation in *D. biarmipes*	Peptide
Acp36DE	AG	Increases female sperm storage	Glycoprotein
Esterase-6	EB &ED	Decreases sperm retention in storage Stimulates ovulation rate	Esterase
Acp62F	AG	Hypothesized: protects sperm within storage	Trypsin inhibitor[b]
PEB-me	EB	Hypothesized: facilitate sperm storage	Structural protein[c]

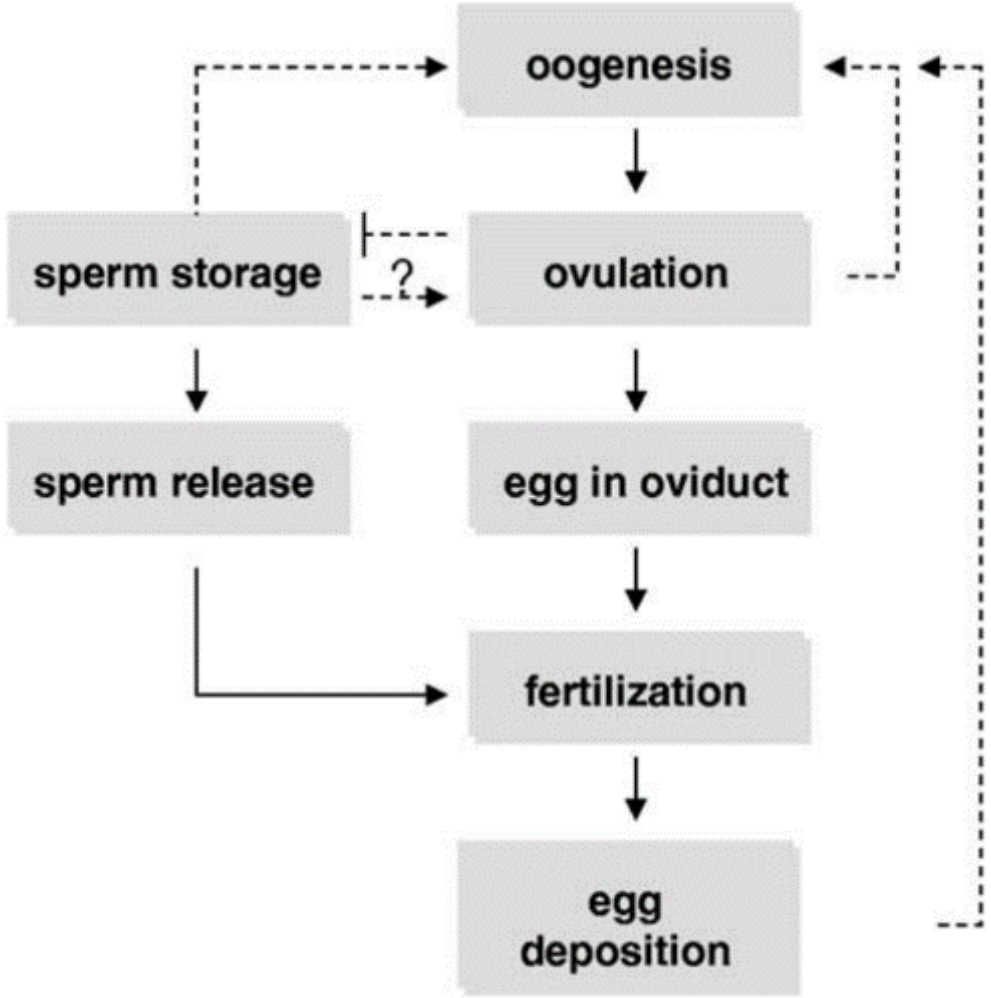
Margaret C Bloch Qazi, et al. Dev Biol. 2003

The ovulation and egg-laying process in mated females

Of the 4000 sperm transferred to

a *D.melanogaster* female

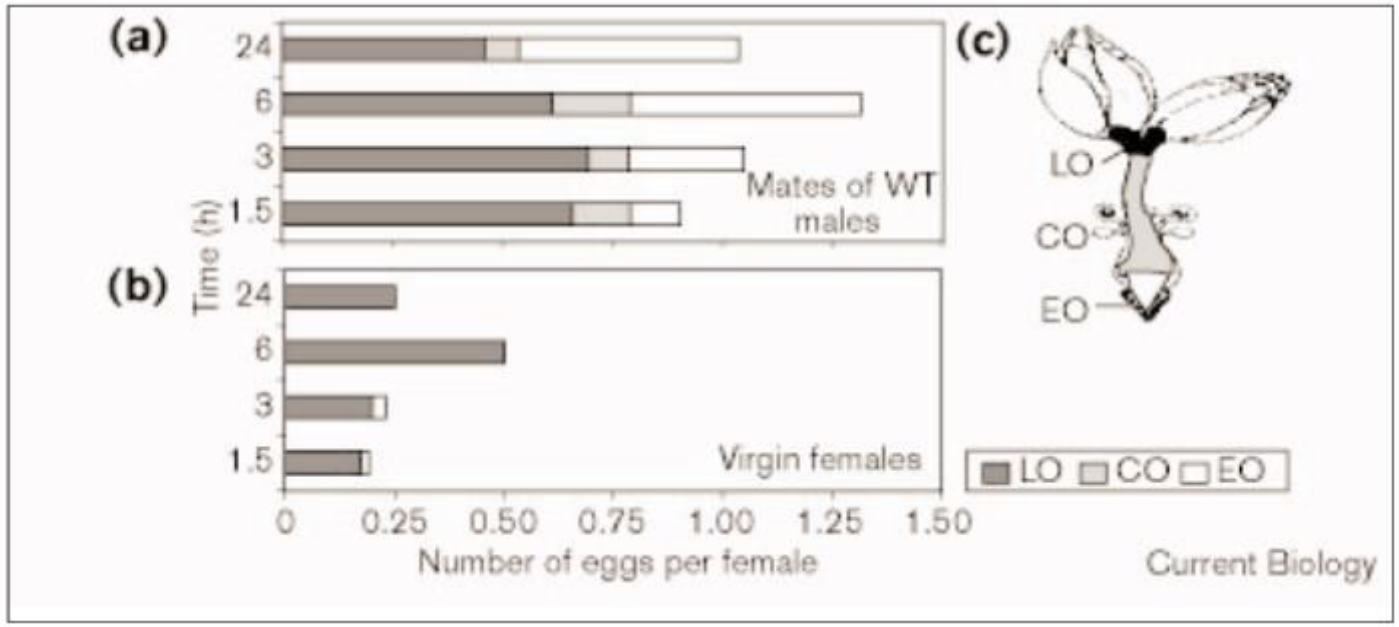
- To stimulate ovulation
- 80% are expelled from the uterus
- Subsequent fertilizations rely on the 700–1000 sperm stored in the female.

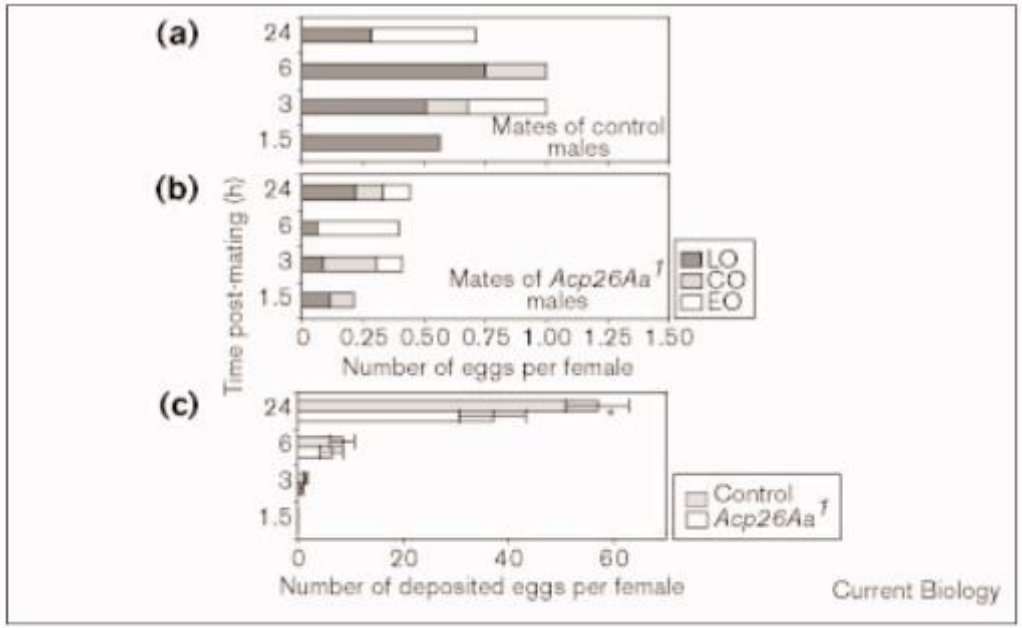


Margaret C Bloch Qazi, et al. Dev Biol. 2003

ovulation

Acp26Aa is essential for release of oocytes by the ovary





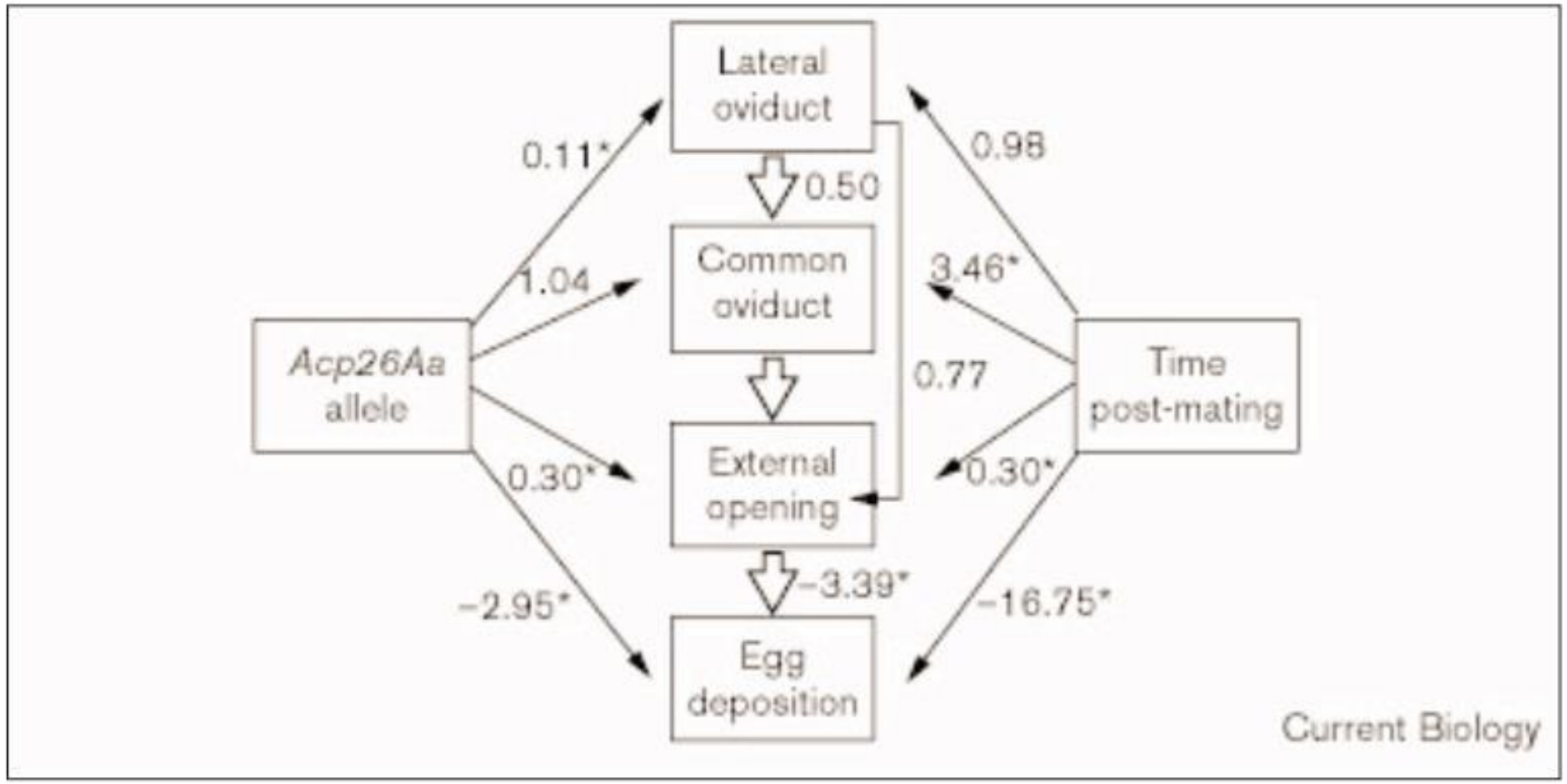
Yael Heifetz, et al. Curr Biol. 2000

LO, lateral oviducts;

CO, common oviduct including the uterus

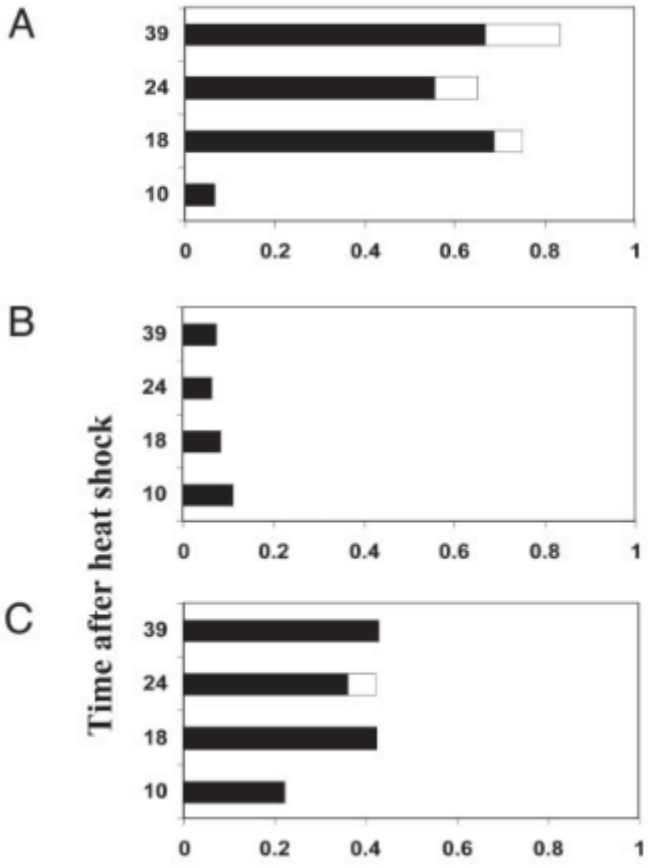
EO, external opening of the genital tract

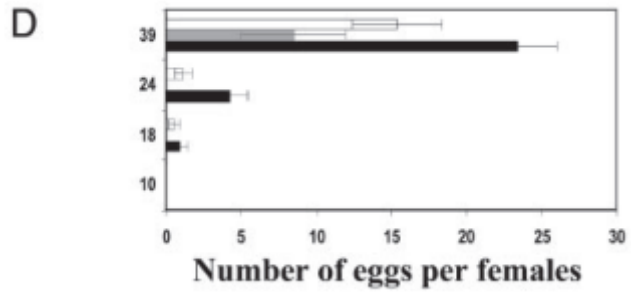
The lack of Acp26Aa in male seminal fluid had the highest effect on the presence of an egg in the lateral oviducts

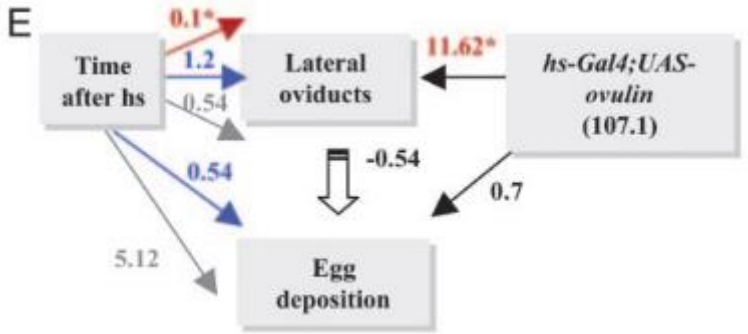


Yael Heifetz. Curr Biol. 2000

Full-length ovulin(Acp26Aa) can stimulate ovulation in unmated virgin females







A, *hsp70-GAL4;UAS-ovulin*$_{\text{full length expressing}}$ females

B, non-heat-shocked *hsp70-GAL4;UAS-ovulin*$_{\text{full length}}$ females

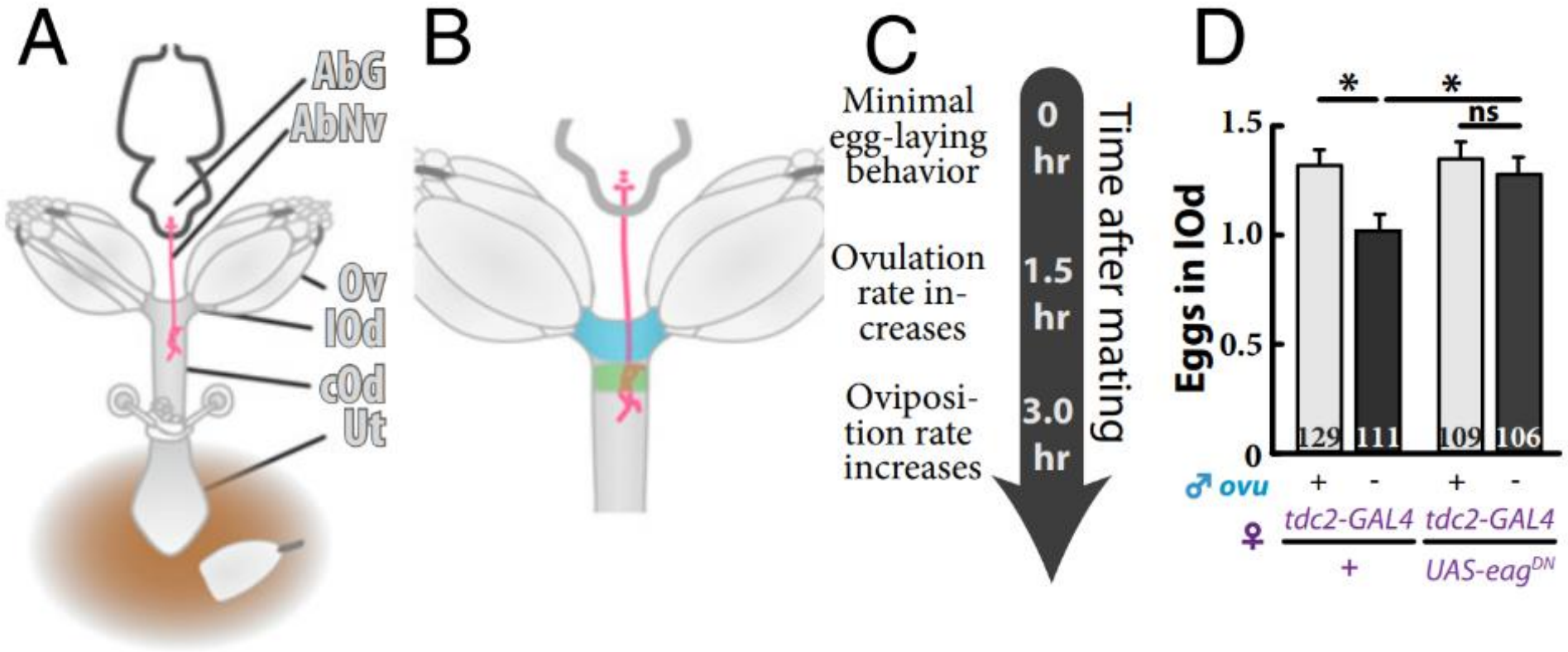
C, *hsp26-Ya* females

Black, lateral oviducts

White, external opening of the reproductive tract

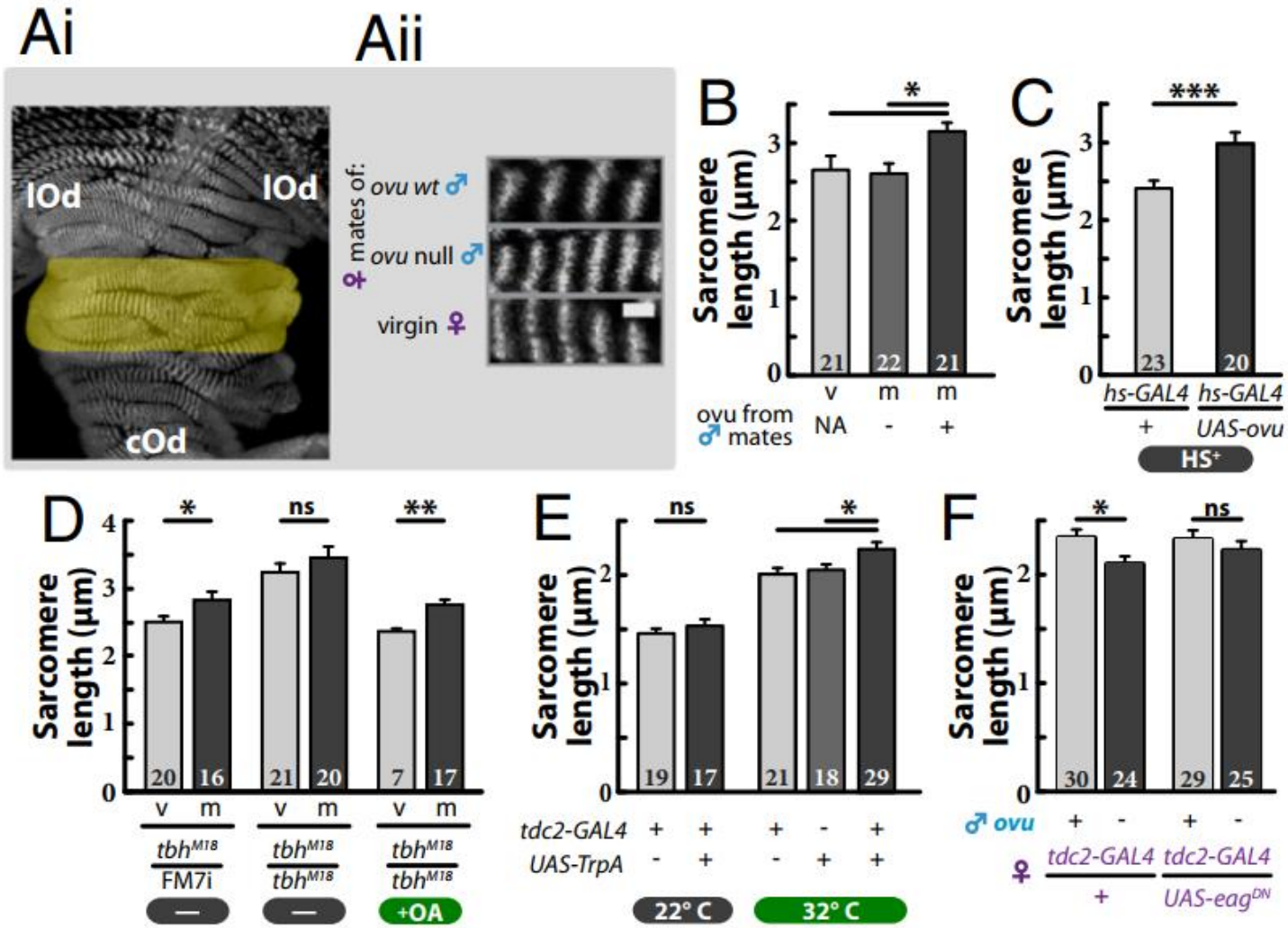
Yael Heifetz, et al. *PNAS*. 2005

Ovulin acts through OA neuronal signaling



C. Dustin Rubinstein and Mariana F. Wolfner. *PNAS*. 2013

Ovulin Relaxes Oviduct Musculature



C. Dustin Rubinstein and Mariana F. Wolfner. *PNAS*. 2013

ii Egg activation

A series of major changes during egg activation

1,The oocyte's outer coverings undergo physical and chemical changes

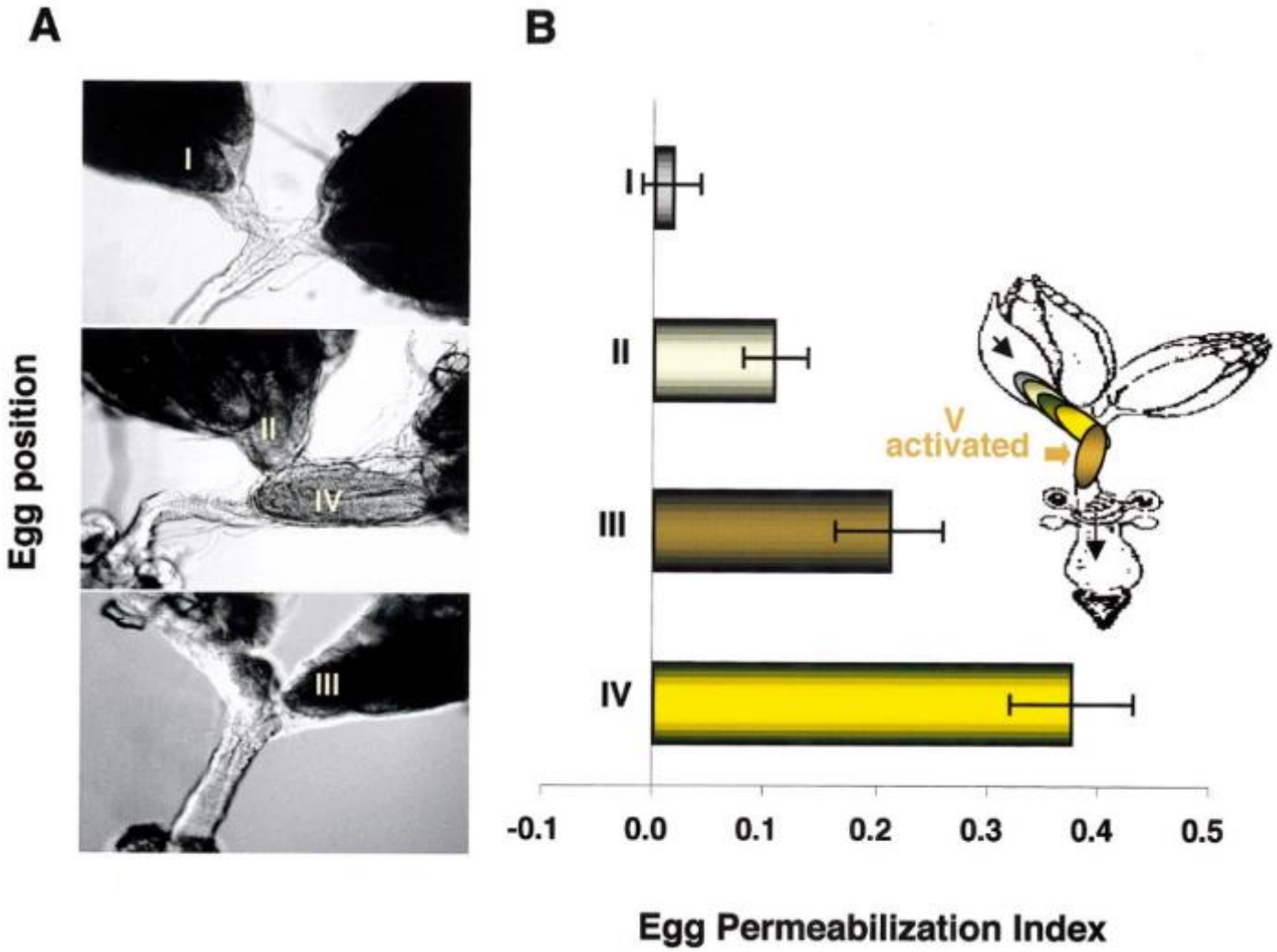
2, Meiosis arrest is released to allow this cell cycle to complete

3, The populations of maternal mRNAs and proteins undergo dynamic changes

4, Cytoskeletal rearrangements occur

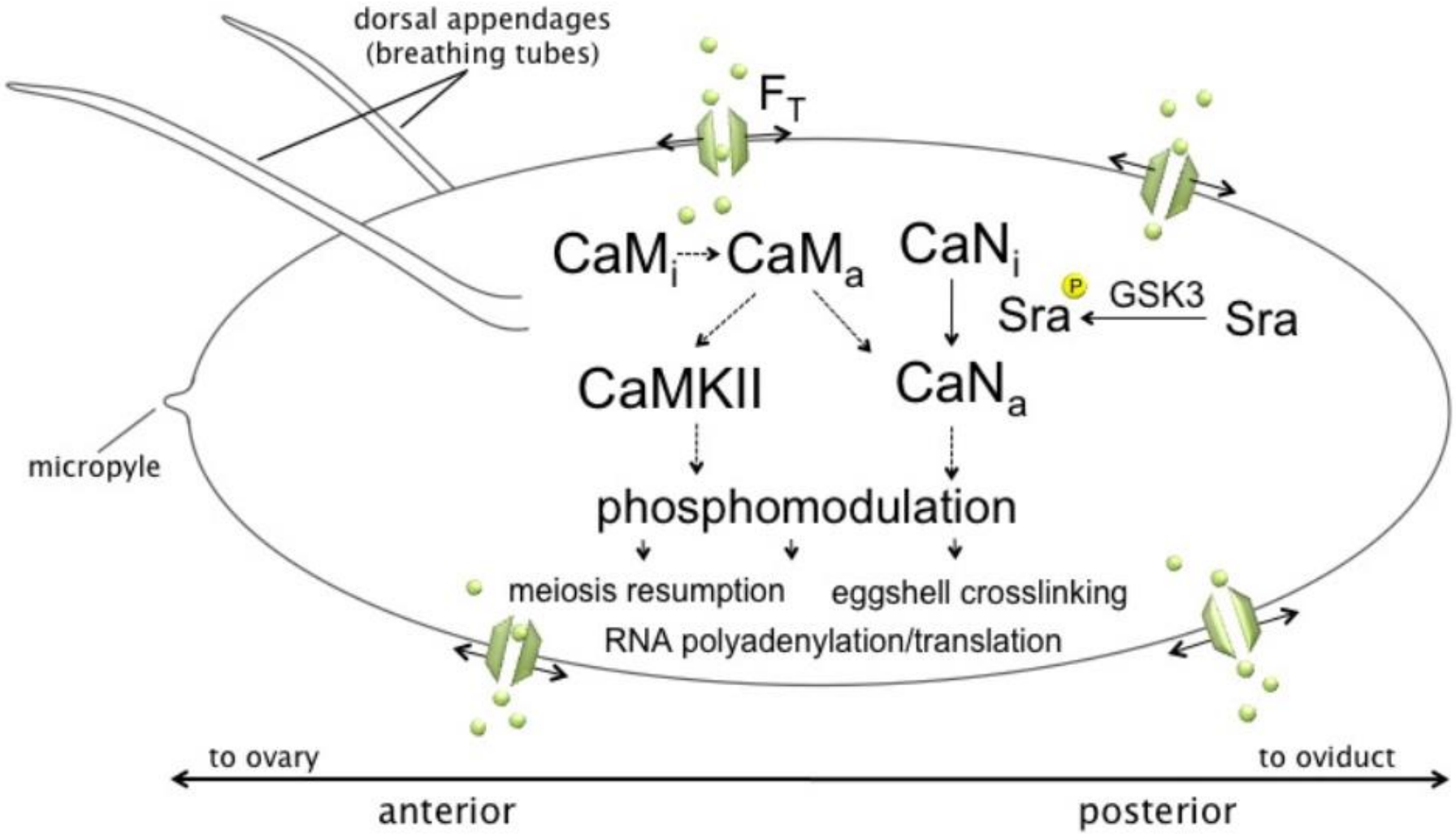
The results of these events is the cellular transformation of a mature oocyte to a developing embryo.

Ovulation triggers egg activation in *Drosophila*



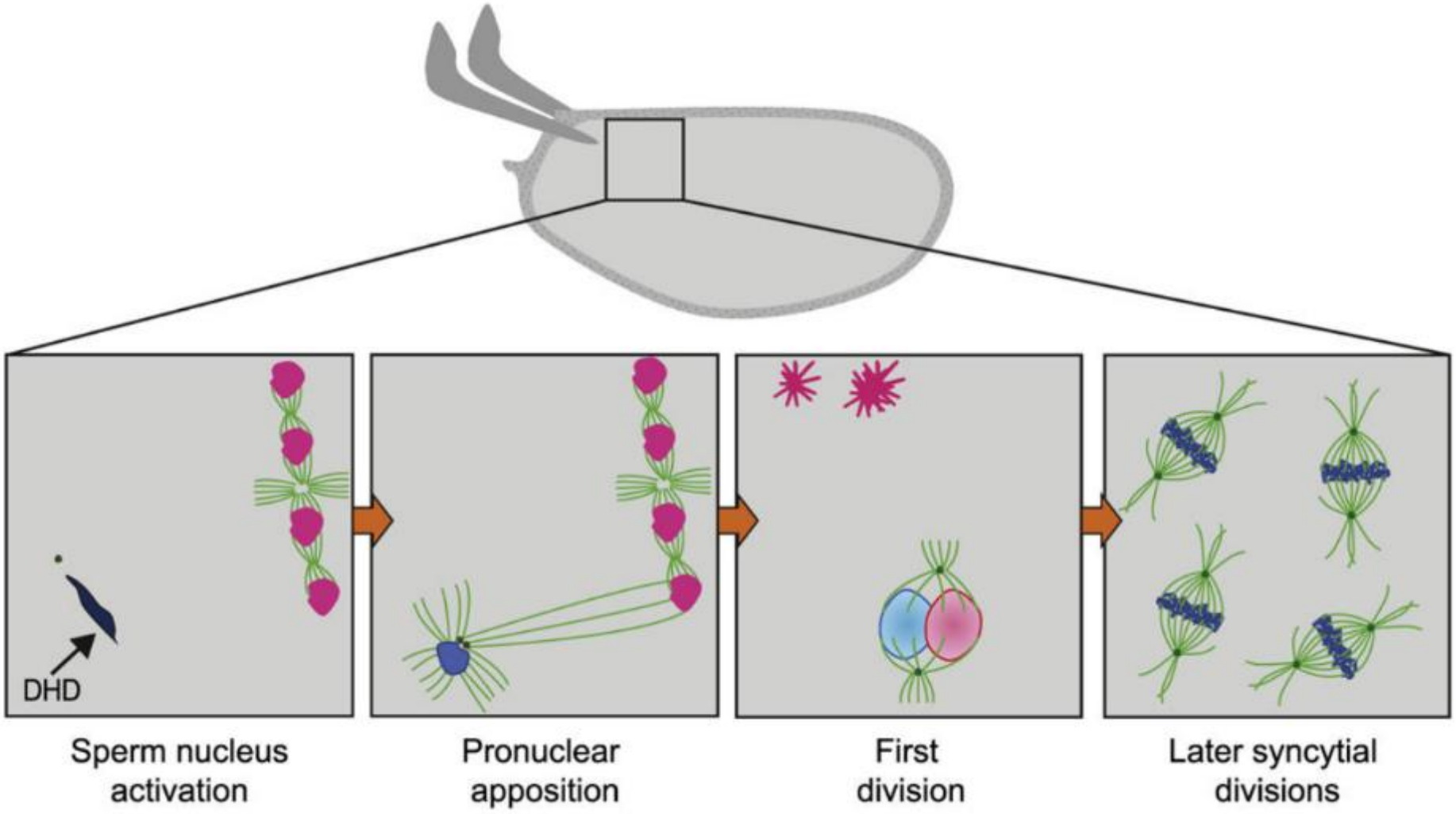
Yael Heifetz, et al. Developmental Biology. 2001

Model of egg activation in *Drosophila*



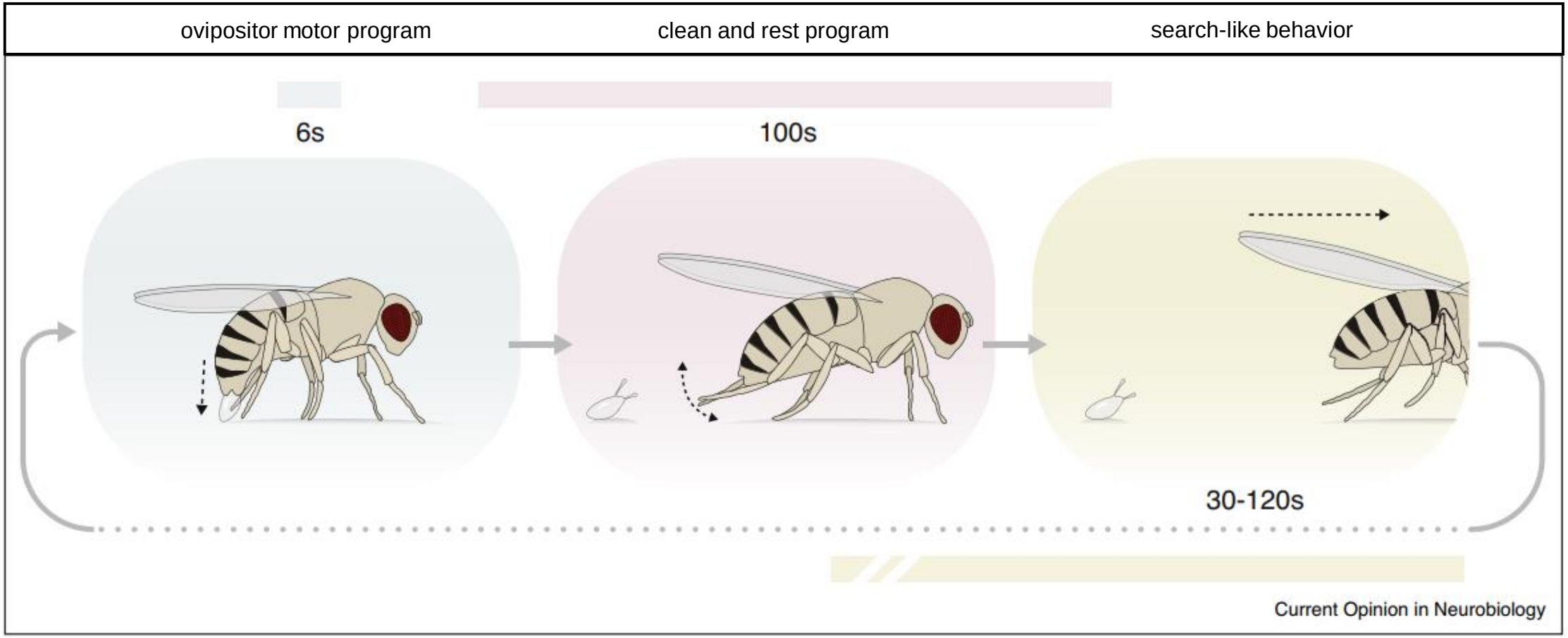
Caroline V. Sartain and Mariana F. Wolfner. *Cell Calcium*. 2013

Fertilization and the start of embryonic divisions



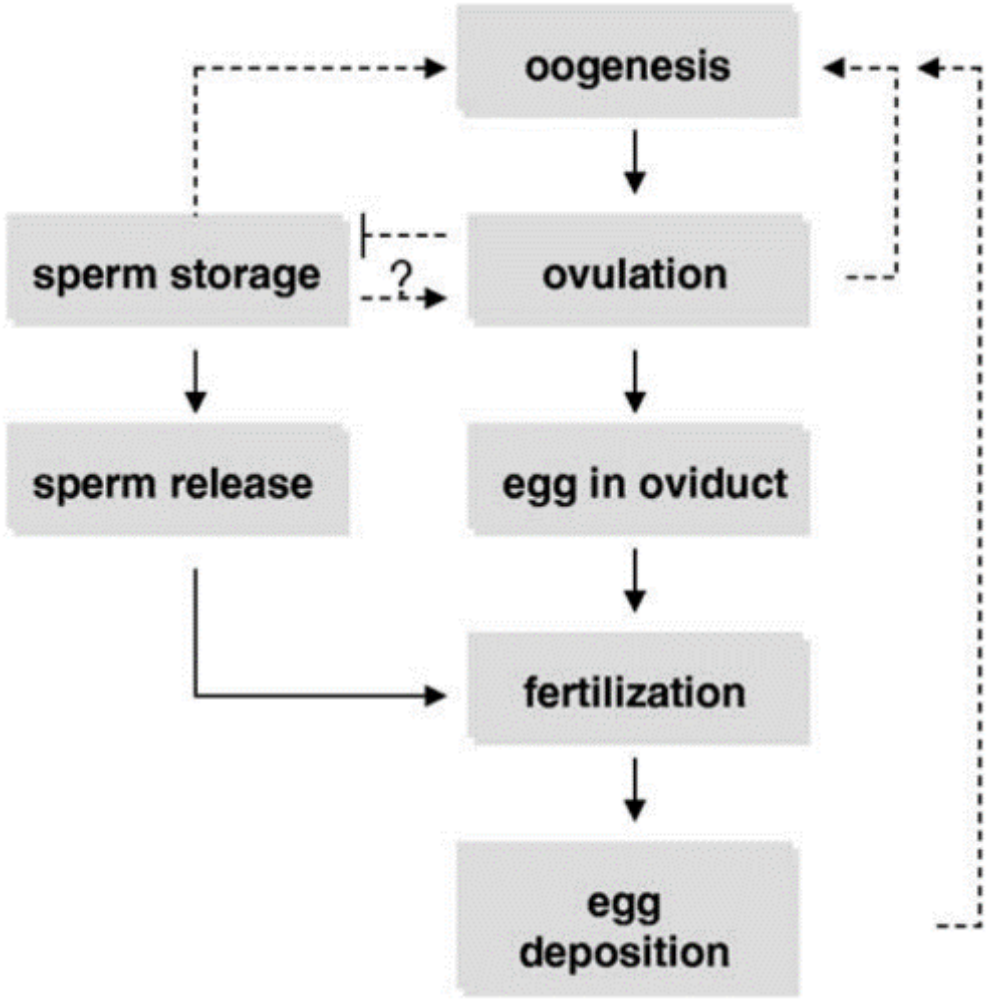
Emir E. Avilés-Pagán and Terry L. Orr-Weaver. Semin Cell Dev Biol. 2018

Egg-laying involves a structured set of actions



Márcia M Aranha, Maria Luísa Vasconcelos. Curr Opin Neurobiol. 2018

3 Storage and release of sperm



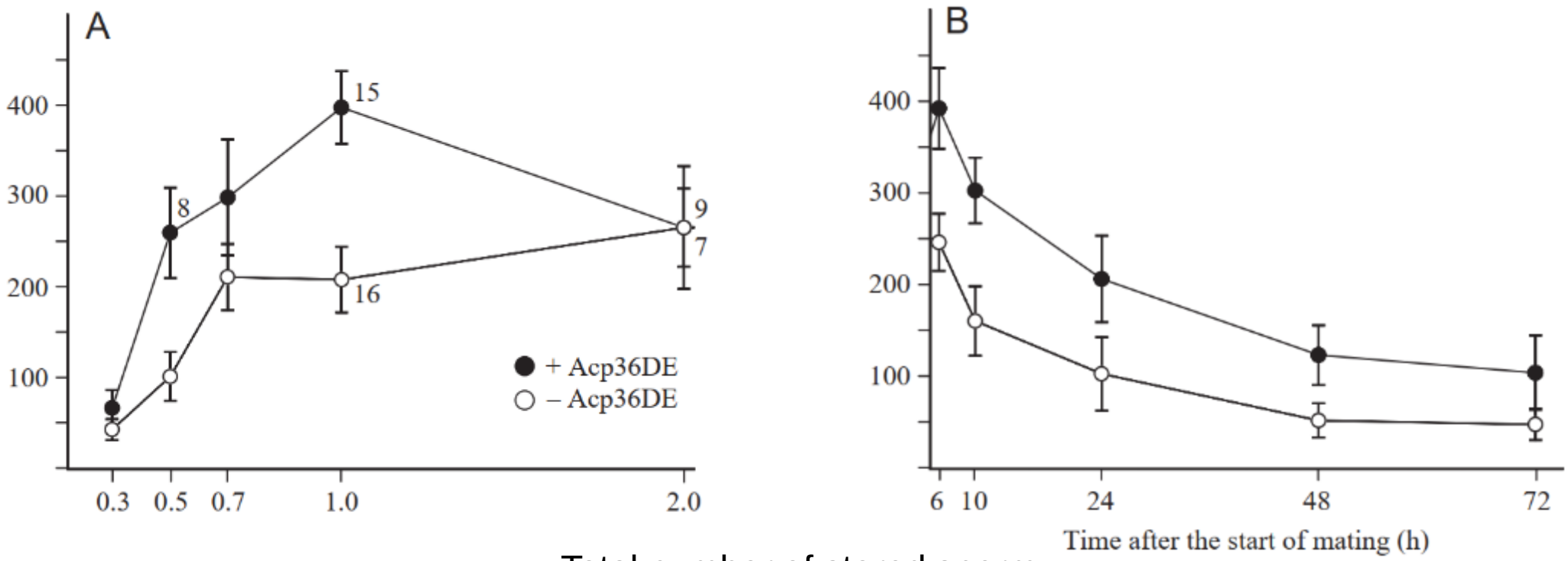
Steps

- sperm entrance and accumulation
- Maintenance
- regulated release from the sites of storage

Function

- efficient gamete use
- the subsequent maintenance of fertility

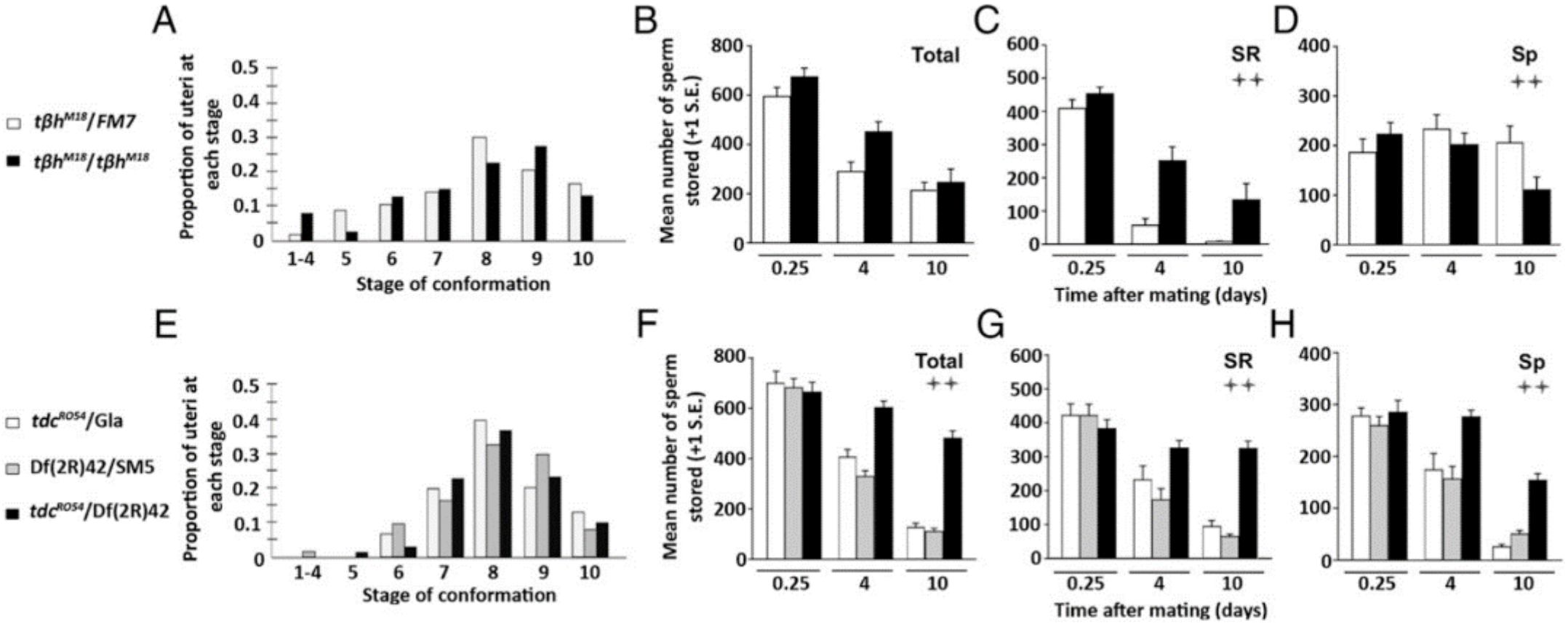
Acp36DE promotes the early accumulation of sperm within SSOs



Total number of stored sperm

Margaret C. Bloch Qazi and Mariana F. Wolfner. J Exp Biol. 2003

OA and TA do not contribute to early sperm storage events but are required for sperm depletion from storage



Frank W. Avila, et al. *PNAS*. 2012

Discussion

How does the reproductive tract coordinate the release of sperm and ovulation of eggs?

References

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Thanks!

PART 2: Negative modulation of egg-laying in *Drosophila*

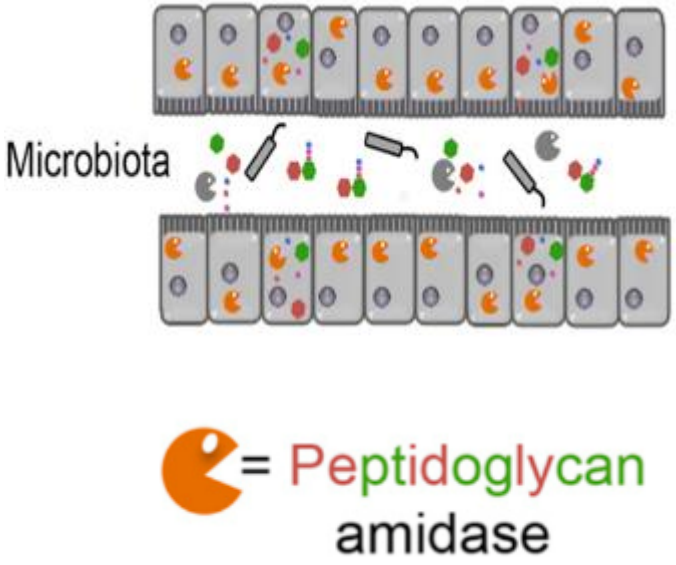
2020-09-24 JSH

Under what conditions dose Drosophila melanogaster repress the oviposition behavior?

Predator

Substrate

Internal



Predator

Defence strategies against a parasitoid wasp in *Drosophila*: fight or flight?

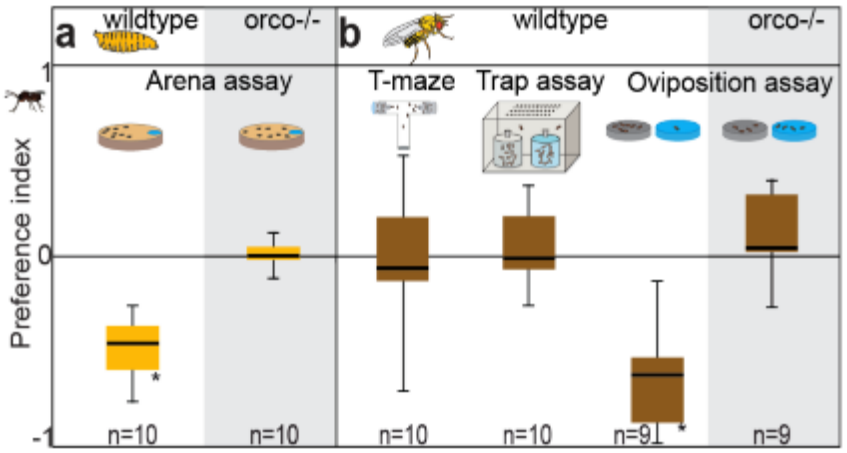
parasitoid wasp

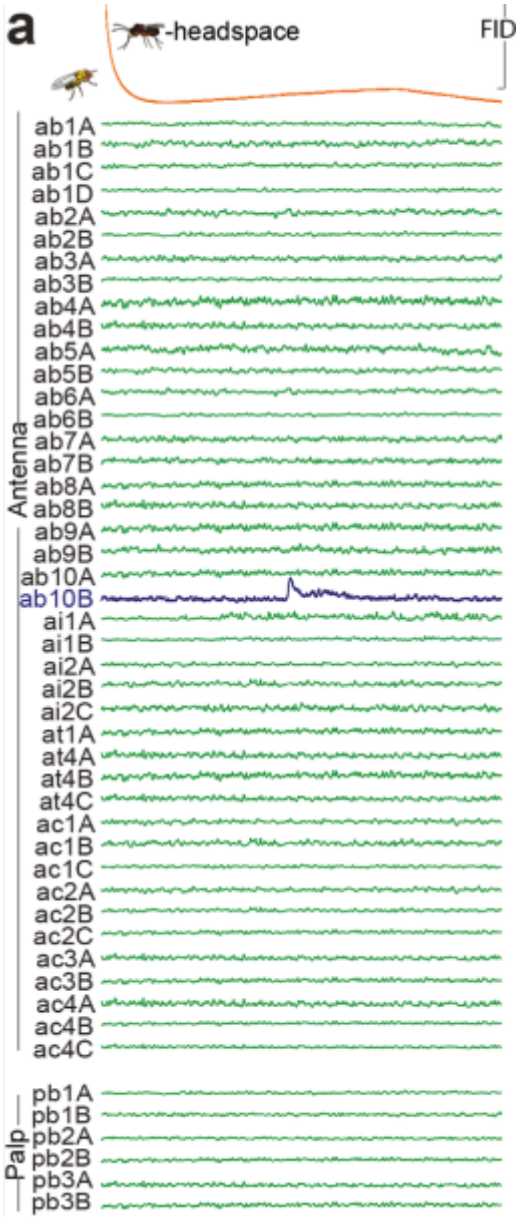
Physiological defences

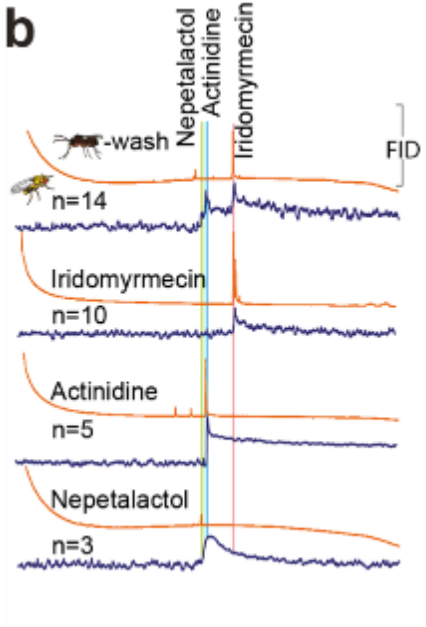
Behavioral defences :

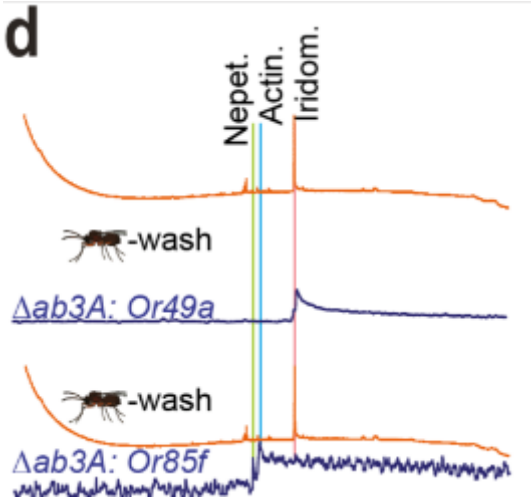
- avoiding infested sites
- reducing the number of offspring

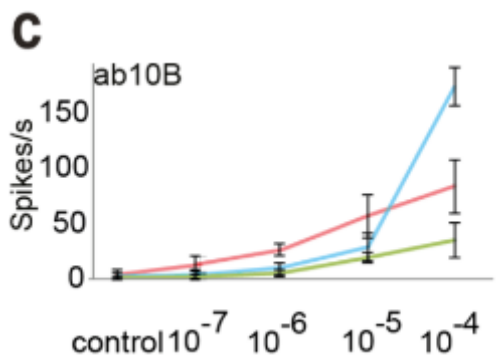
The ab10B neuron is highly specific to Or49a and Or85f detecting parasitoid odors

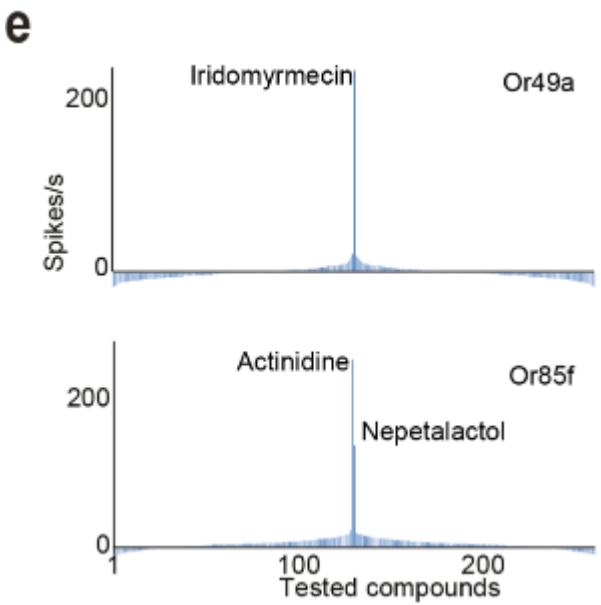






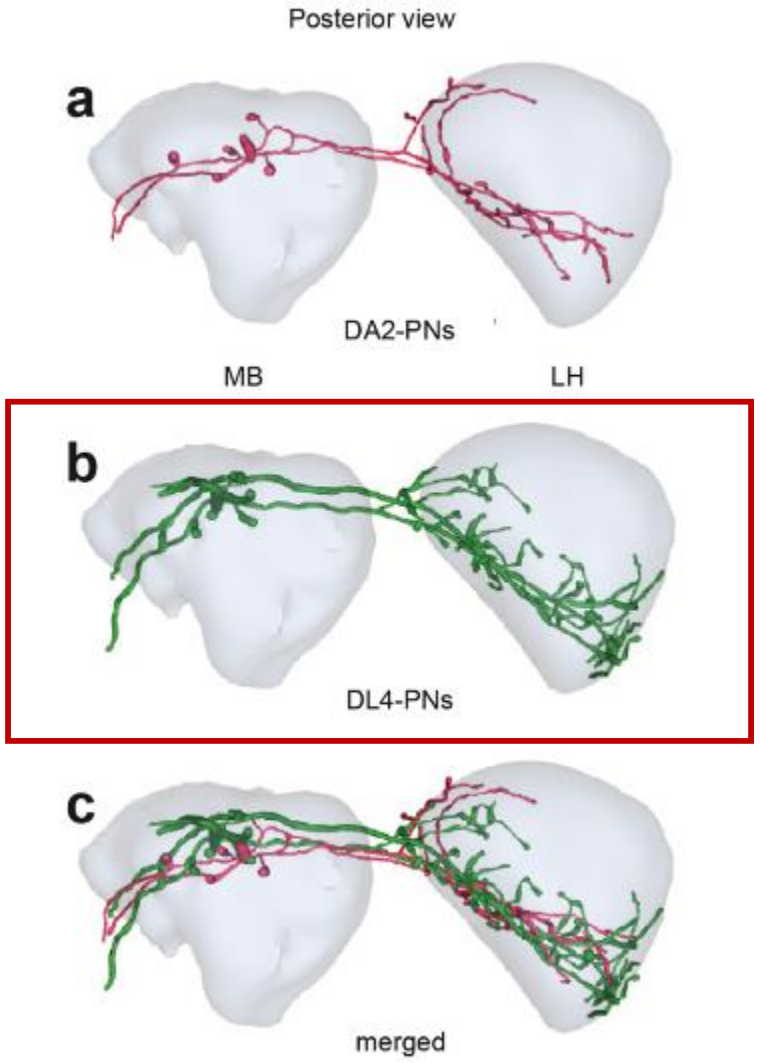


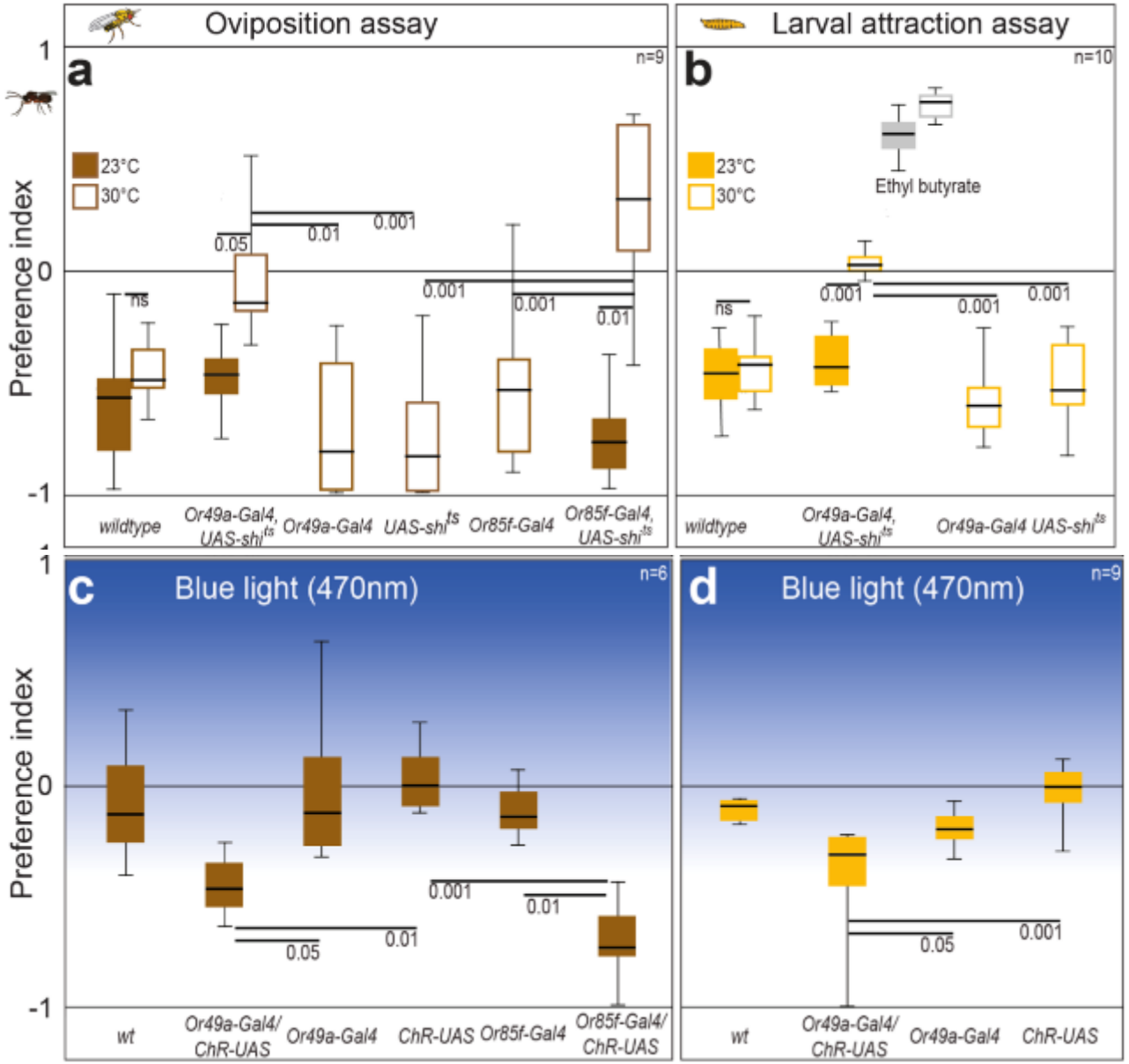




Ebrahim SA, et al. PLOS Biology. 2015

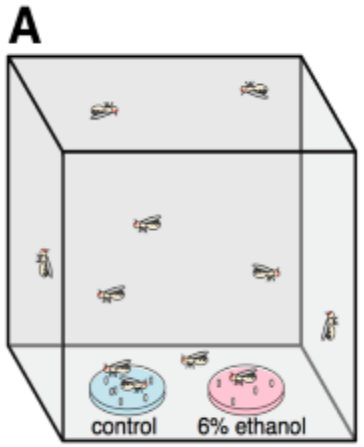
The ab10B neuron is necessary and sufficient to govern oviposition avoidance and larval avoidance behavior

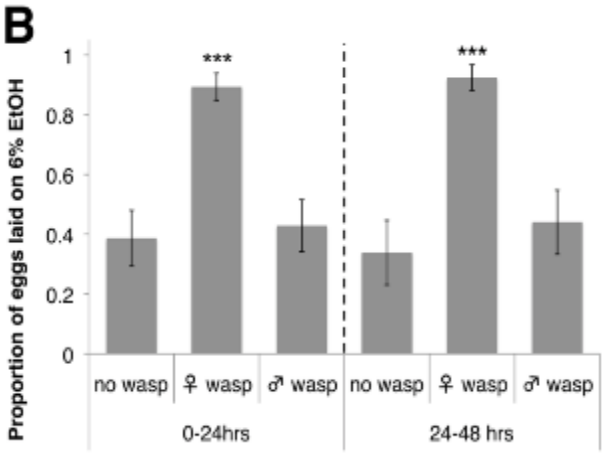


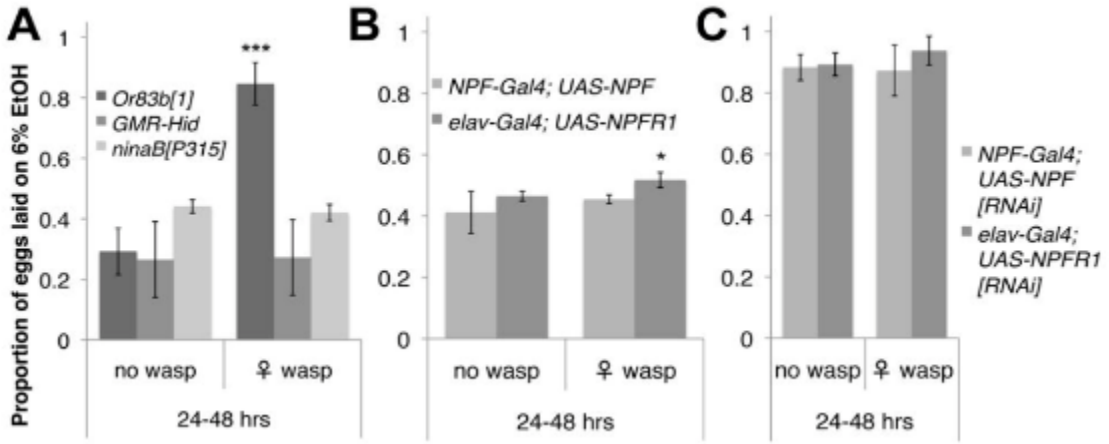


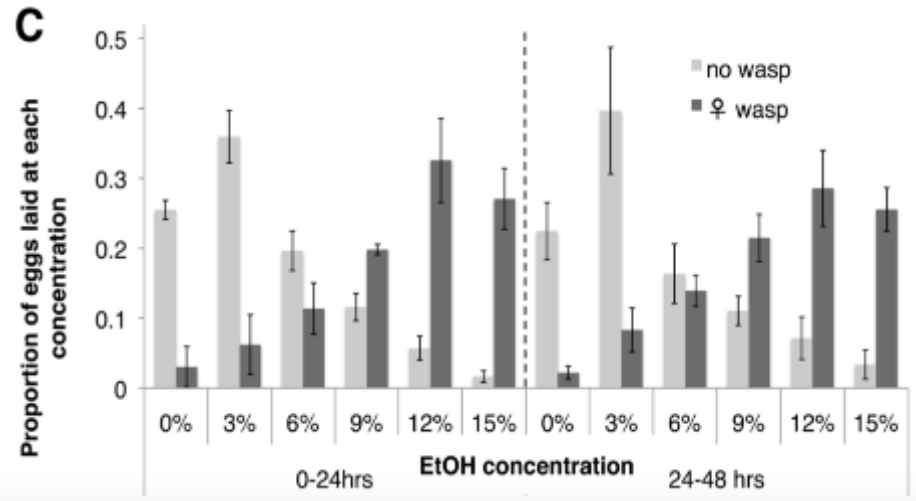
Ebrahim SA, et al. PLOS Biology. 2015

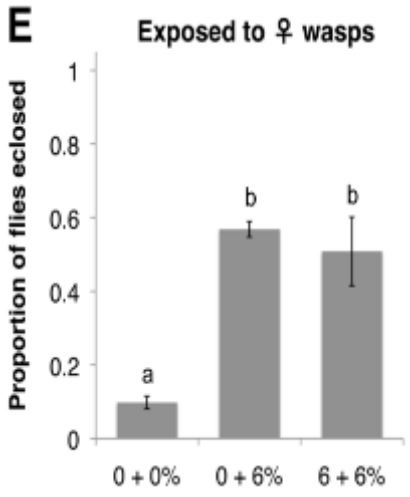
Sight and NPF signaling control fly ability to sense and respond to wasps

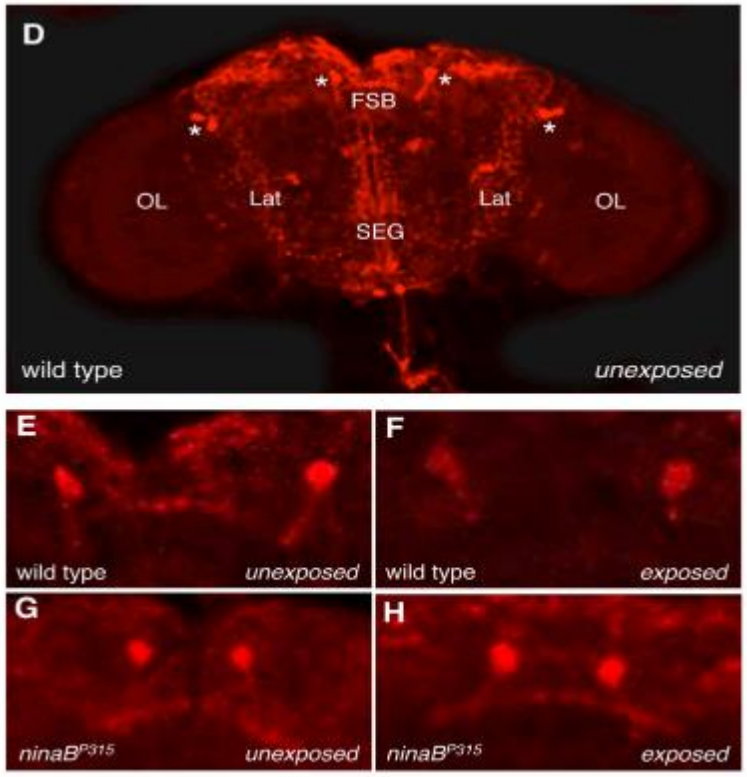






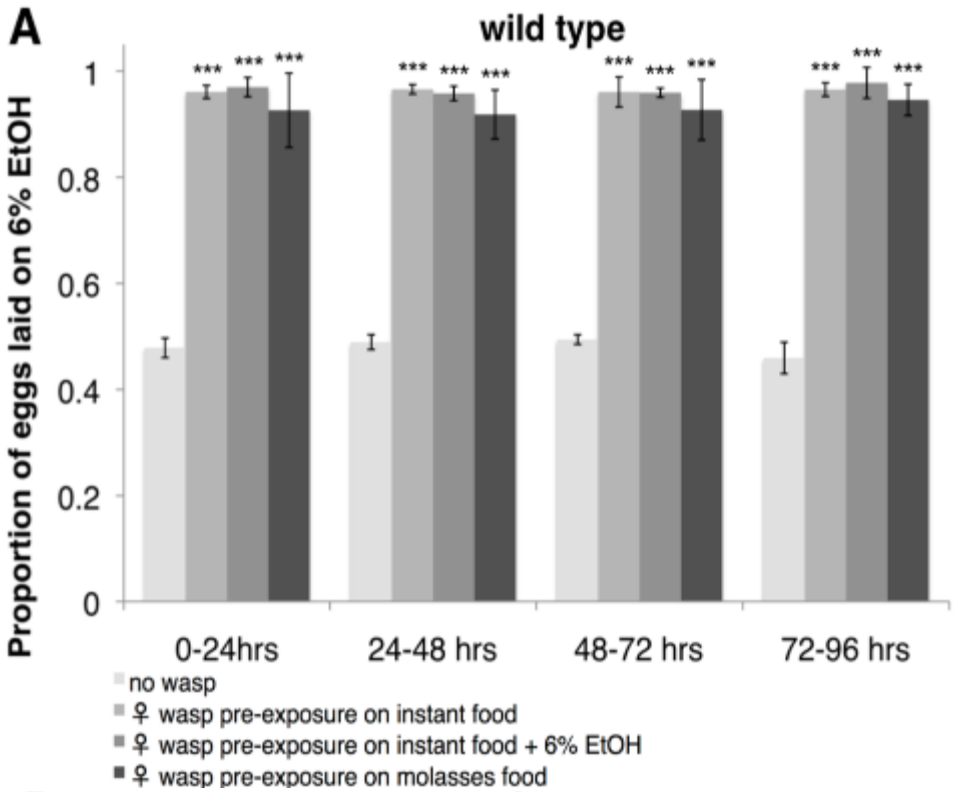


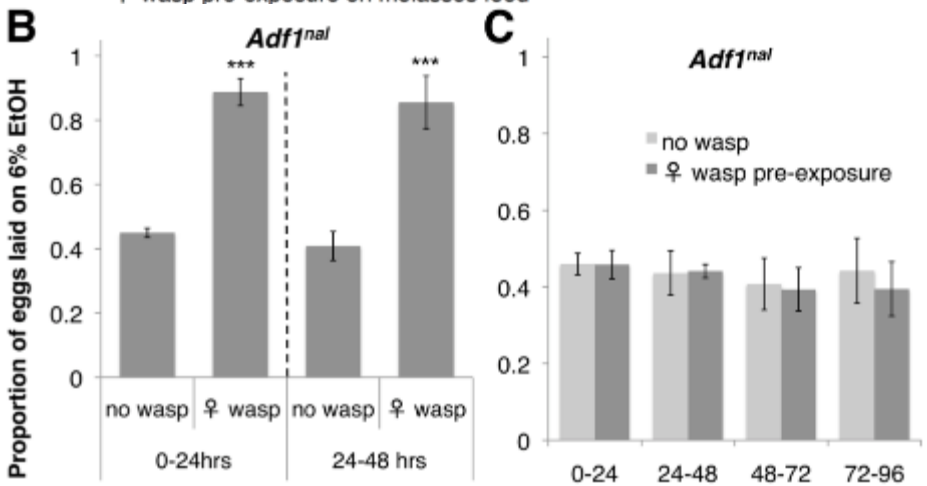


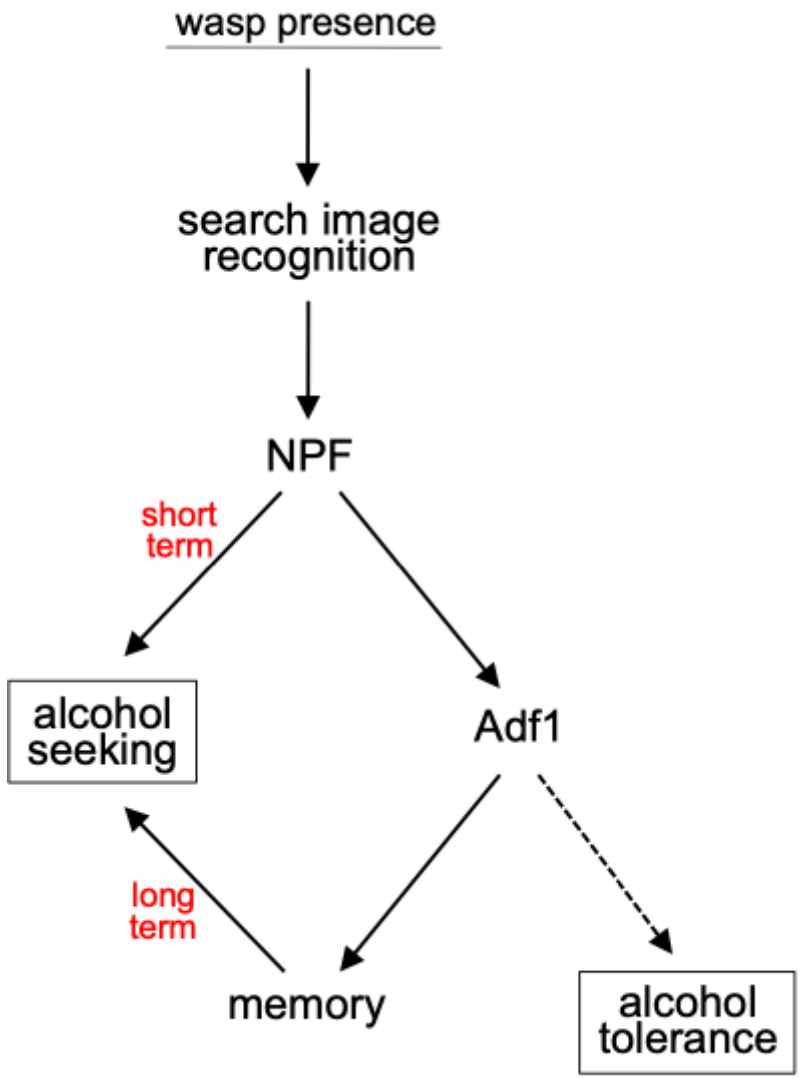


Kacsoh BZ, et al. Science. 2013

Flies form long-term memories of seeing wasps impacting oviposition preference







Kacsoh BZ, et al. Science. 2013

Conclusion：

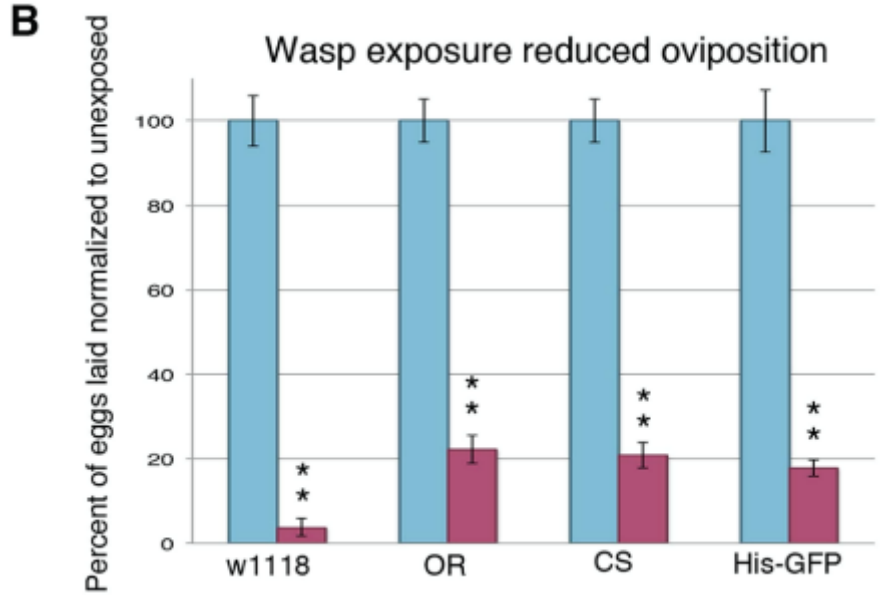
Avoidance behavior

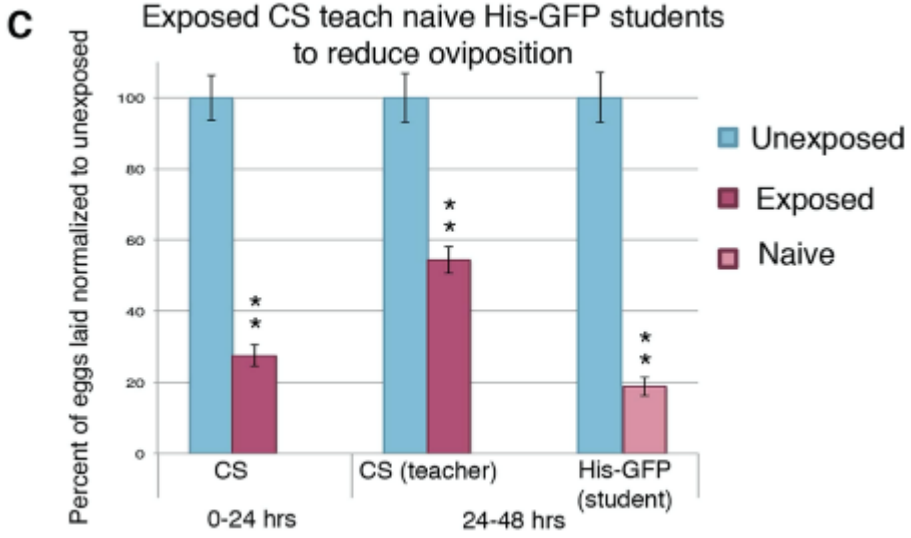
- Drosophila avoids parasitoids by sensing their semiochemicals via a olfactory circuit. （ ab10B neuron：Or49a and Or85f、 DL4-PNs、MB-LH)
- Visual perception of wasps by flies might cause decreased NPF levels in fly brains.
- Flies can form long-term memories of seeing wasps.

Question:

What causes an acute oviposition depression when expositing to predator?

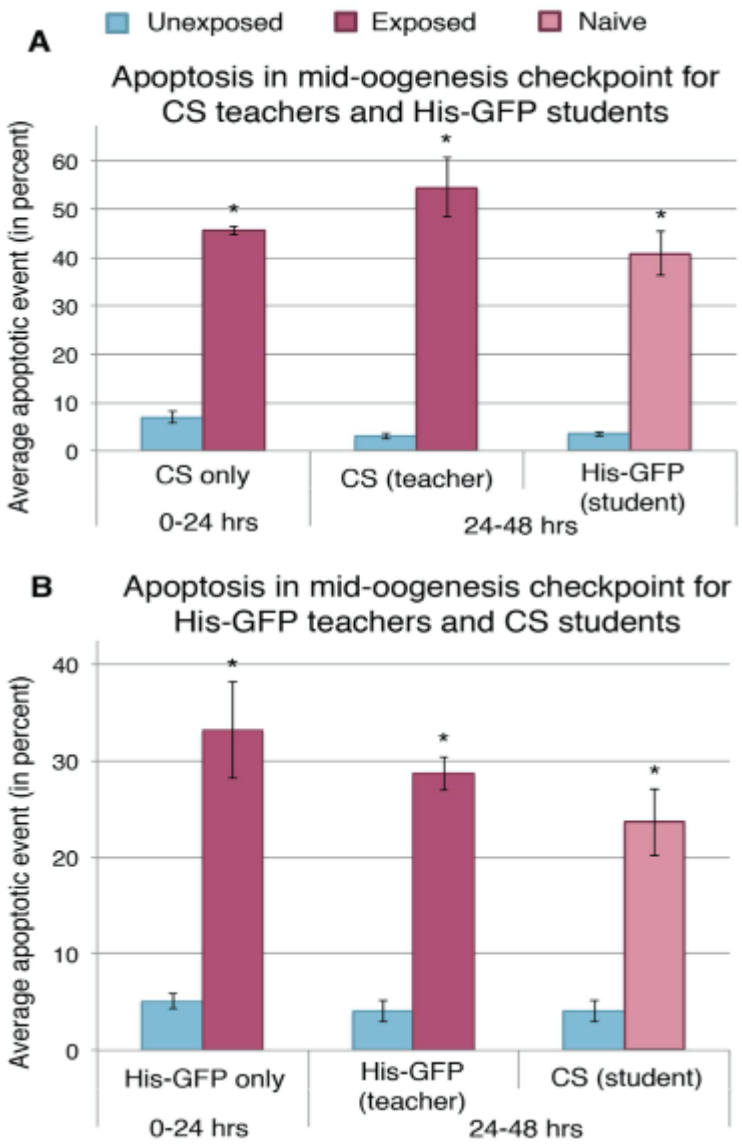
Flies respond to wasps by decreasing oviposition and confer this information to naive flies

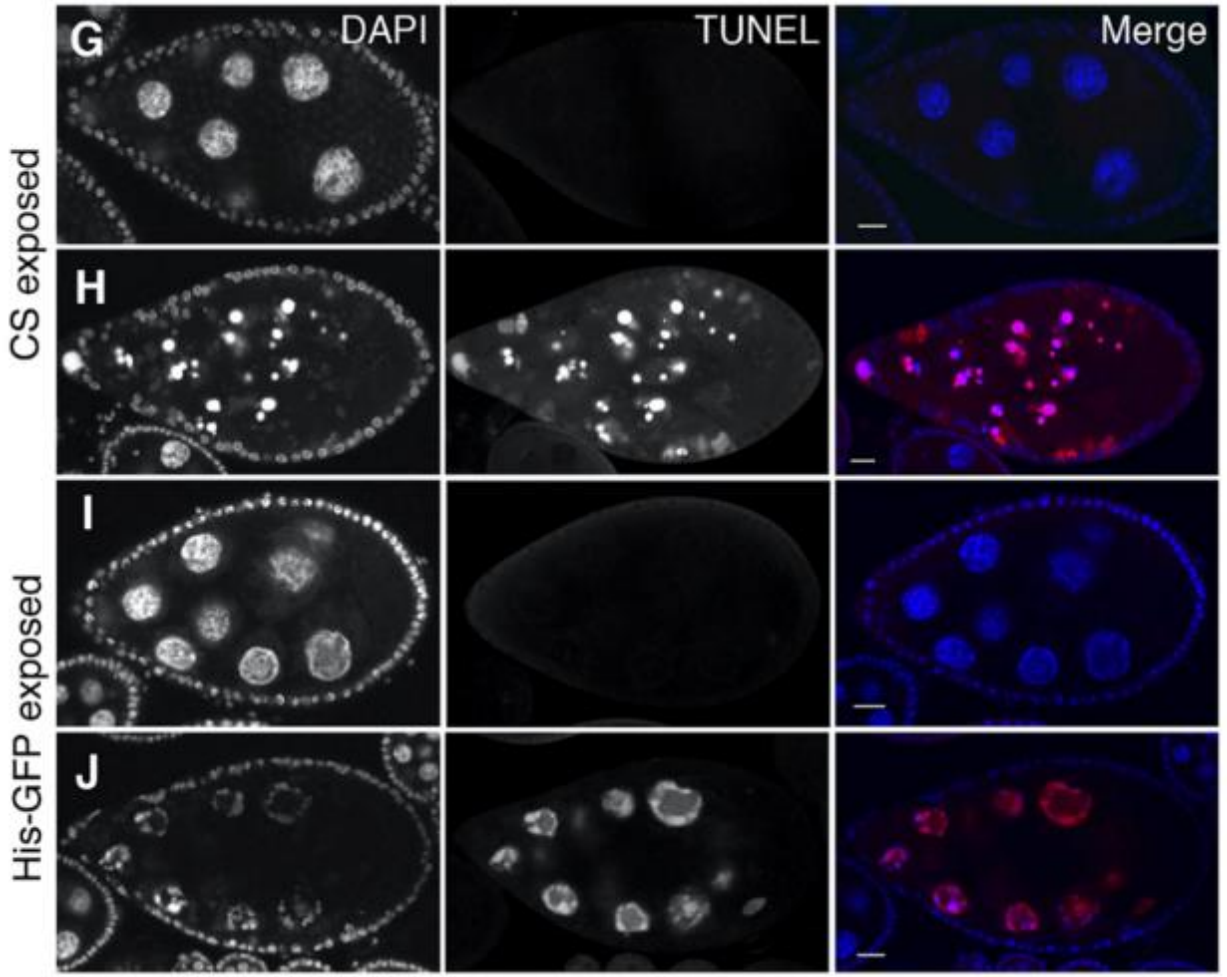




Kacsoh BZ,et al. elife.2015

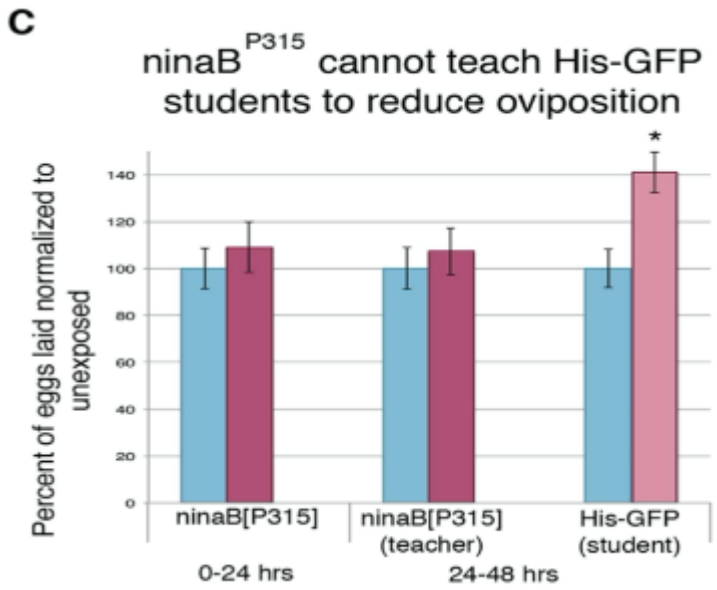
Wasp exposure induces stage-specific apoptosis in wasp-exposed teachers

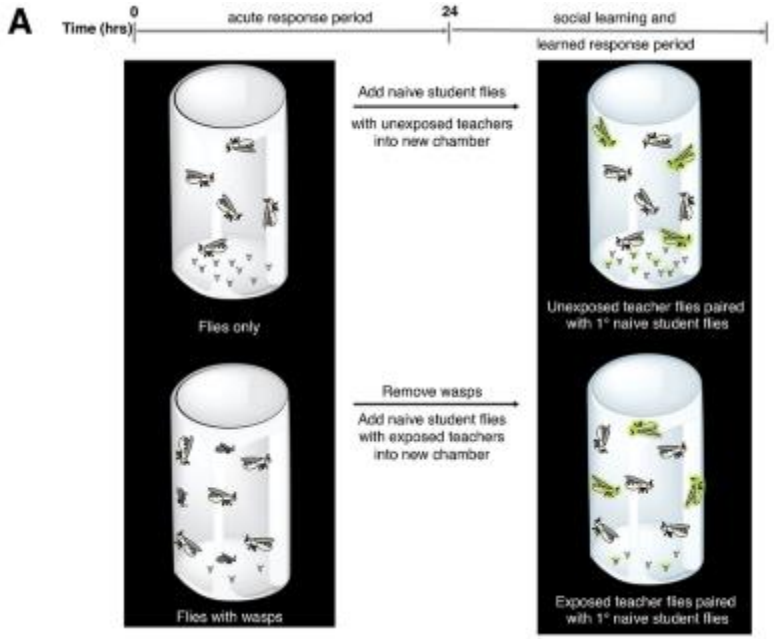


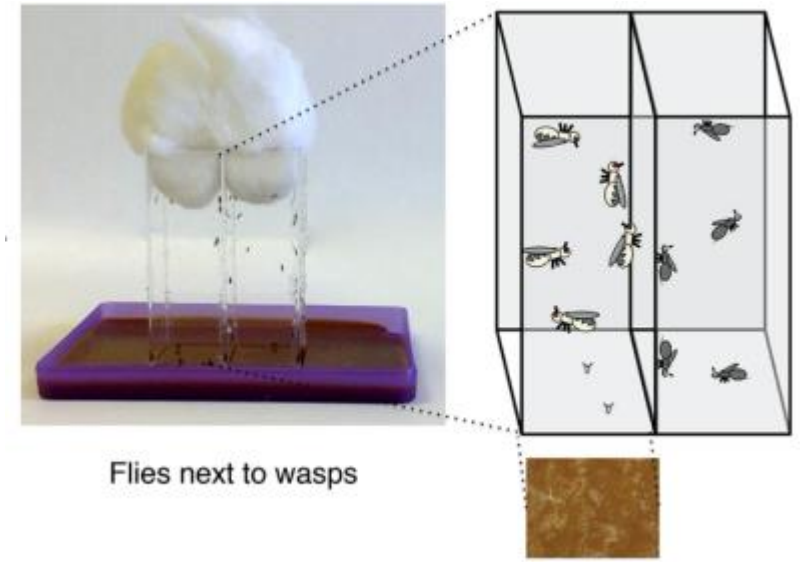


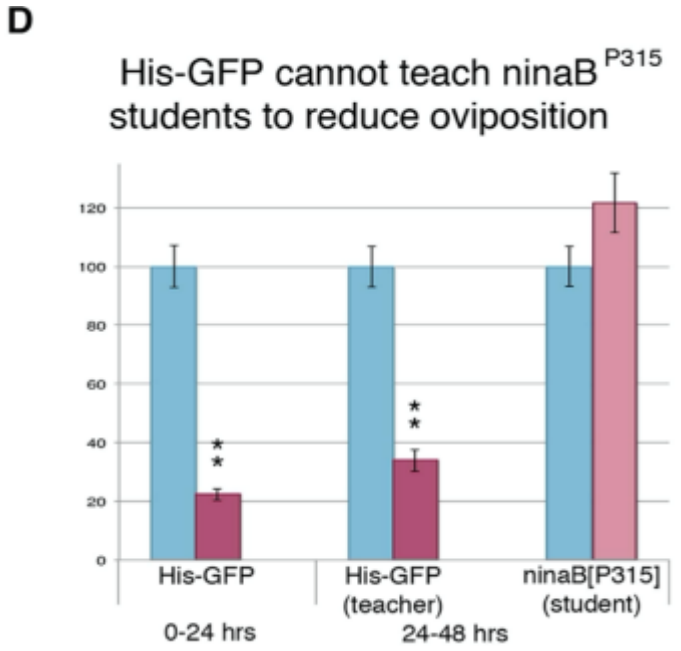
Kacsoh BZ,et al. elife.2015

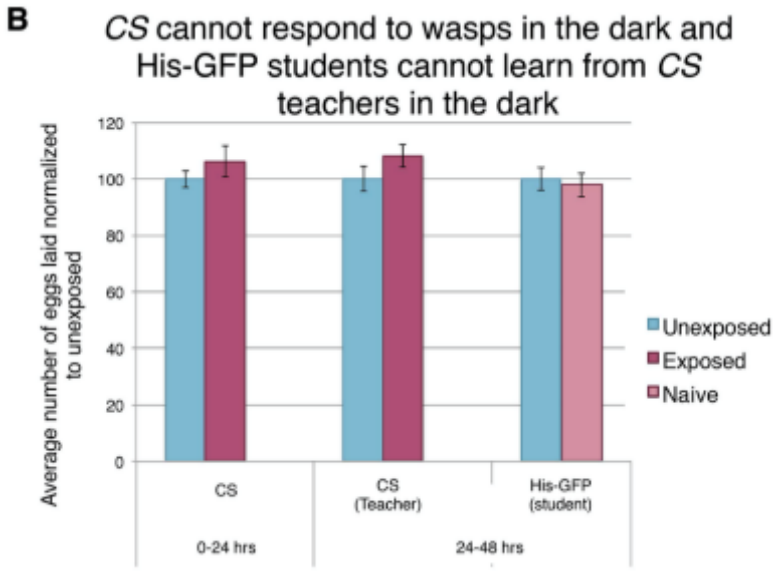
Flies respond to a visual stimulus during wasp exposure

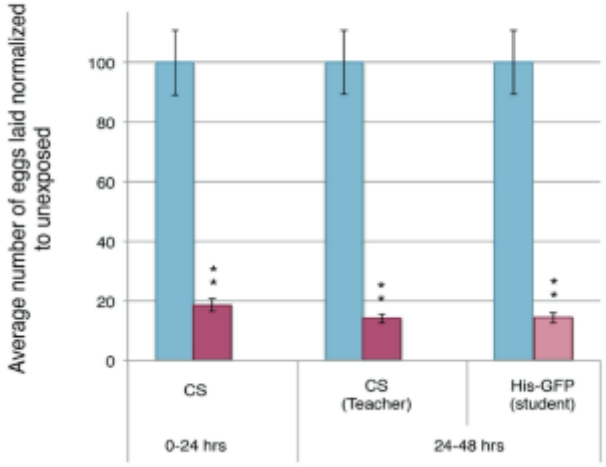






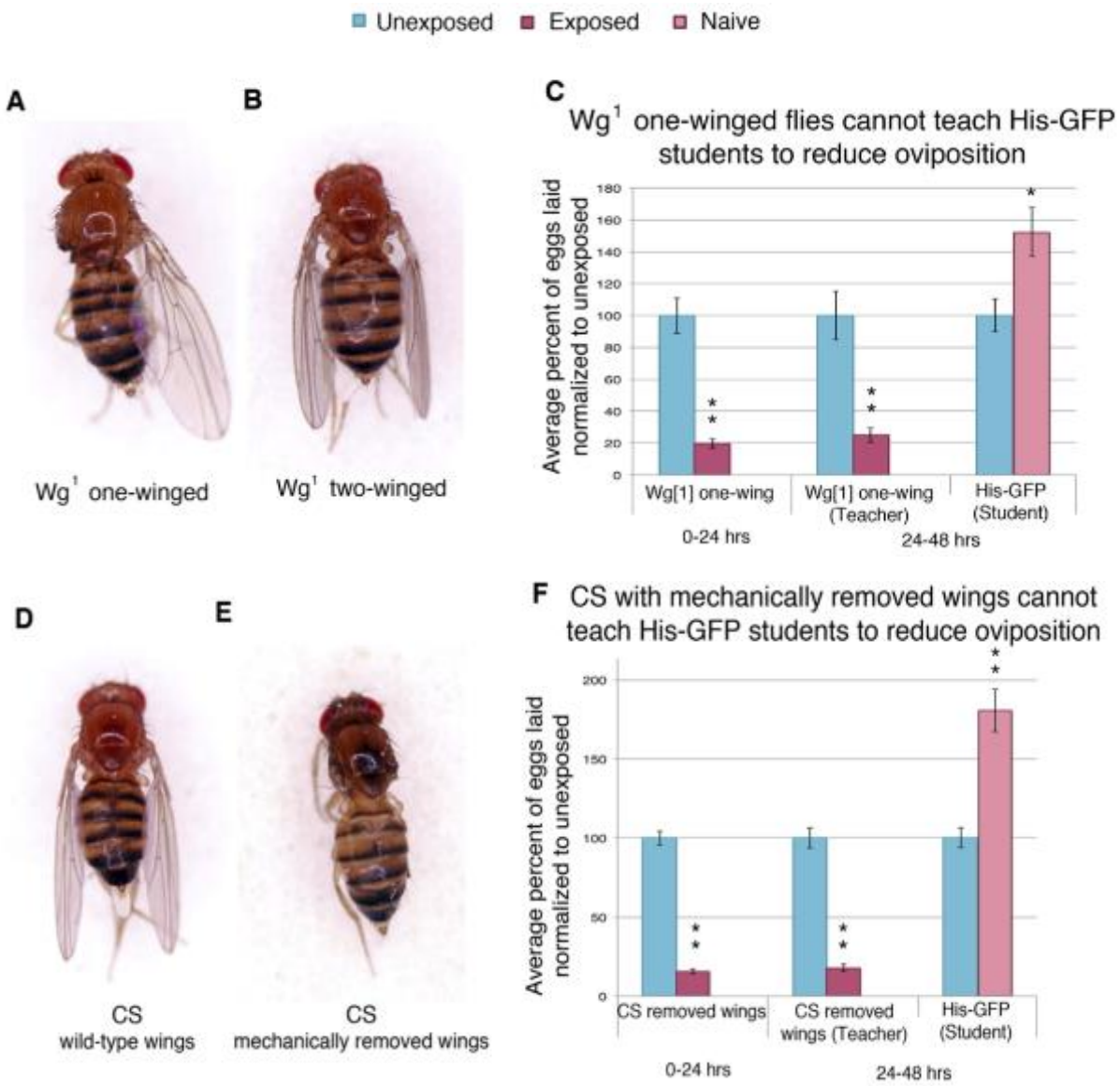


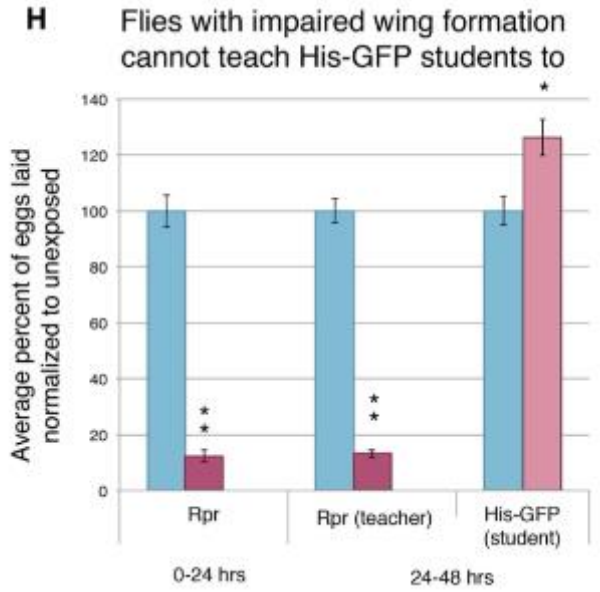




Kacsoh BZ,et al. elife.2015

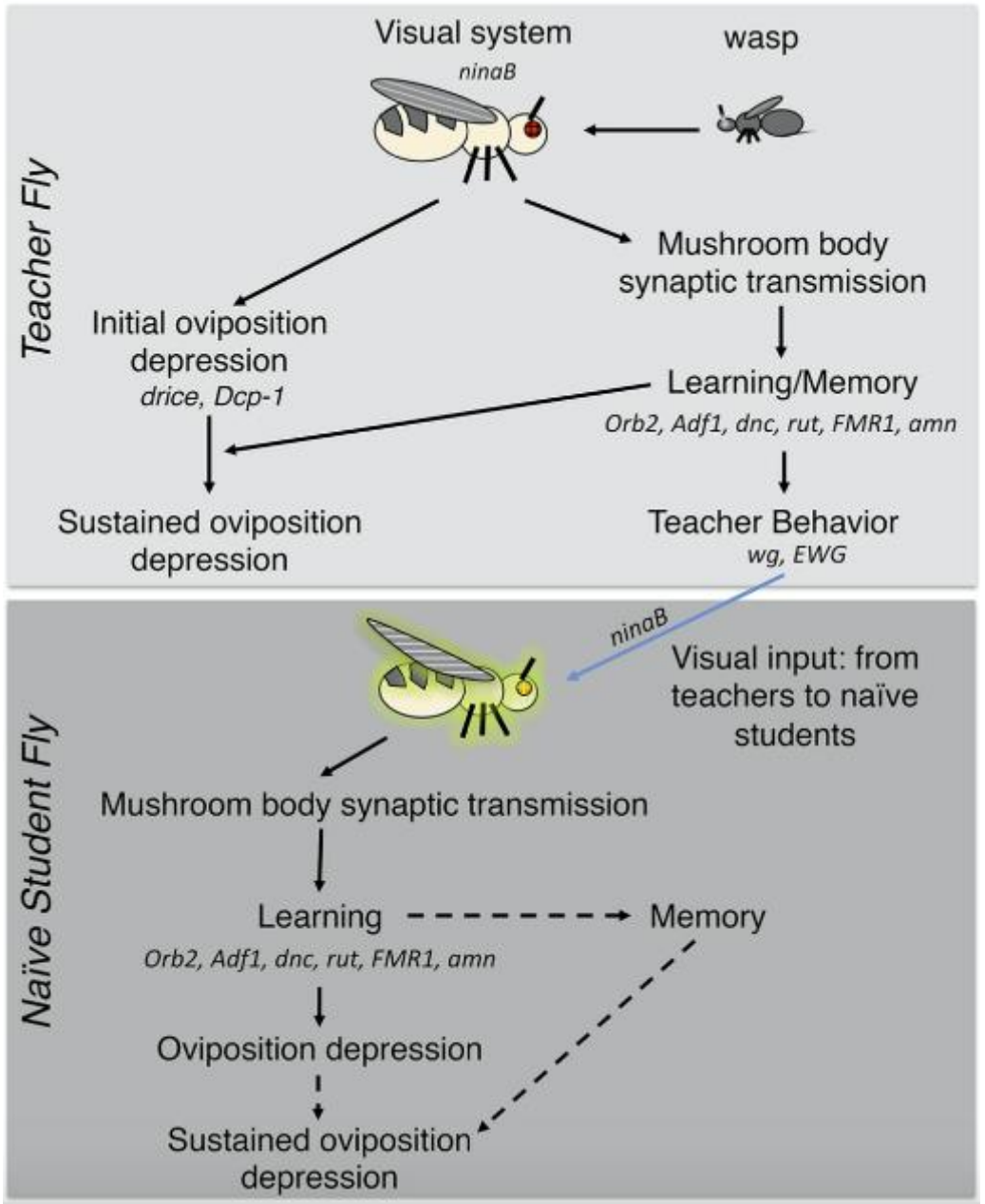
Teacher flies communicate information to naive flies using their wings





Kacsoh BZ,et al. elife.2015

Conclusion:



Kacsoh BZ,et al. elife.2015

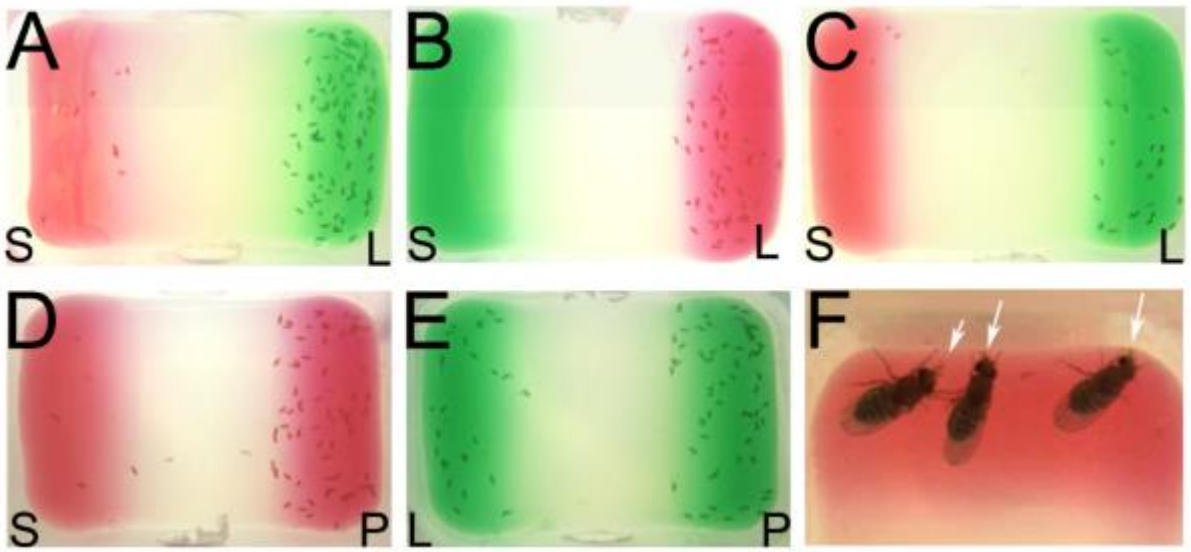
Substrate

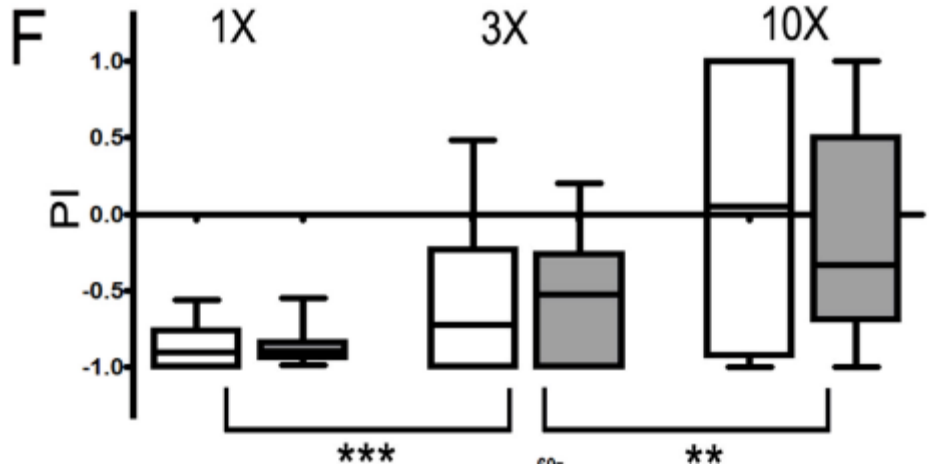
cue	receptor	sense
sugar	GR5a	Gustation
Geosmin	OR56a	Olfaction
Phenol	OR46a	Olfaction
UV light	R7 TRPA1 *(in proboscis)*	Vision Gustation

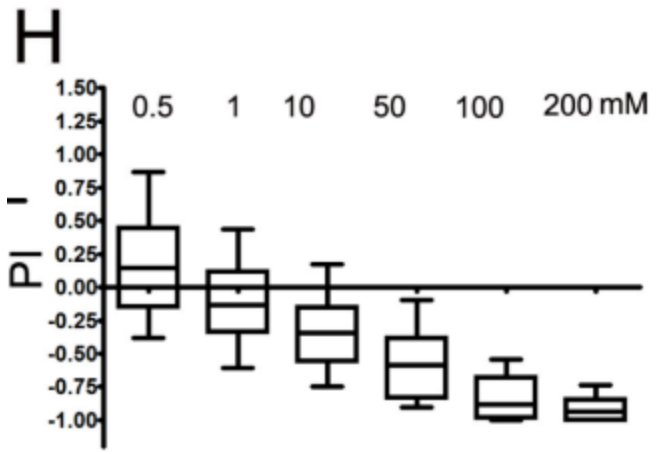
1. Sucrose is nutritious, but why do flies seldom lay their eggs on sucrose between two-choice chambers?

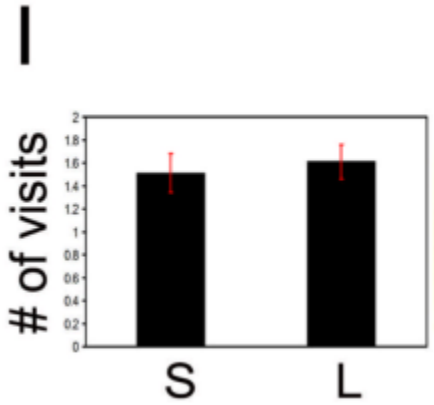
2. Drosophila are generally phototatic toward UV, what impels them laying eggs away from UV?

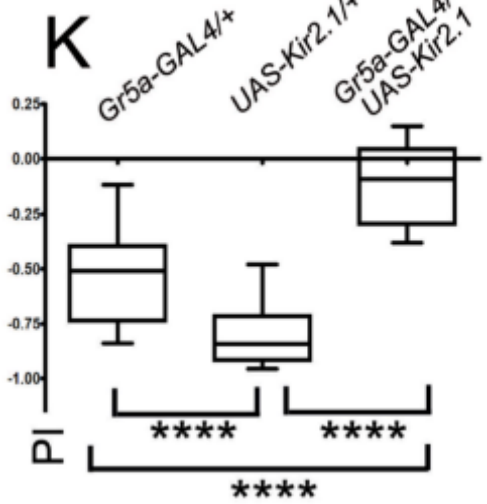
Drosophila avoid laying eggs on media containing high level of sucrose









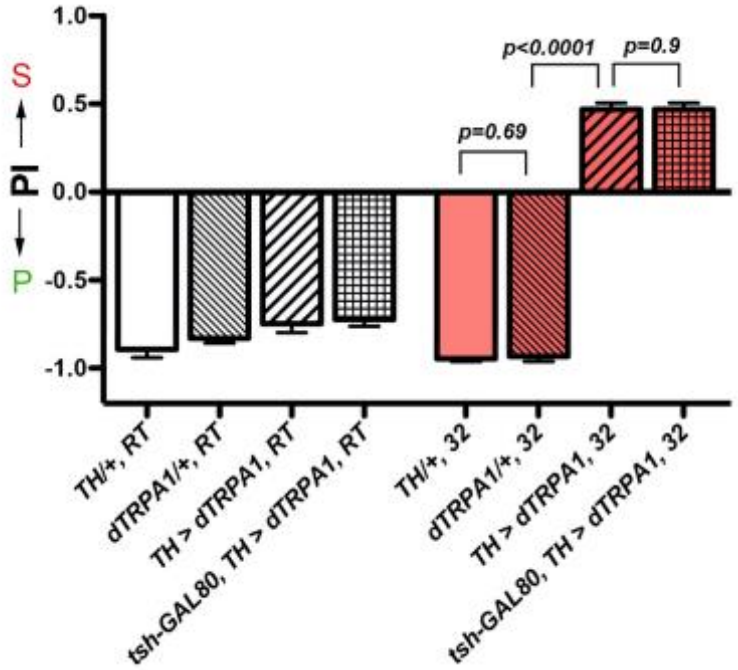


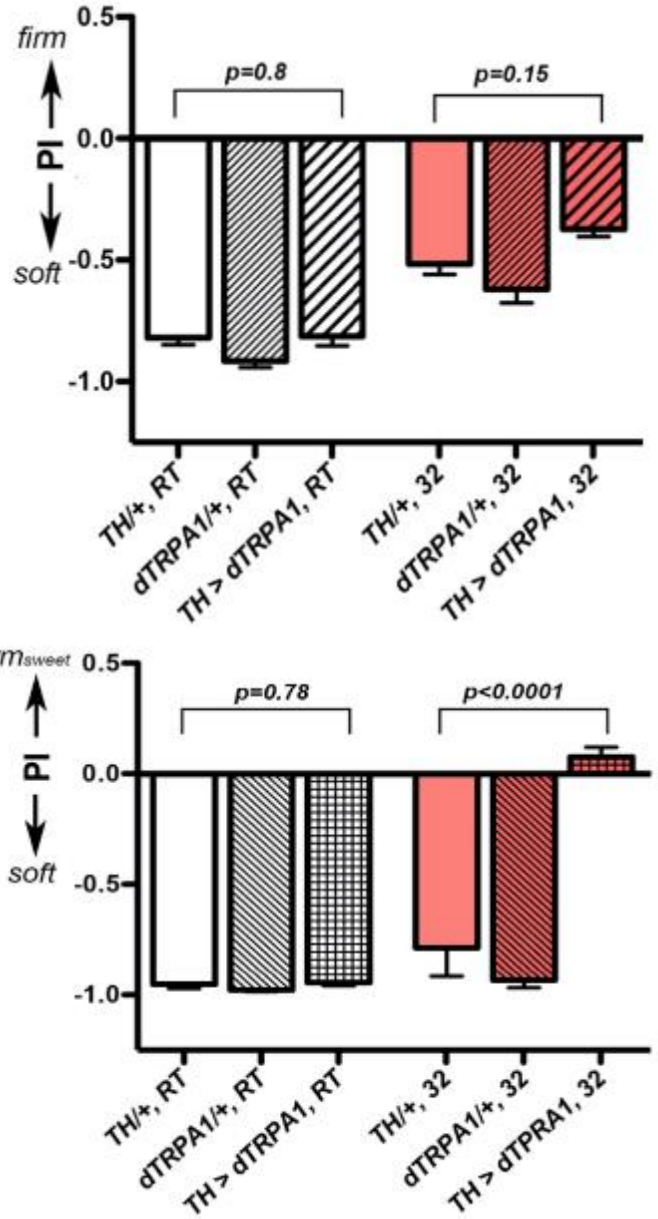
"desirability" of egg-laying sites

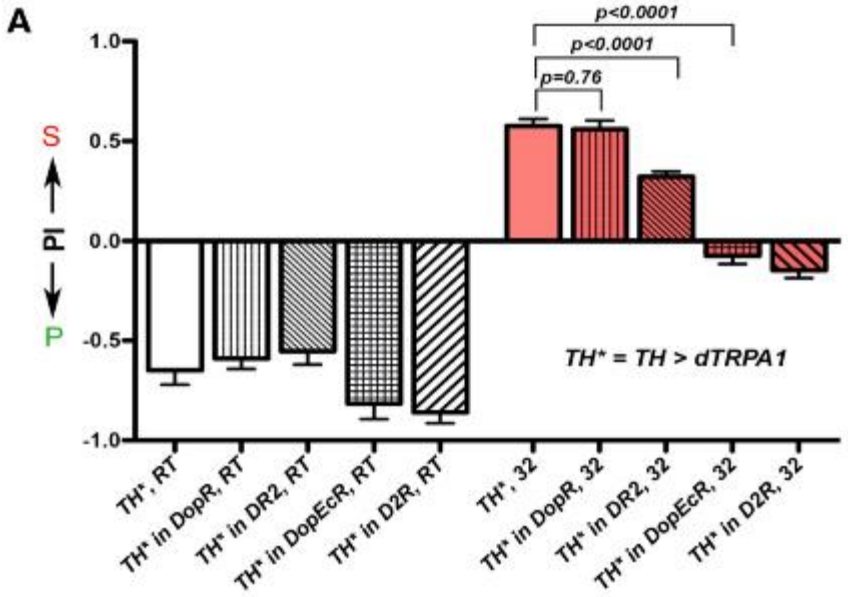
"effort it takes to locate eggs"

Yang CH, et al. Science. 2008

TH neurons promote the value of sucrose-containing substrates for egg laying

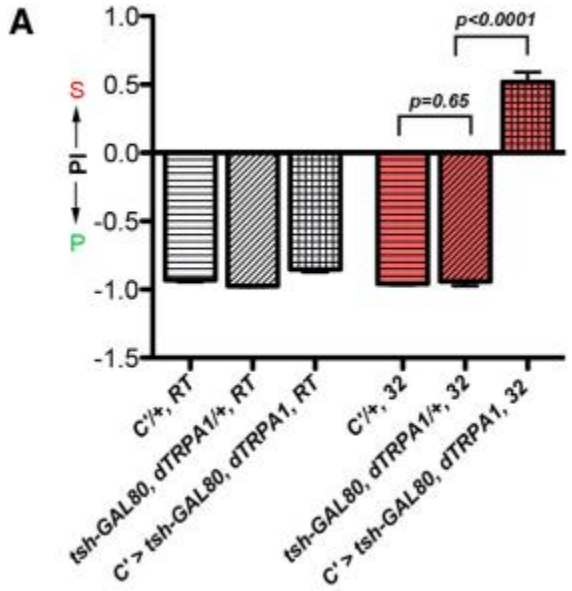


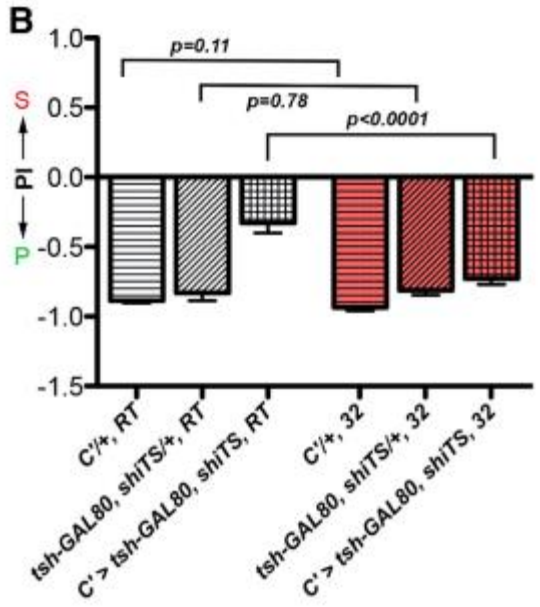


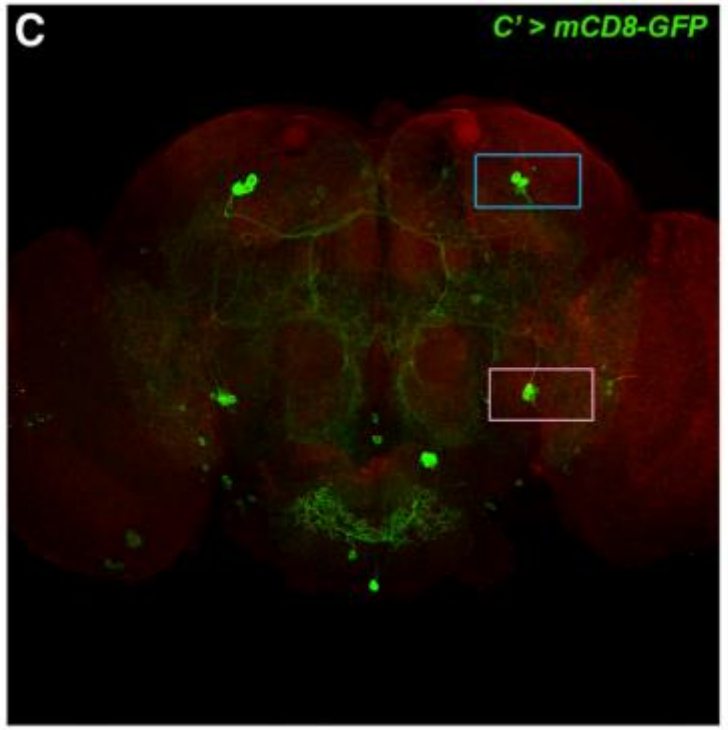


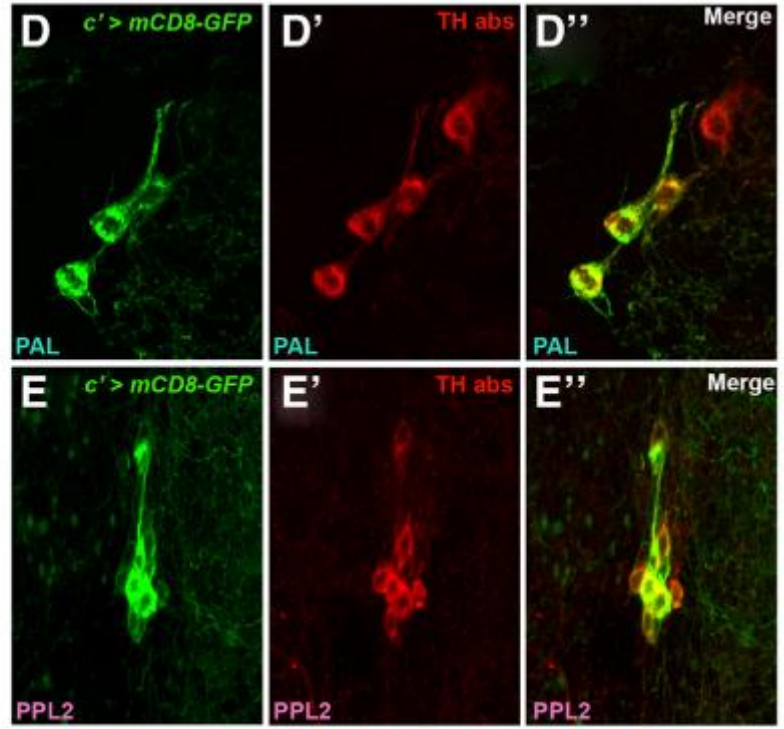
Yang CH, et al. The Journal of Neuroscience.2015

DA neurons in the PAL and the PPL2 are candidates for promoting sucrose preference



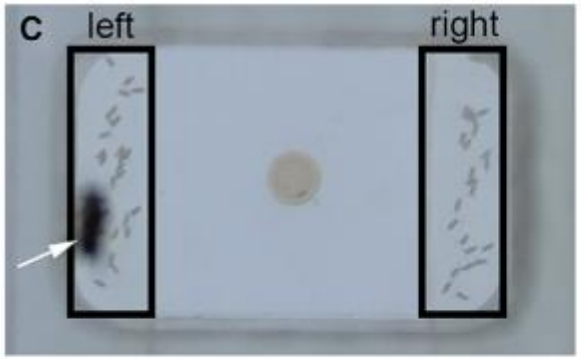


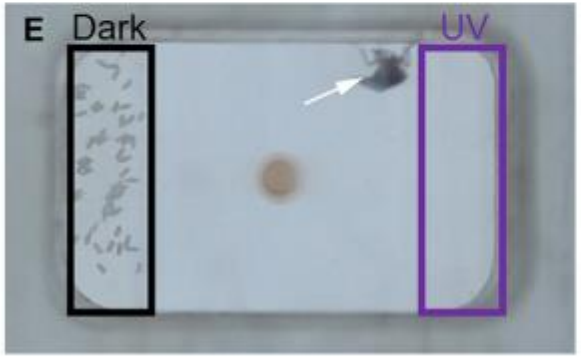


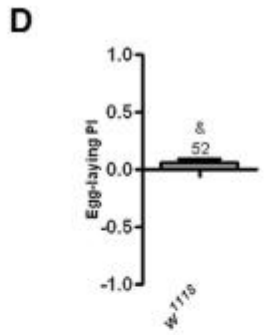


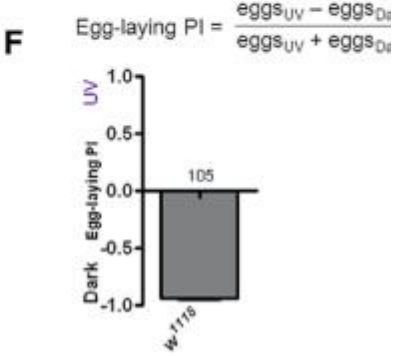
Yang CH, et al. The Journal of Neuroscience.2015

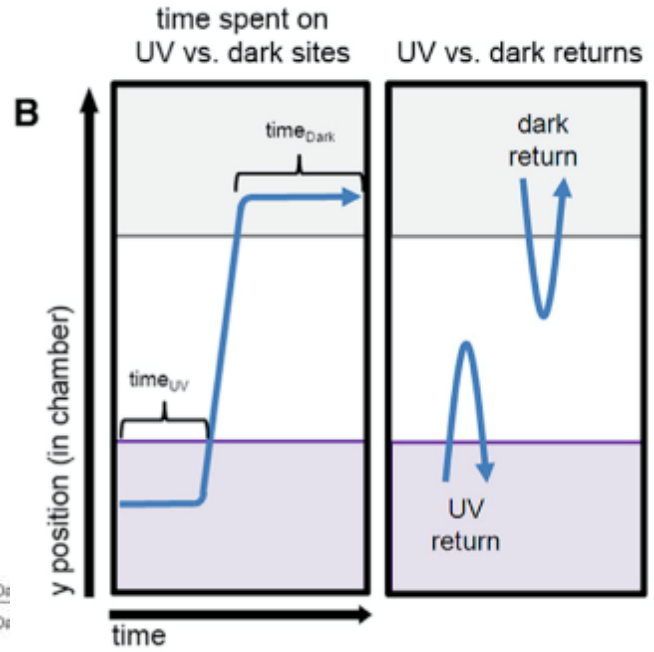
Egg-laying demand induces movement aversion of UV

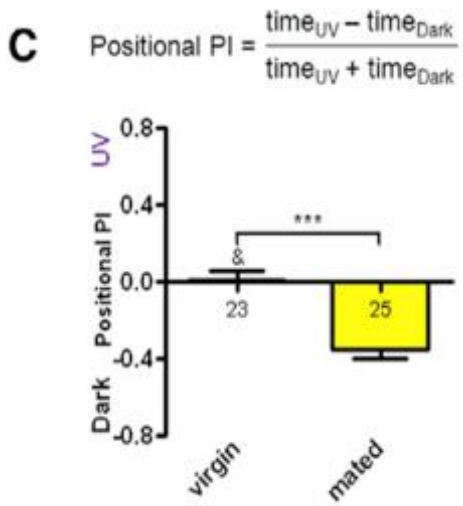


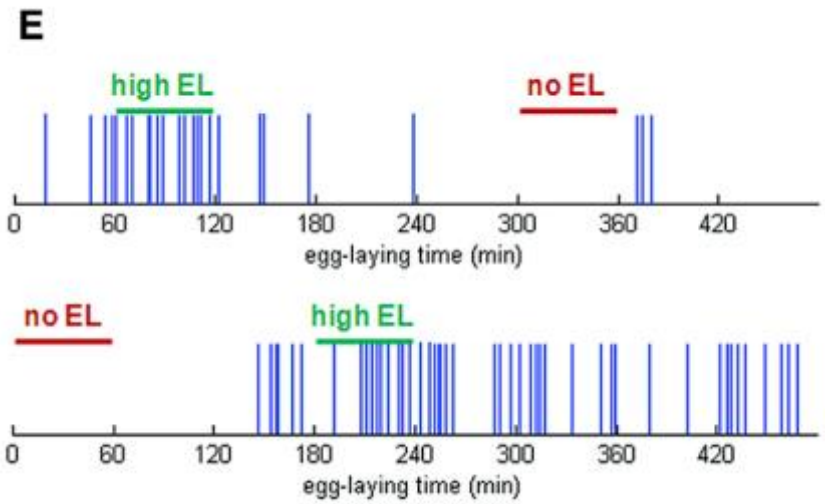


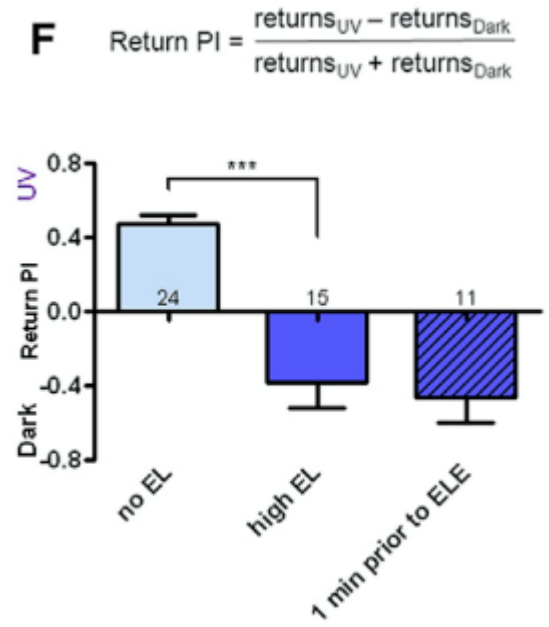






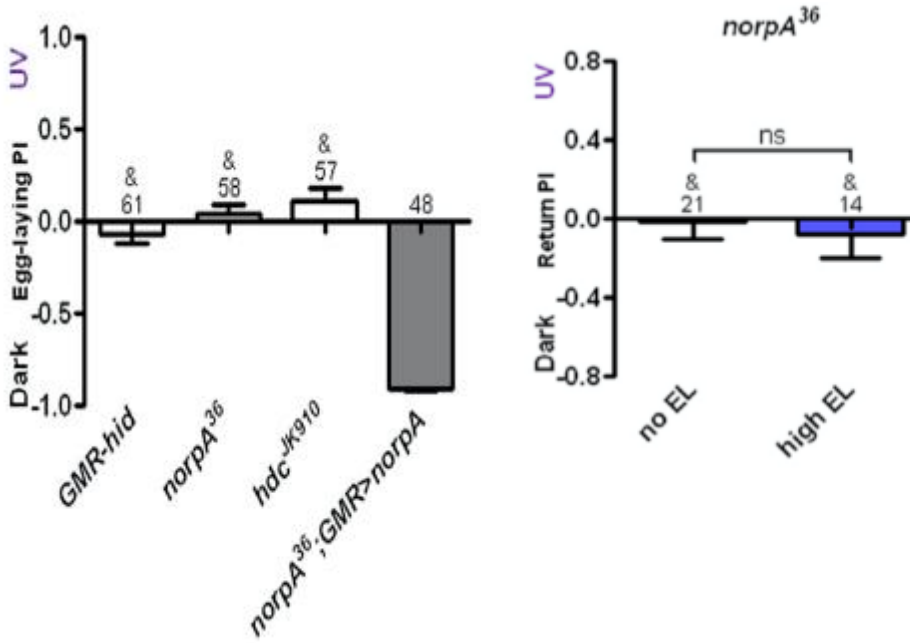






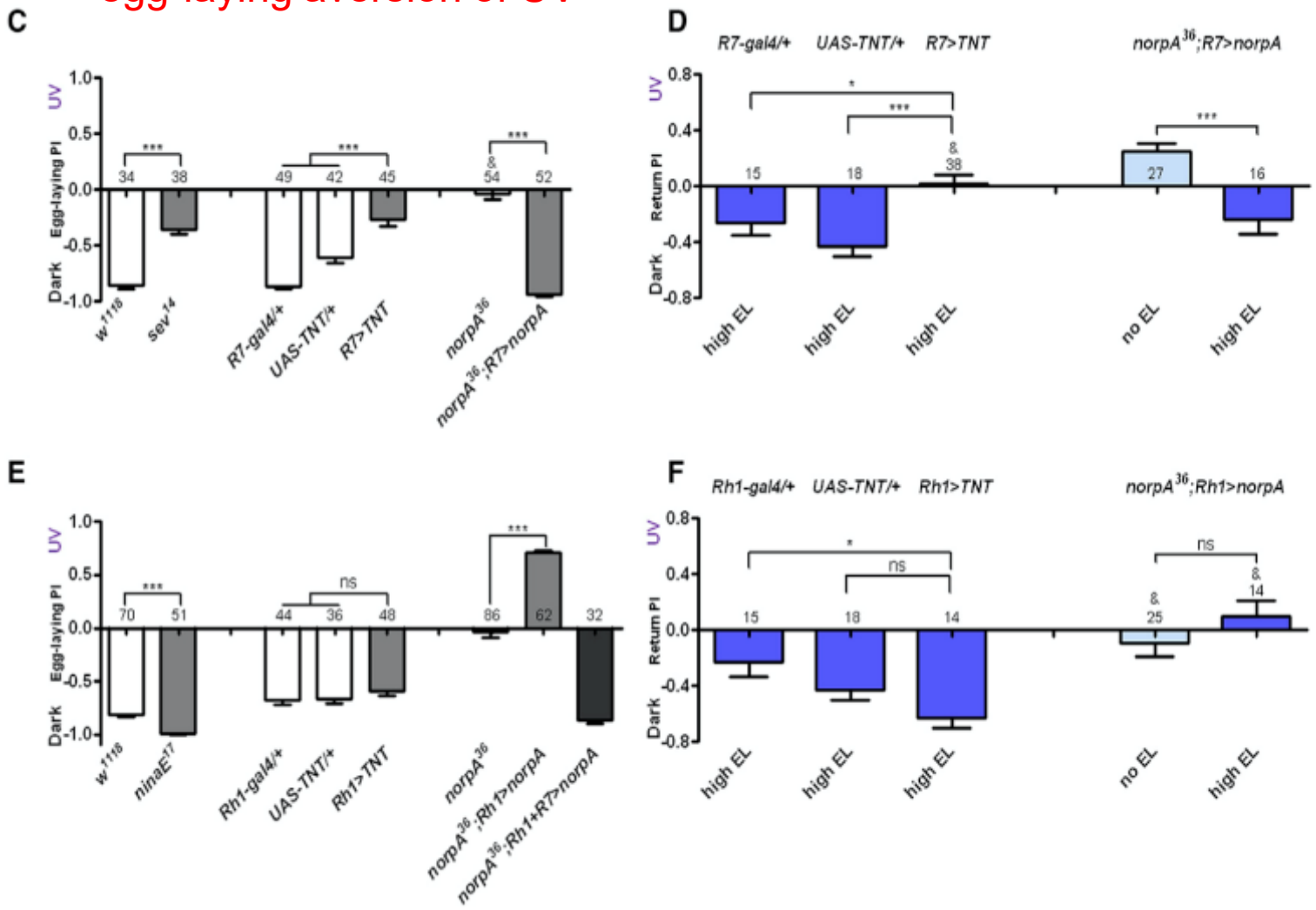
Zhu EY, et al. Current Biology. 2014

R7 Photoreceptors Are Required for Egg-Laying and Movement Aversion of UV



“egg-laying aversion of UV”

“movement aversion of UV”



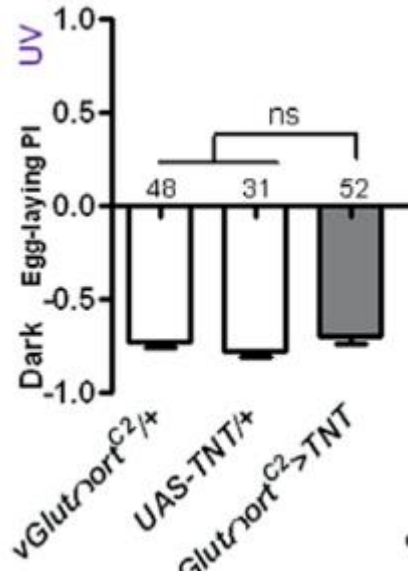
GMR-hid: lacking physical eyes

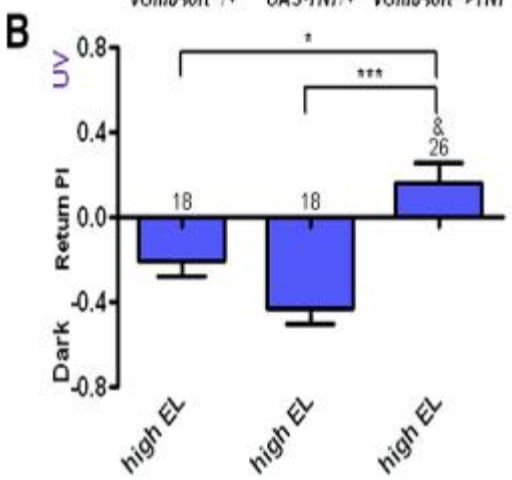
norpA^{36}: the phototransduction molecule phospholipase C

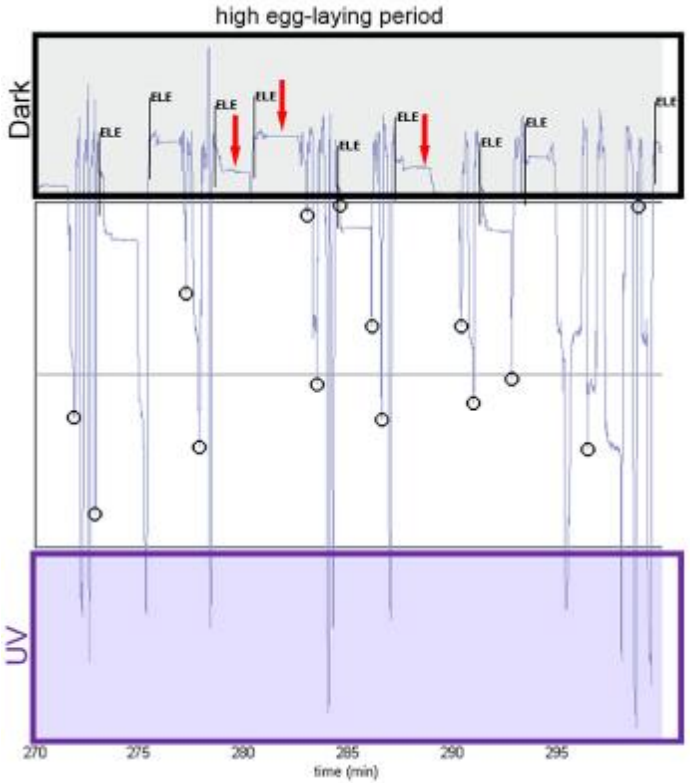
hdcJK^{910}: the ability to produce histamine

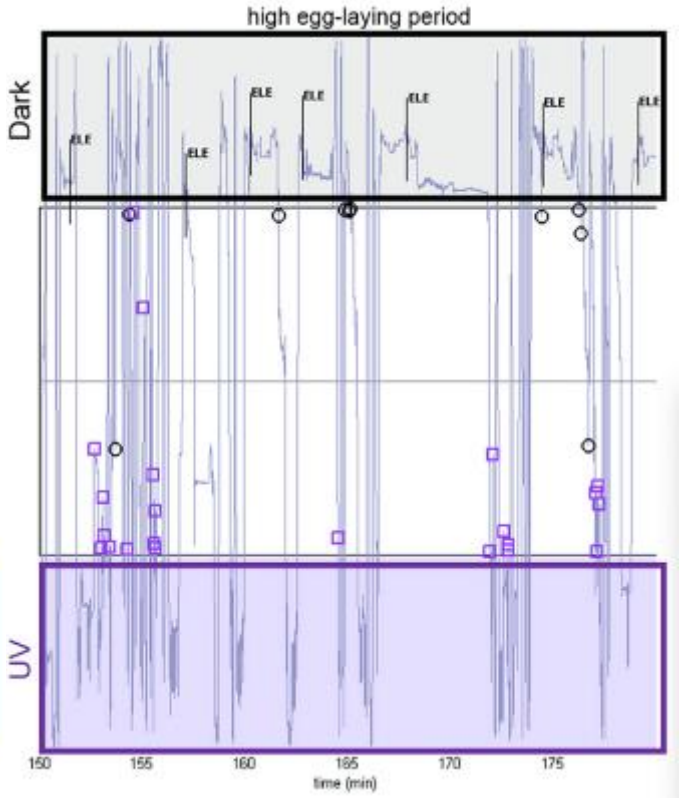
Zhu EY, et al. Current Biology. 2014

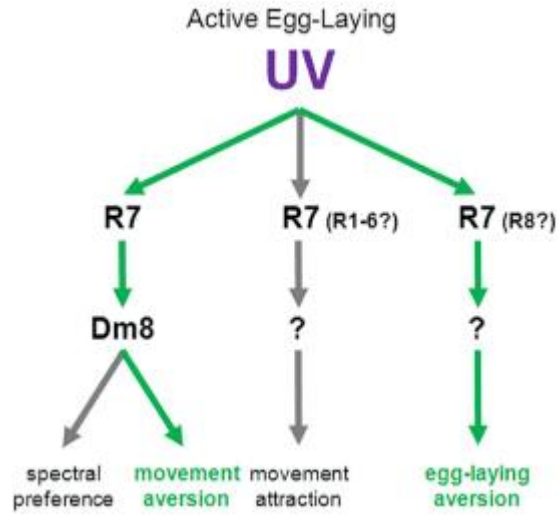
Dm8 Neurons Are Required for Movement Aversion of UV, but Not Egg-Laying Aversion of UV





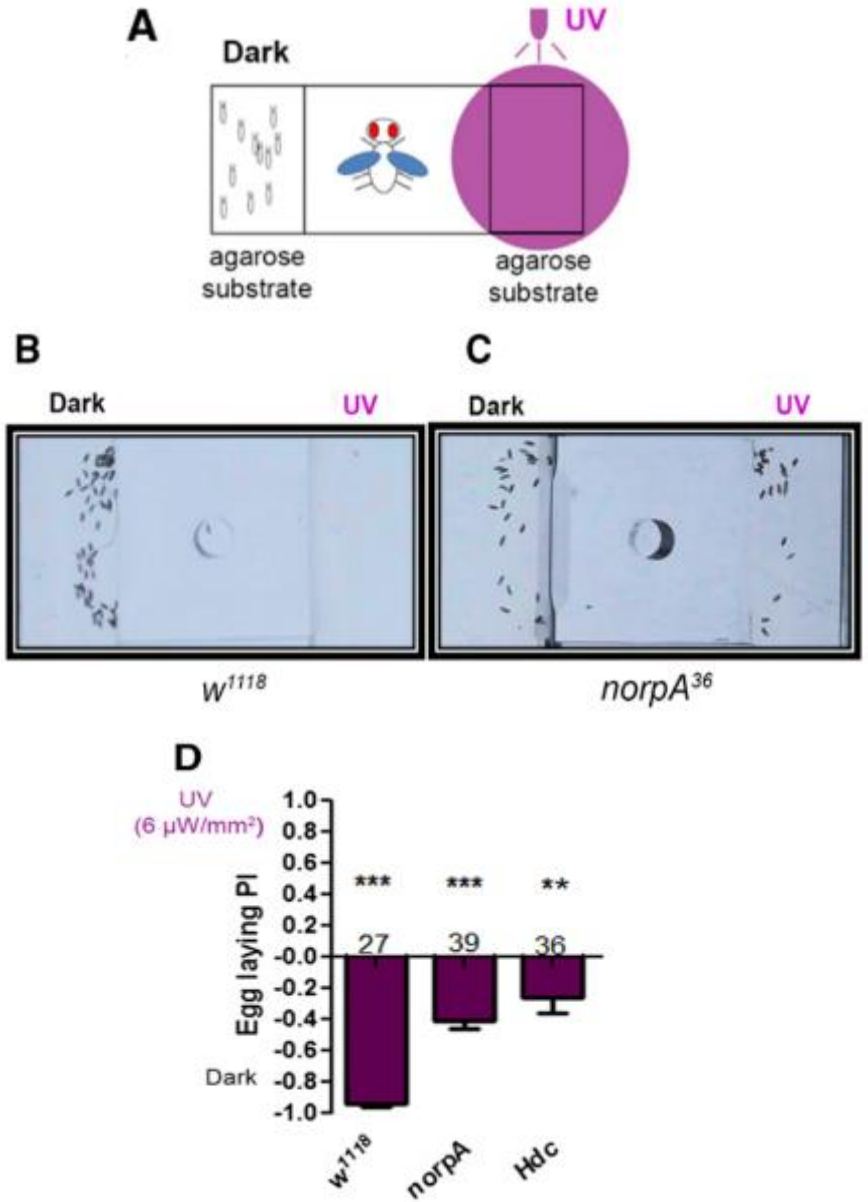


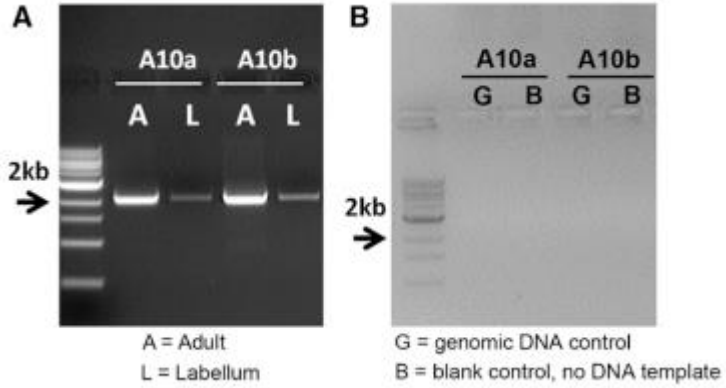


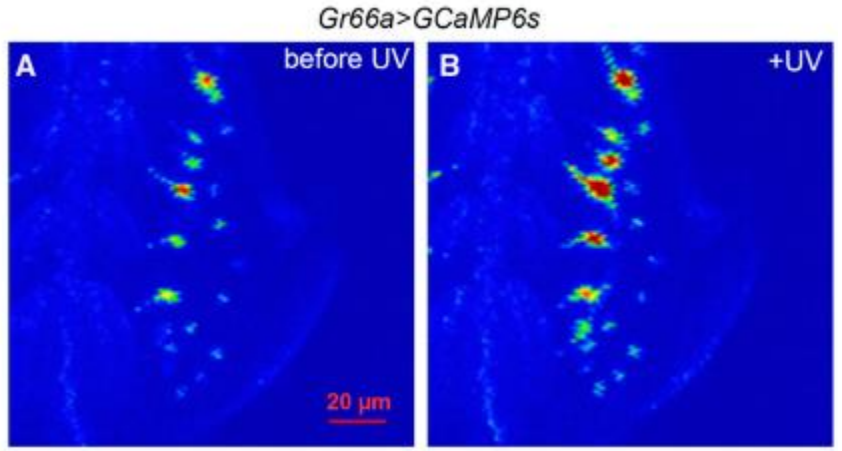


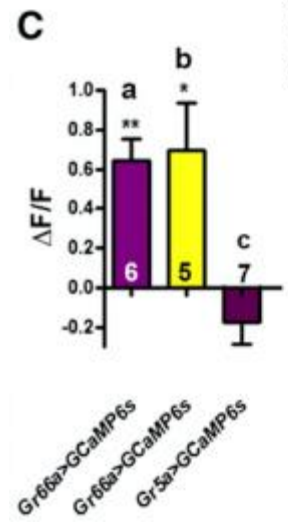
Zhu EY, et al. Current Biology. 2014

H2O2/UV-sensitive dTRPA1 isoforms are expressed in the Gr66a-expressing neurons



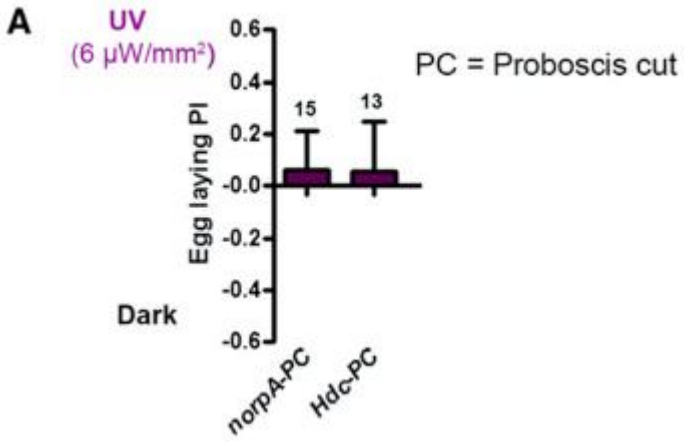


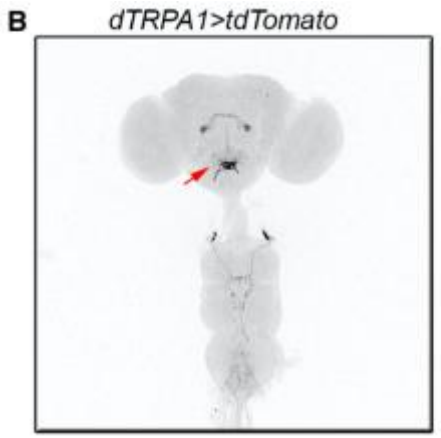


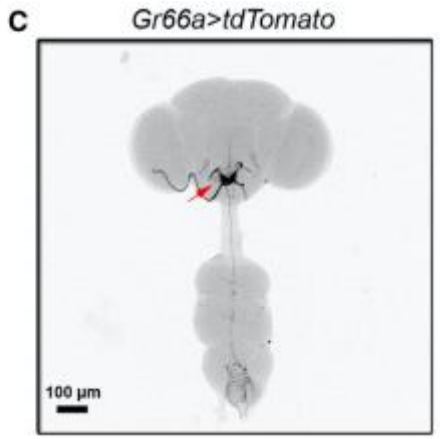


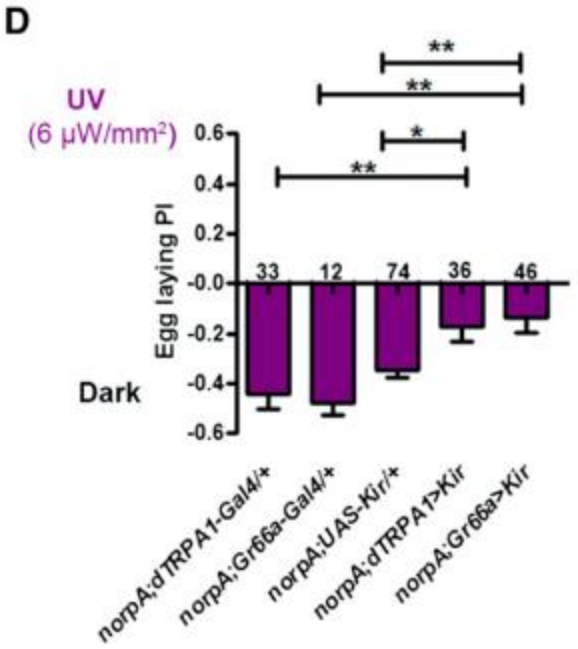
Guntur AR, et al. Genetics. 2017

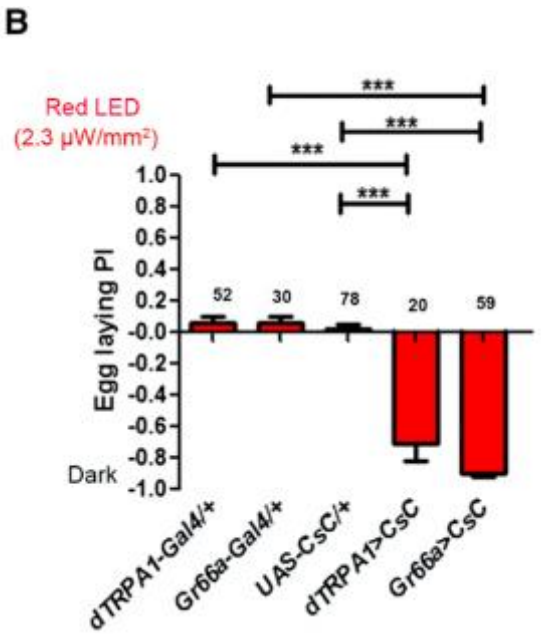
Gr66a/dTRPA1-expressing neurons on the proboscis promote vision-independent egg-laying avoidance of UV

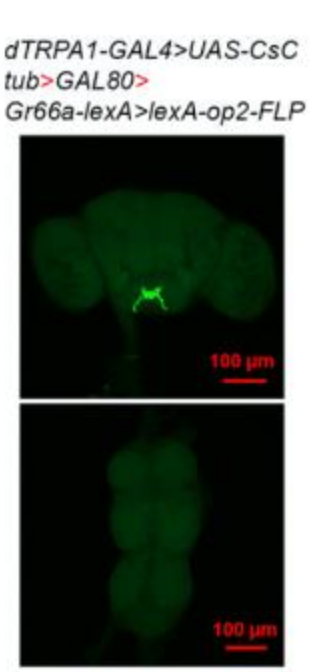


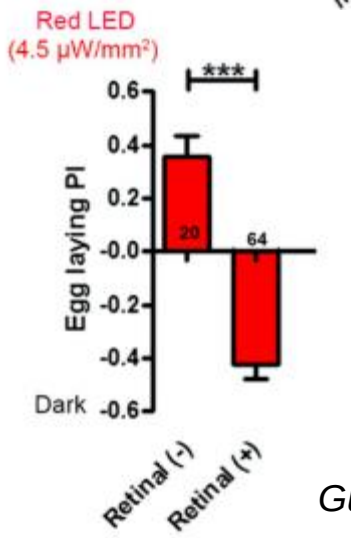






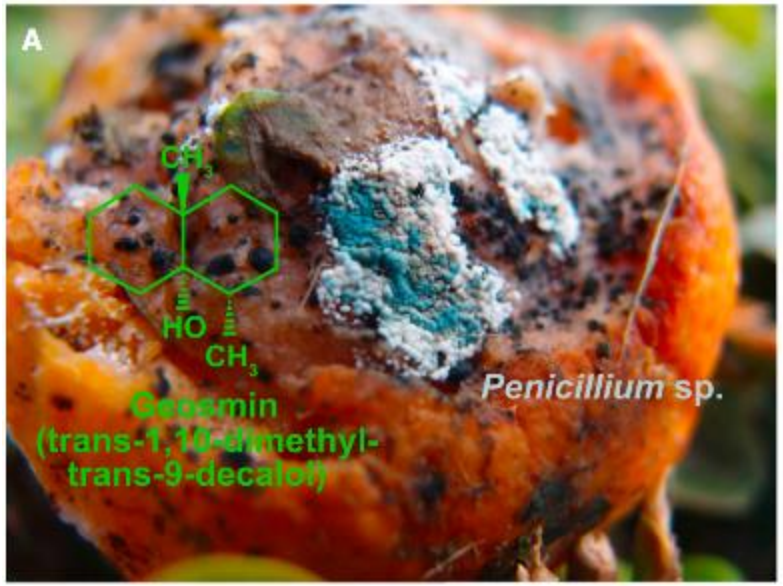


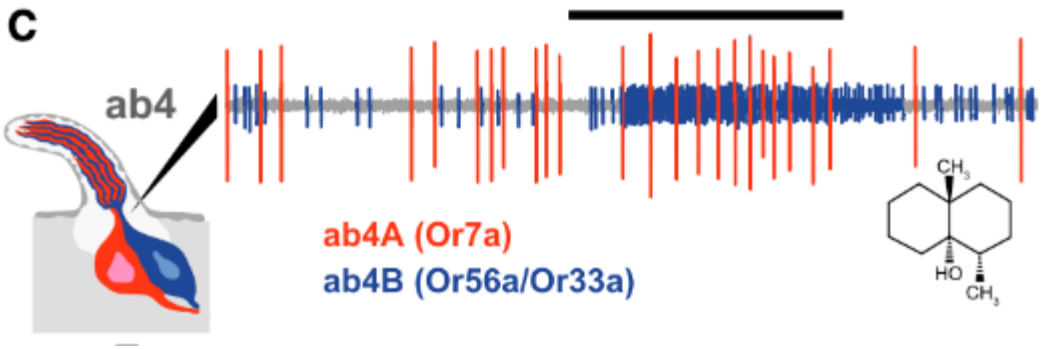




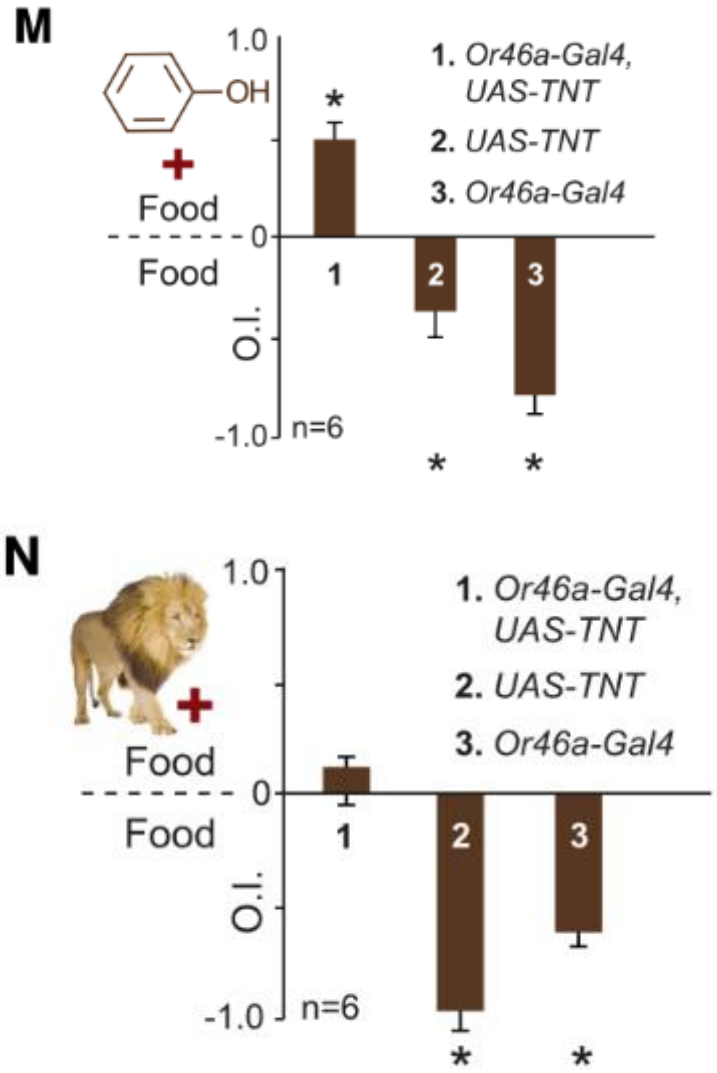
Guntur AR, et al. Genetics. 2017

Functional olfactory circuits participate in choice of flies oviposition site





Stensmyr MC, et al. Cell. 2012



Mansourian S, et al. Current Biology. 2016

Conclusion：

- The value of a sucrose substrate can be adjusted by the activities of a **specific DA circuit**.

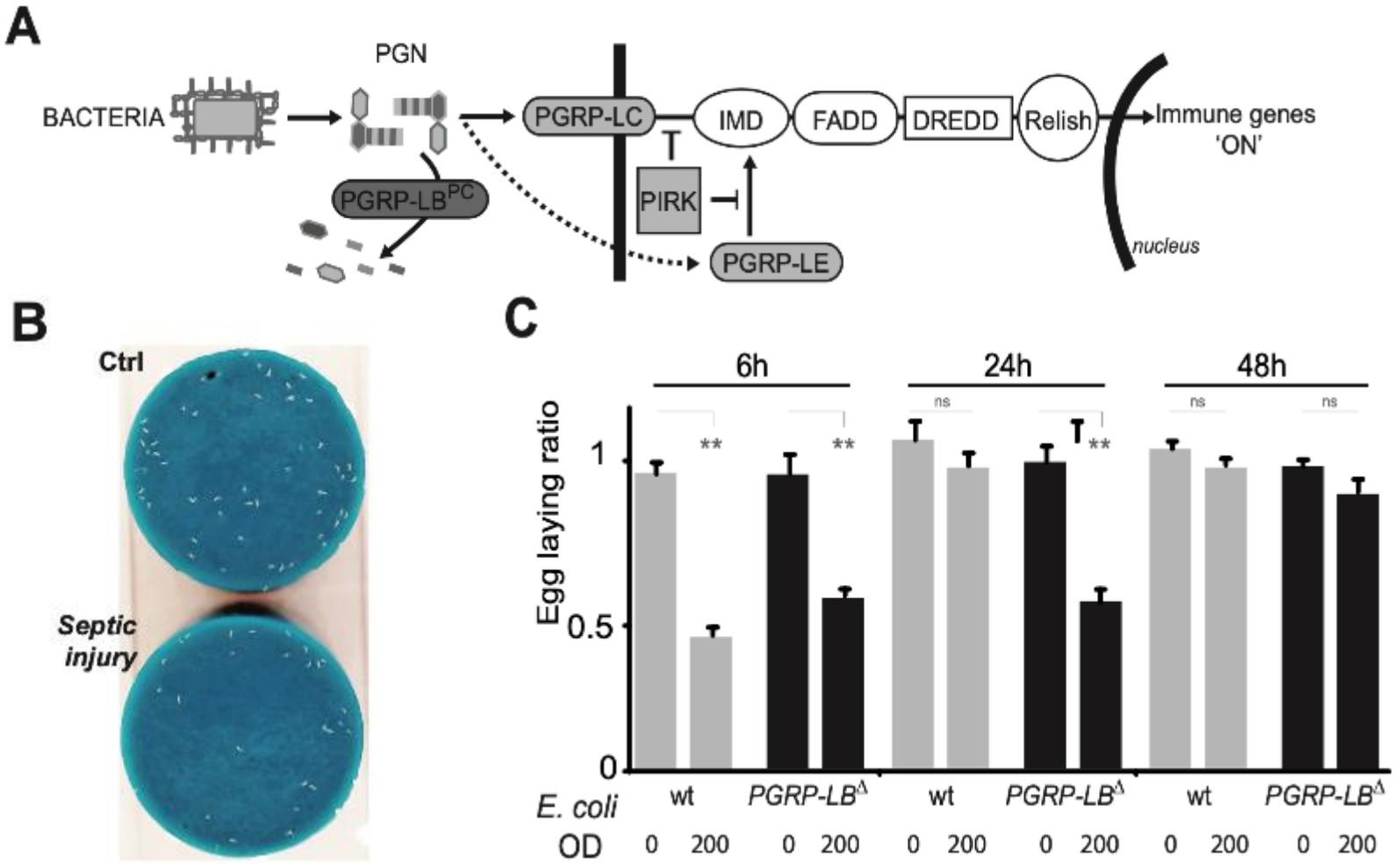
“Once the sucrose substrate is determined to be the lesser valued option, females execute their decision to reject this inferior substrate not by stopping their visits to it, but by **actively suppressing their egg-laying motor** program during their visits. ”

Adult Drosophila possess at least two sensory systems for detecting **UV**.

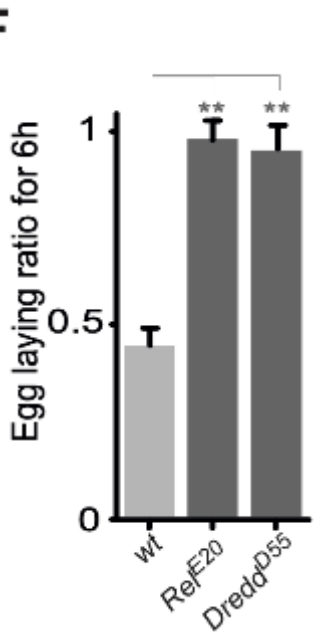
- Egg-laying and movement aversion of UV are under separate circuit control downstream of R7s. Only movement aversion of UV requires Dm8s neuron.
- vision-independent UV avoidance is mediated by a group of bitter-sensing neurons on the proboscis that express dTRPA1 isoforms.

Internal

Bacteria infection decreases fly oviposition

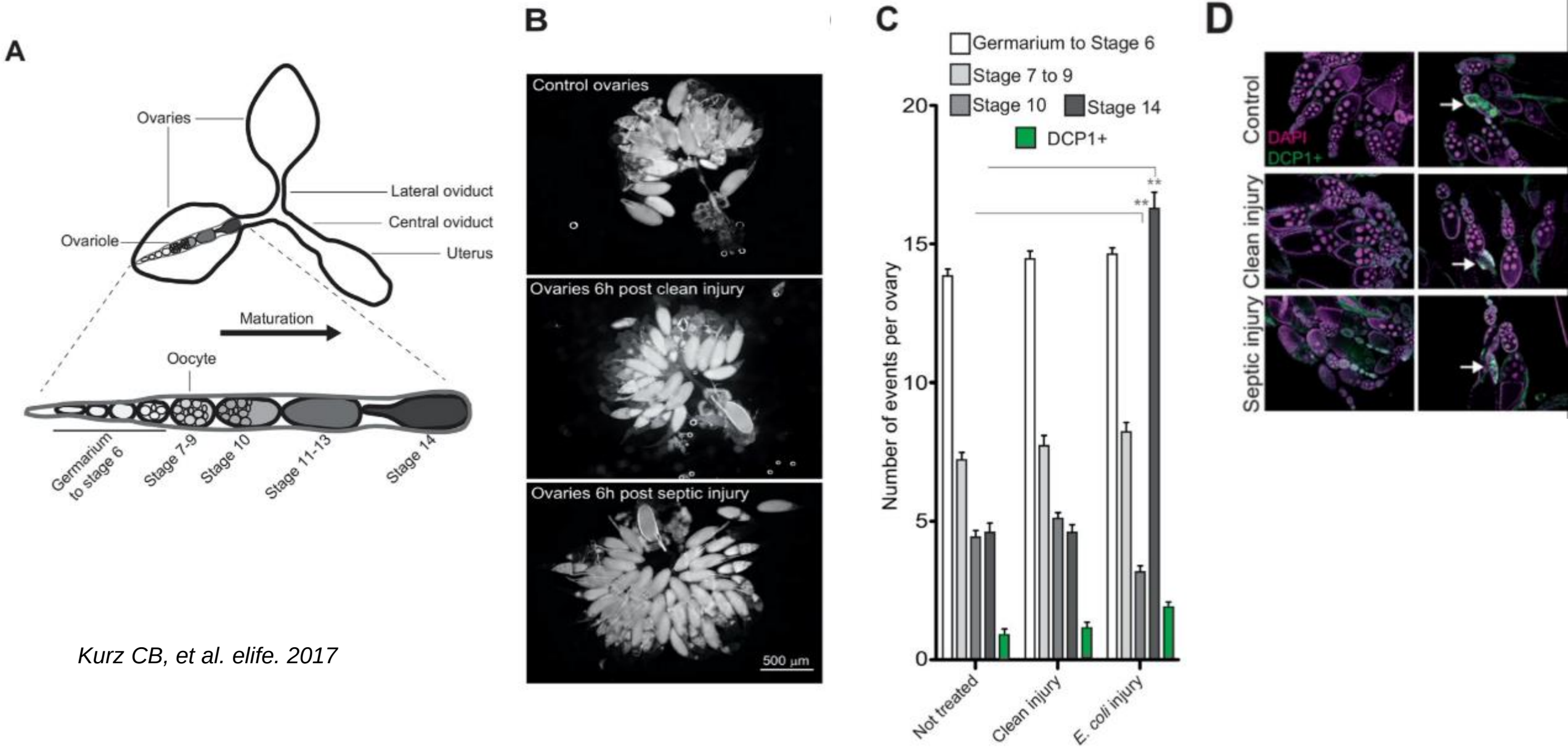


"NF-kB pathway"



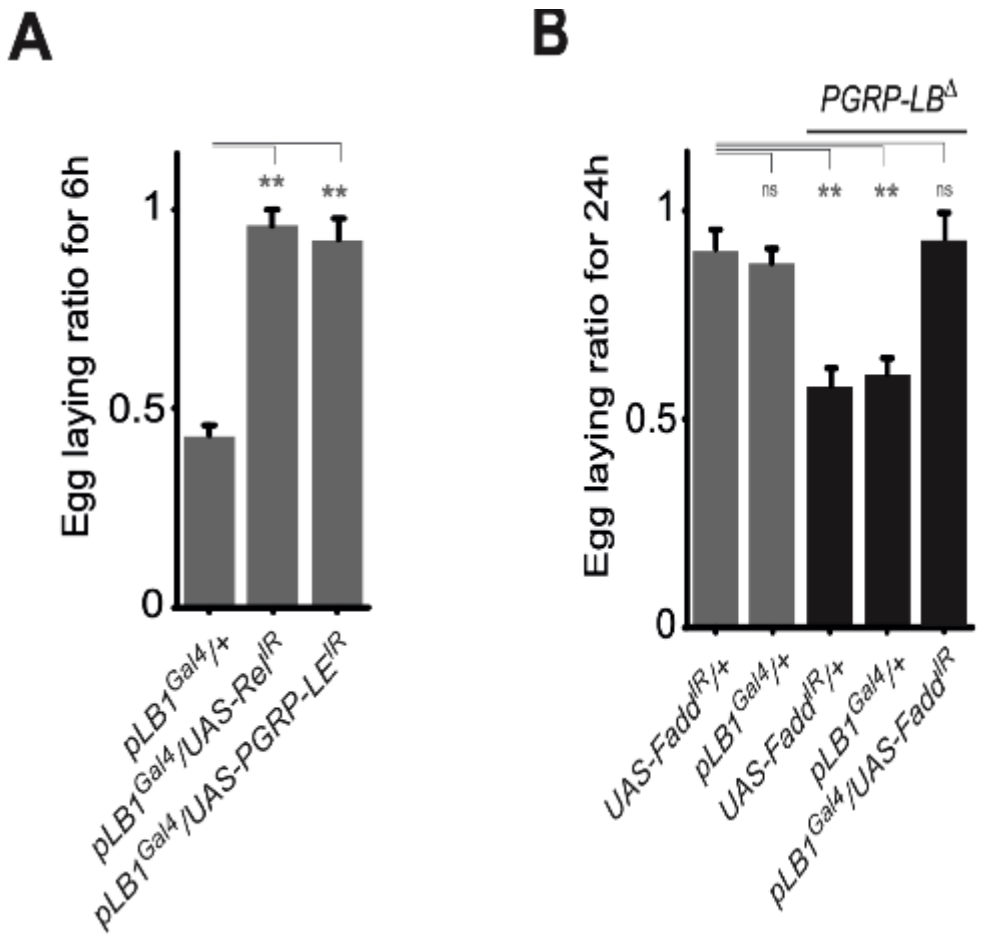
Kurz CB, et al. elife. 2017

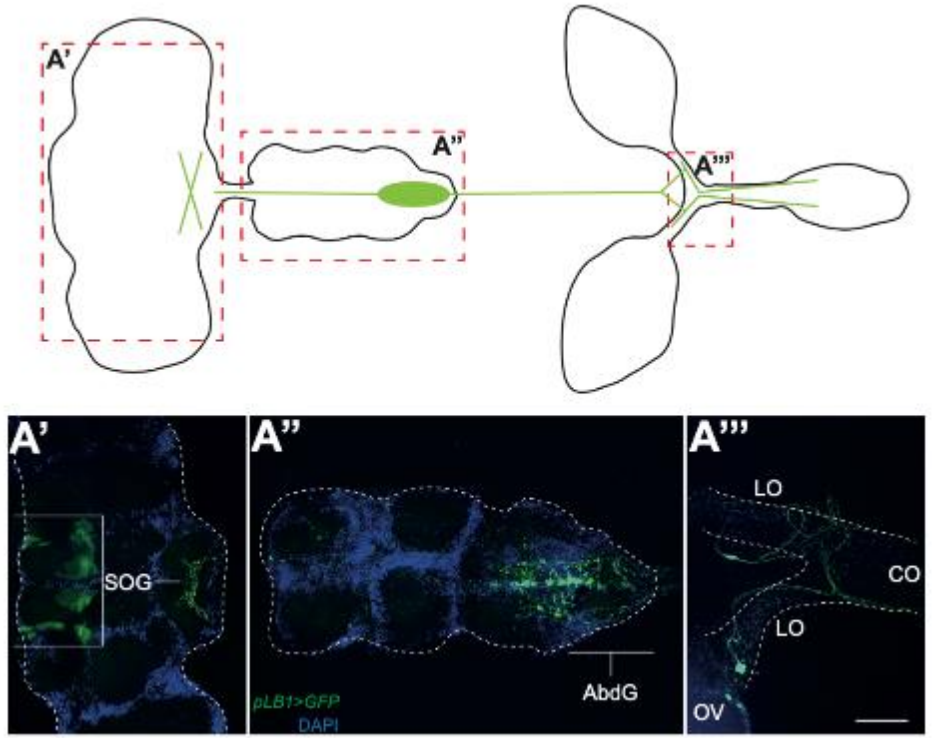
Bacteria infection induces a temporary retention of oocytes within ovaries



Kurz CB, et al. elife. 2017

A functional NF-kB pathway is required in pLB1 cells to modulate egg-laying post-infection

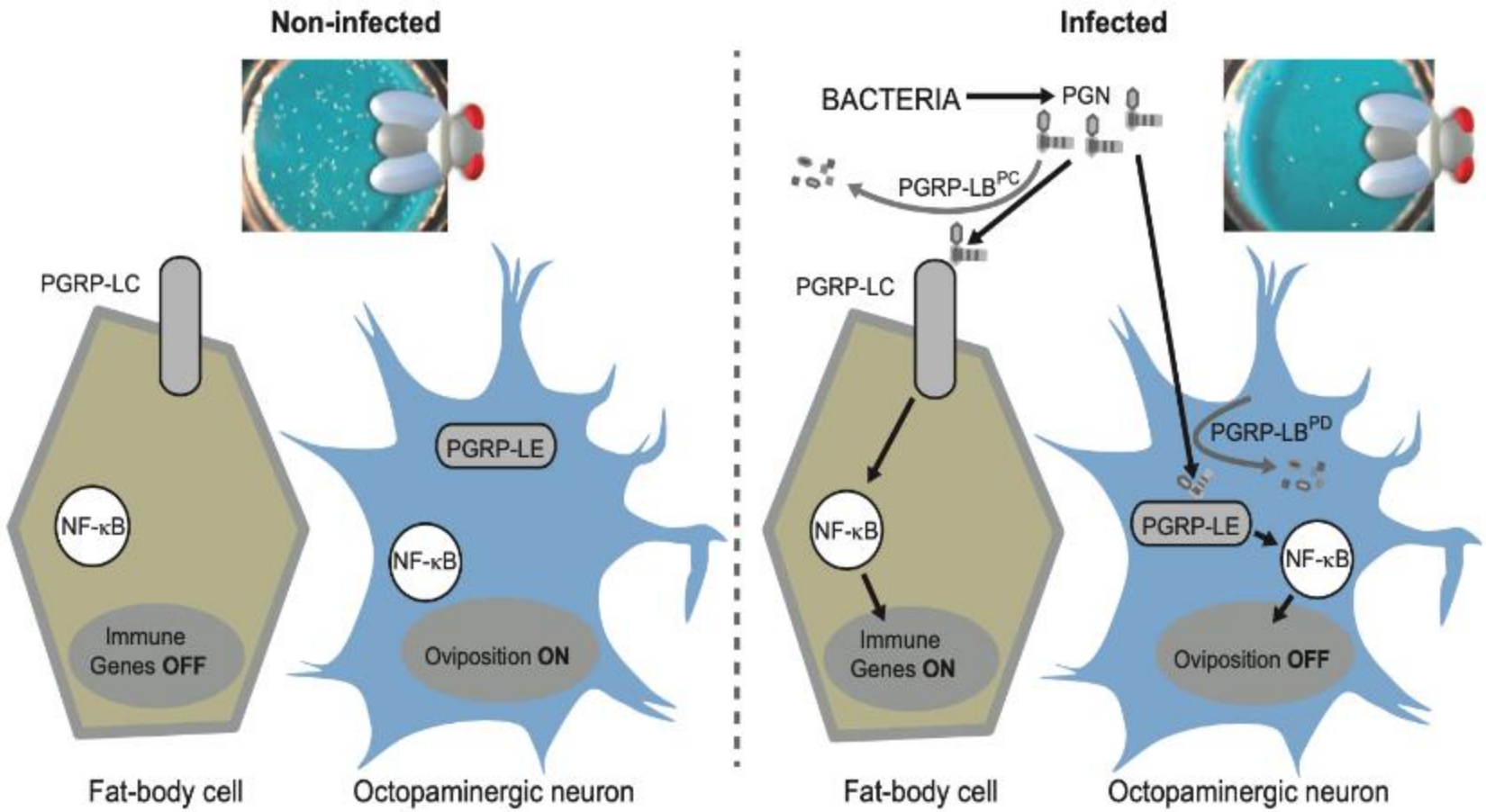




pLB1QF/QUAS-GFP (pLB1>GFP)

Kurz CB, et al. elife. 2017

Conclusion:



Kurz CB, et al. elife. 2017

Question:

1.Is there a decision center that outputs instructions to suppress egg-laying?

2. What is the mechanism for reducing the number of eggs when flies assess that the environment is not suitable for laying eggs?

oocyte retention, immature oocyte, egg-laying motor system

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Positive modulation of egg-laying in *Drosophila*

邢丽敏

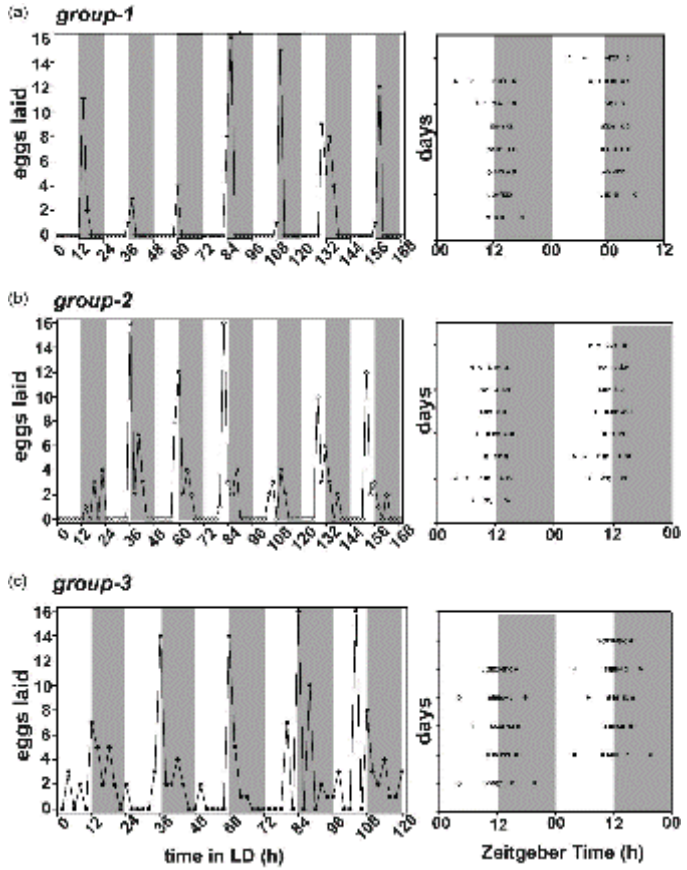
2020/09/24


昵图网 www.nipic.com

- What are the differences between the egg-laying mechanisms of virgin and mated females?
- How does mating behavior induce female to lay eggs?
- What other external factors can positively affect a female's egg-laying behavior?

Egg-laying behaviour in virgin females of *Drosophila melanogaster*

——The mechanisms that control the laying of eggs by virgin flies have not been elucidated



virgins – group-1;
1 day of male presence – group-2;
6 or 11 days of male presence – group-3

Menon, Anuj et al. *Chronobiol Int*. 2014

Table I. Genetic Variants With Elevated Ovulation in Virgin *Drosophila*

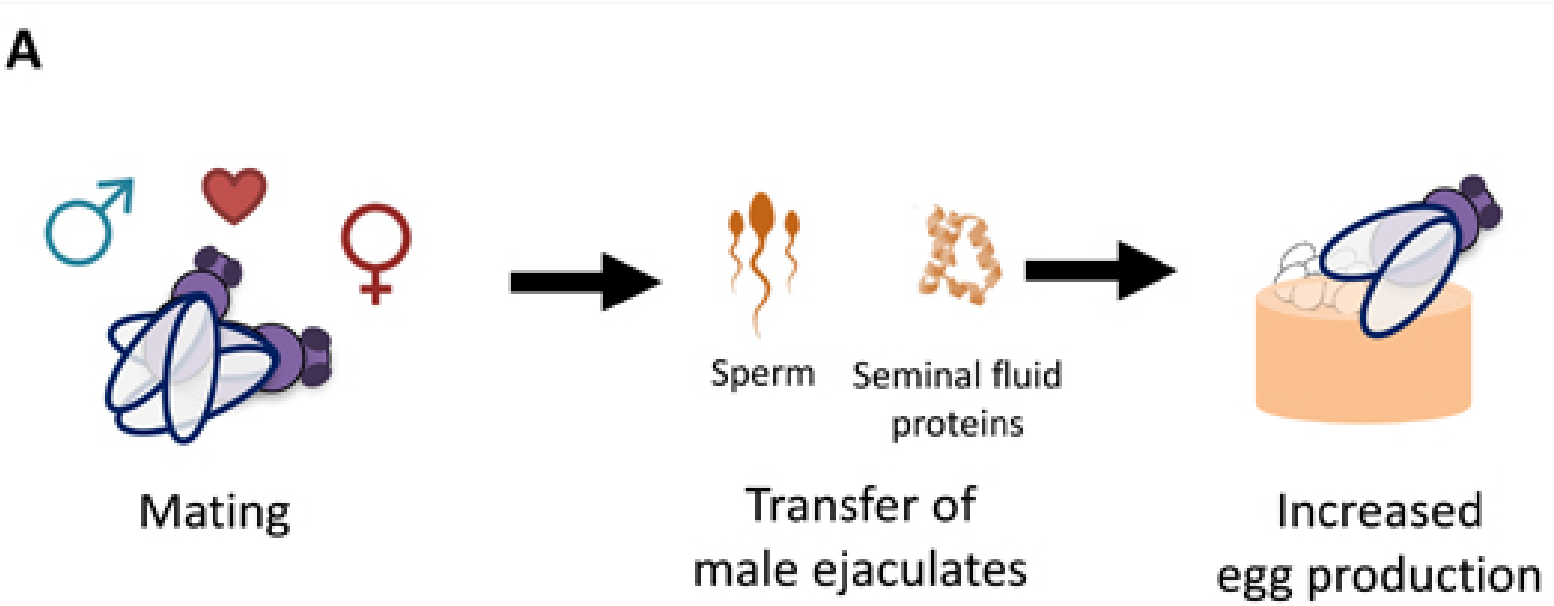
Lines	N	%	Positive error	Negative error
Or-R	100	0	3.7	0.0
Or-R (mated)	100	77	7.2	9.2
233y	100	68	8.3	9.7
70	100	50	9.6	9.6
c625	100	46	9.7	9.4
146y	100	30	9.6	8.1
106y	100	27	9.4	7.7
c601	100	20	8.9	6.7
091y	100	19	8.8	6.5
188y	100	15	8.3	5.7

A Ejima. et al., *Behav Genet*. 2001

A. What are the differences between the egg-laying mechanisms of virgin and mated females?

B. How does mating behavior induce female to lay eggs?

C. What other external factors can positively affect a female's egg-laying behavior?



What substrates induce females to lay eggs after mating?

The Amino-Acid Sequence of a Peptide (PS-1) from *Drosophila funebris*: A Paragonial Peptide from Males which Reduces the Receptivity of the Female

Heinz BAUMANN, Kenneth J. WILSON, Pei Shen CHEN, and René E. HUMBEL
Biochemisches Institut, and Zoologisches Institut der Universität Zürich

(Received October 18 / December 16, 1974)

Cell, Vol. 54, 291–298, July 29, 1988, Copyright © 1988 by Cell Press

A Male Accessory Gland Peptide That Regulates Reproductive Behavior of Female D. melanogaster

P. S. Chen,* E. Stumm-Zollinger,* T. Aigaki,*† J. Balmer,* M. Bienz,* and P. Böhlen‡
*Institute of Zoology
†Institute of Biochemistry
University of Zürich
CH-8057 Zürich, Switzerland

Neuron, Vol. 7, 557–563, October, 1991, Copyright © 1991 by Cell Press

Ectopic Expression of Sex Peptide Alters Reproductive Behavior of Female D. melanogaster

Toshiro Aigaki,* Irène Fleischmann,† Pei-Shen Chen,† and Eric Kubli†
*Department of Experimental Biology
Tokyo Metropolitan Institute of Gerontology
Tokyo 173
Japan
†Zoological Institute
University of Zurich-Irchel
CH-8057 Zurich
Switzerland

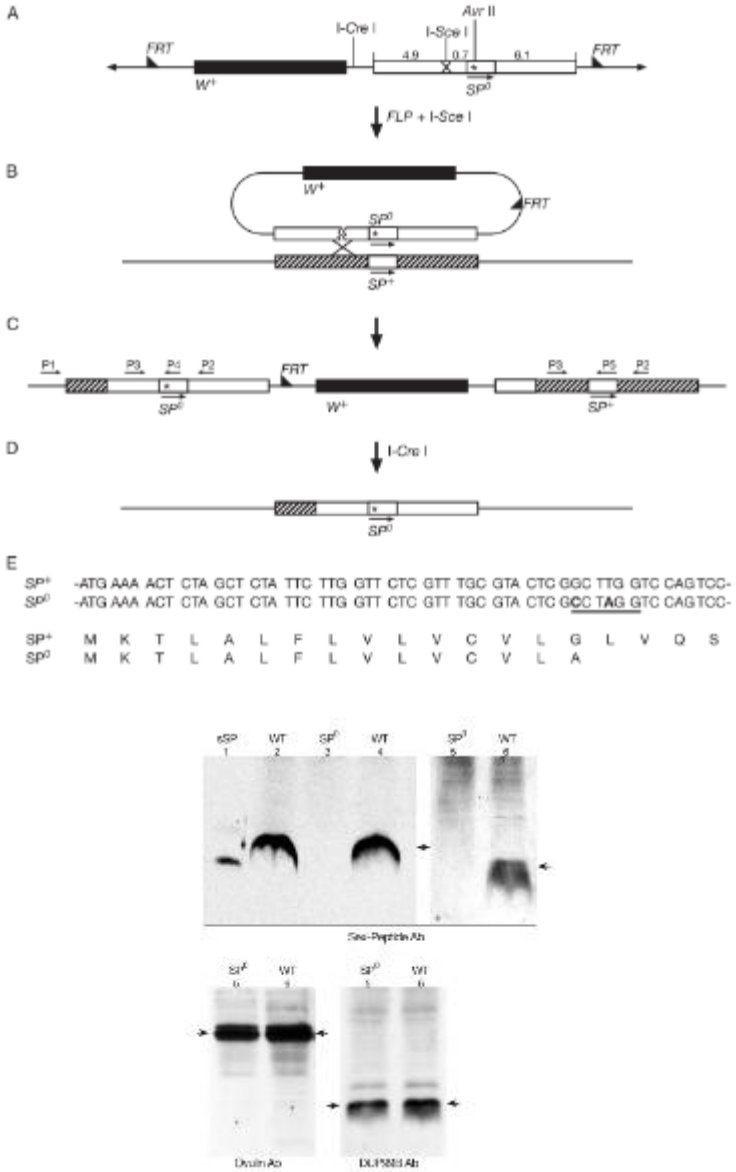
D. melanogaster is one of the species whose reproductive biology has been extensively studied (Fowler, 1973; Spieth and Ringo, 1983; Hall et al., 1980; Hall, 1986; Tompkins, 1989). It is also known as an excellent experimental system because of its genetic amenability. Mated females oppose remating by extruding their ovipositors toward the courting males (Connolly and Cook, 1973). This rejection behavior is distinct from that of immature virgins, which are also unreceptive but refuse mating by more general behaviors, such as jumping, kicking, or running away from the

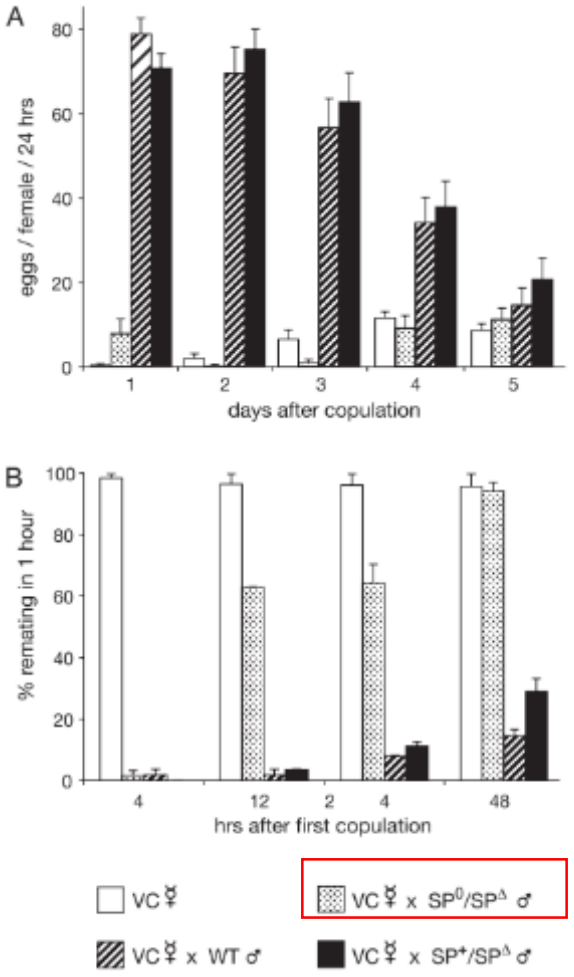
Sex-peptide is the molecular basis of the sperm effect in *Drosophila melanogaster*

sex-peptide (SP):
induce the postmating responses

DUP99B: minor importance

Ovulin:
increase of egg laying during the first day after mating

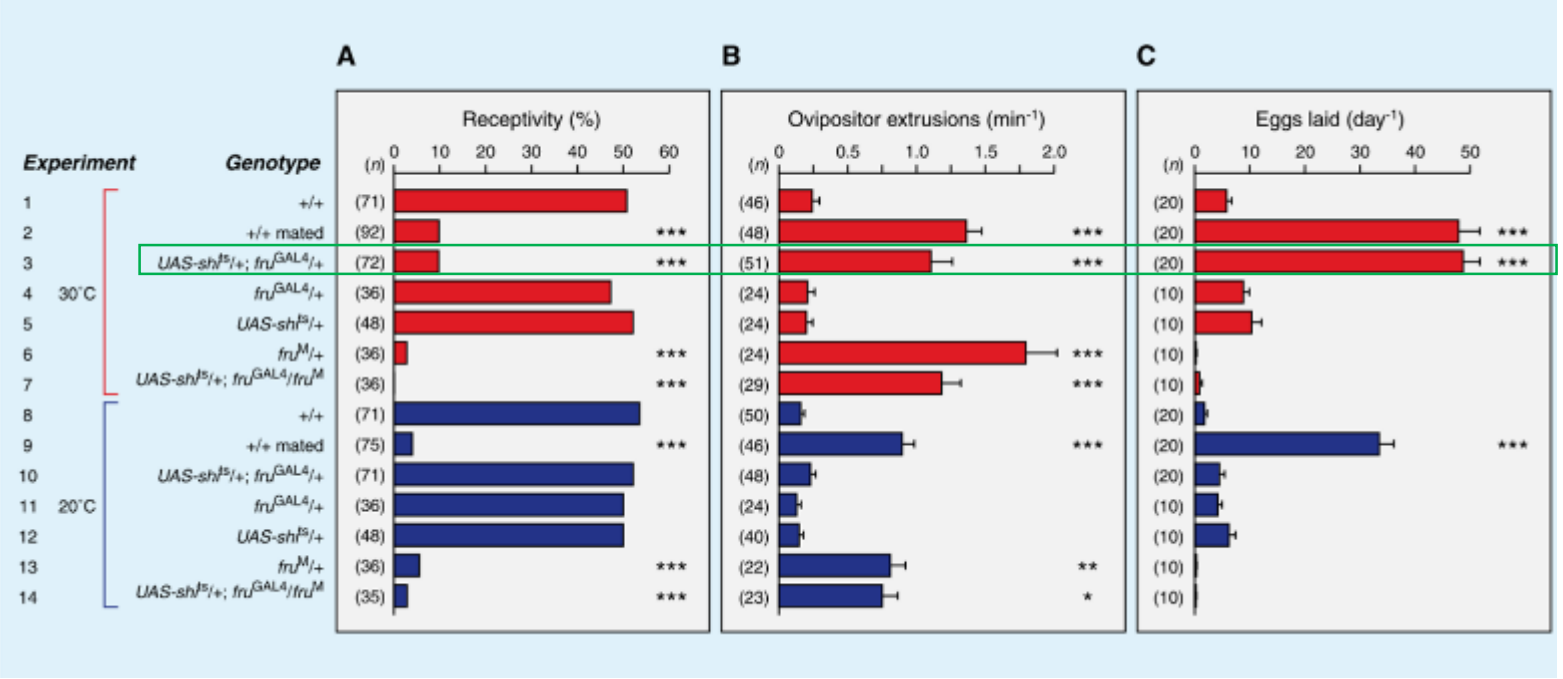


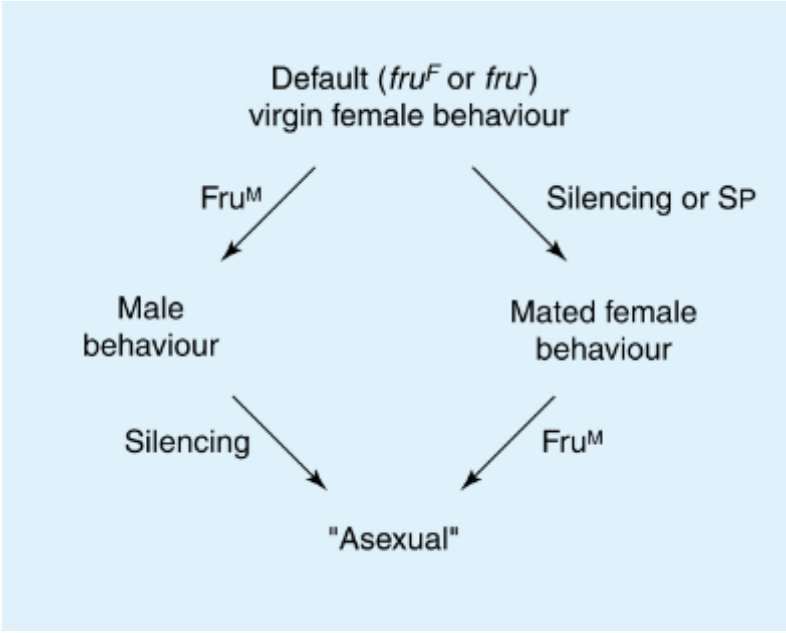


Huanfa Liu and Eric Kubli. *PNAS*. 2003

How does sex peptide function in females?

fru neurons is required in virgin females to promote mating behavior and to inhibit post-mating reproductive behaviors



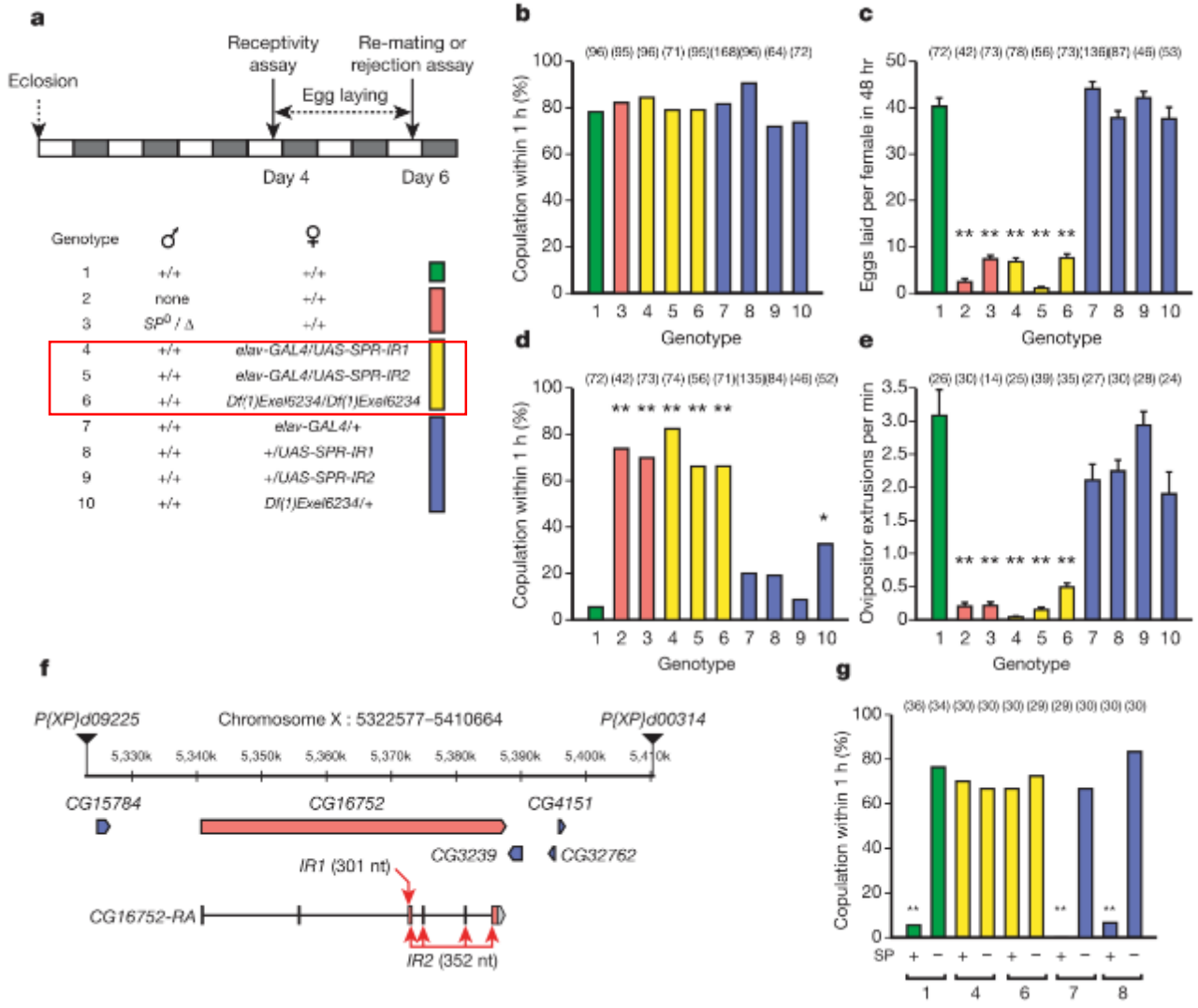


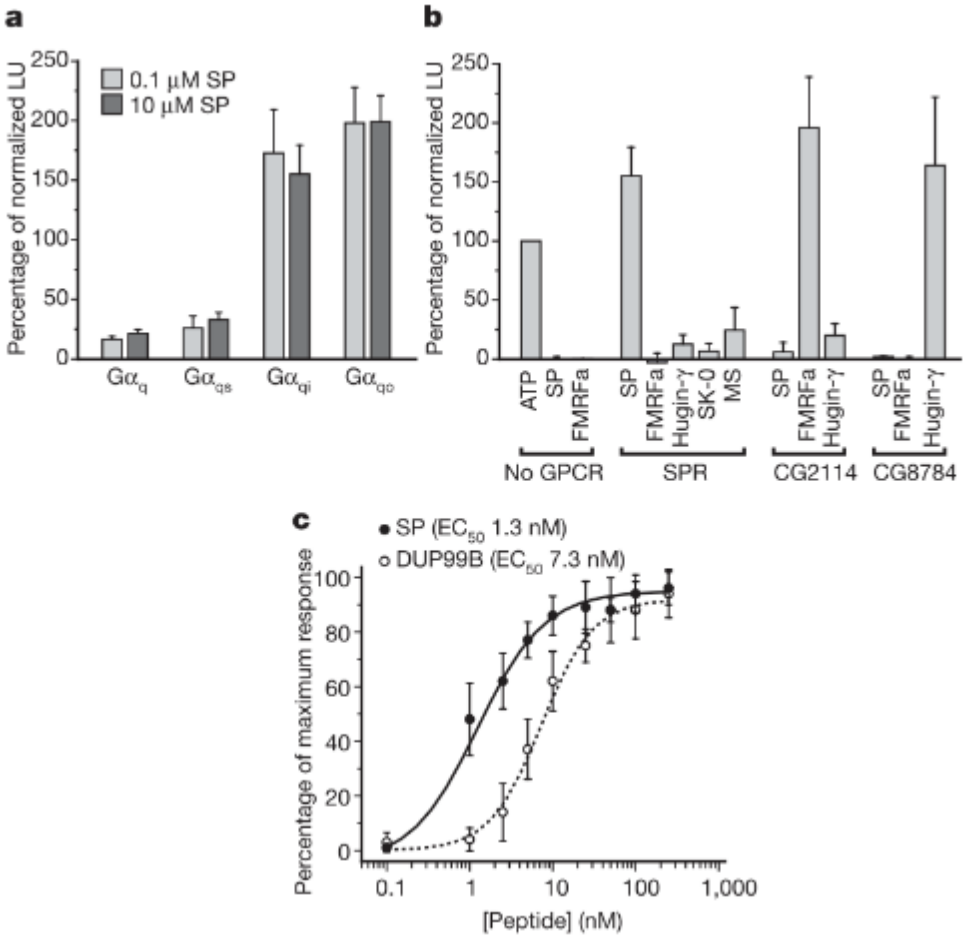
Sex peptide may therefore promote post-mating behaviors by modulating the activity of the *fru* circuit in females

Kvitsiani, D. & Dickson, B. J. *Curr. Biol*. 2006.

SPR is required in the nervous system for the behavioral switch triggered by SP

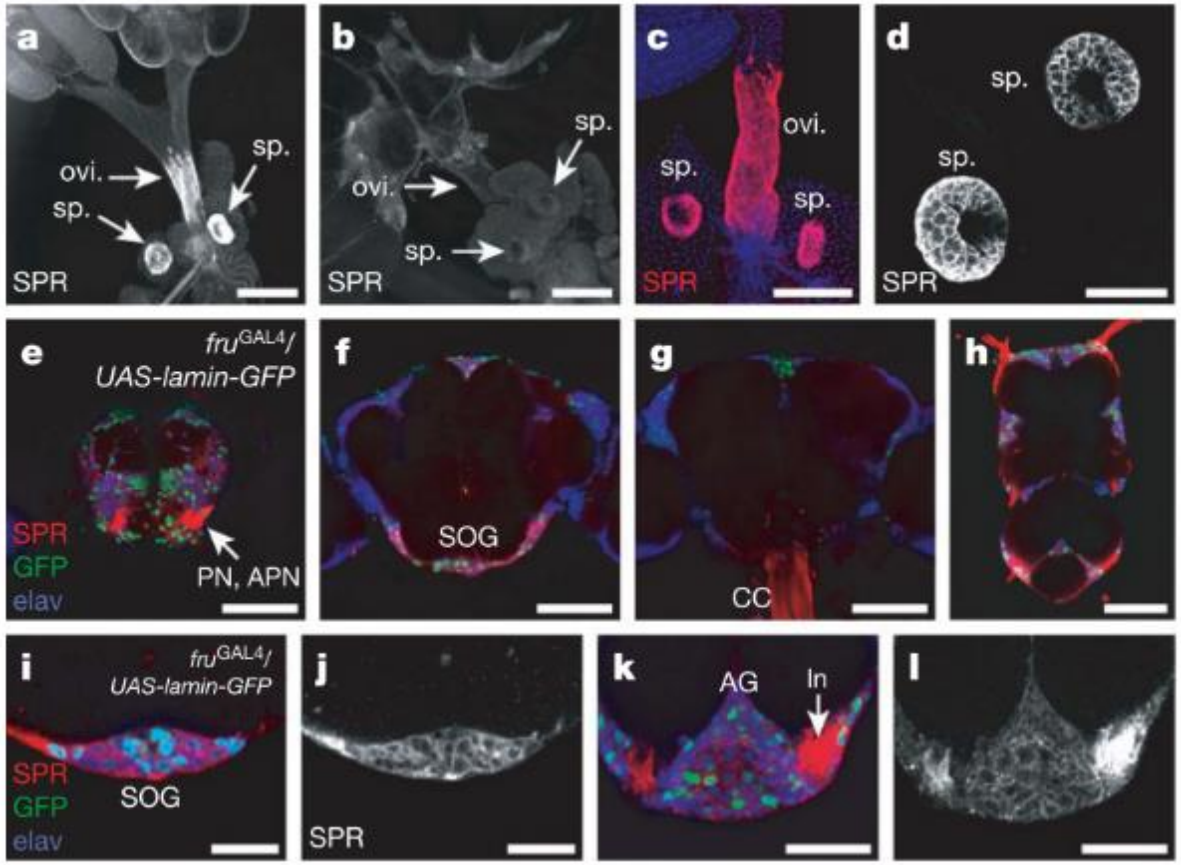
SPR：CG16752

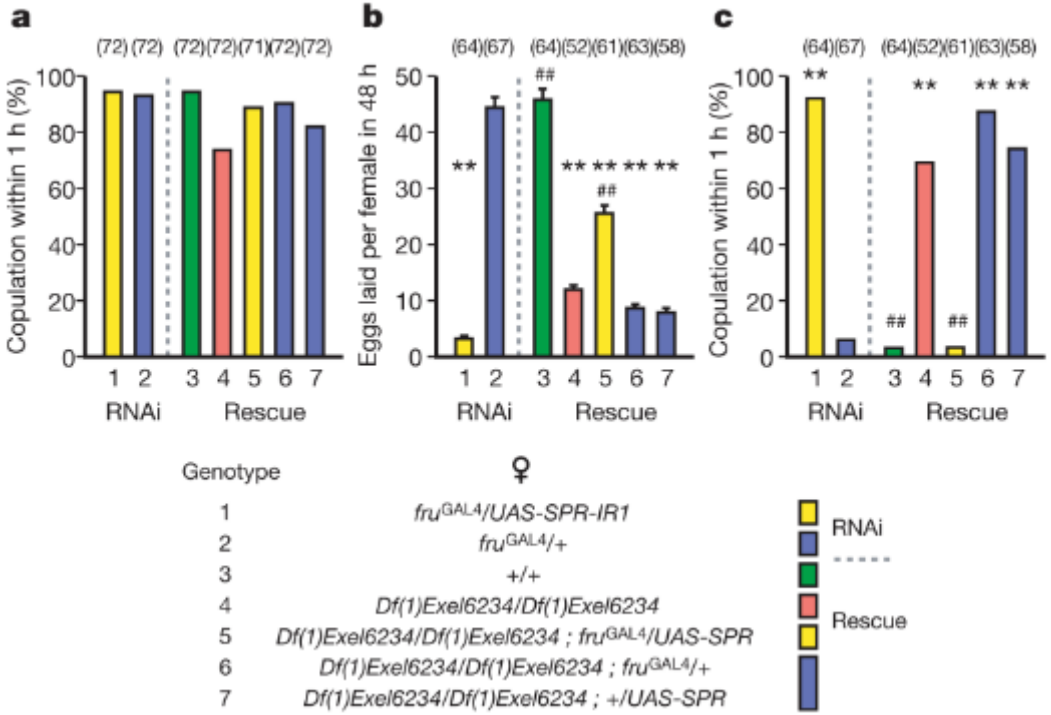




Yapici, N., et al. *Nature*. 2008.

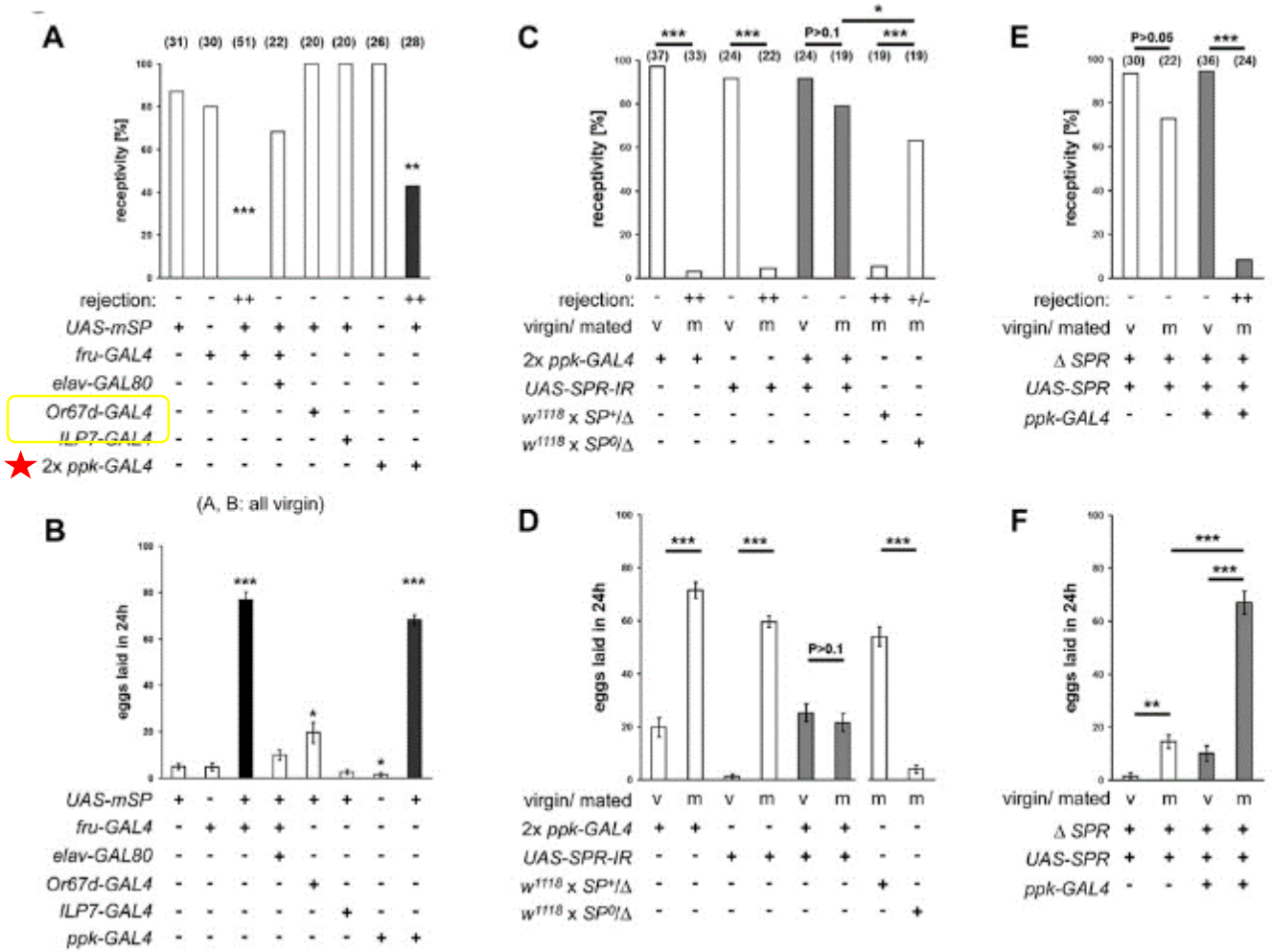
SPR is in the reproductive organs and the CNS, and acts in *fru* neurons





Yapici, N., et al. *Nature*. 2008.

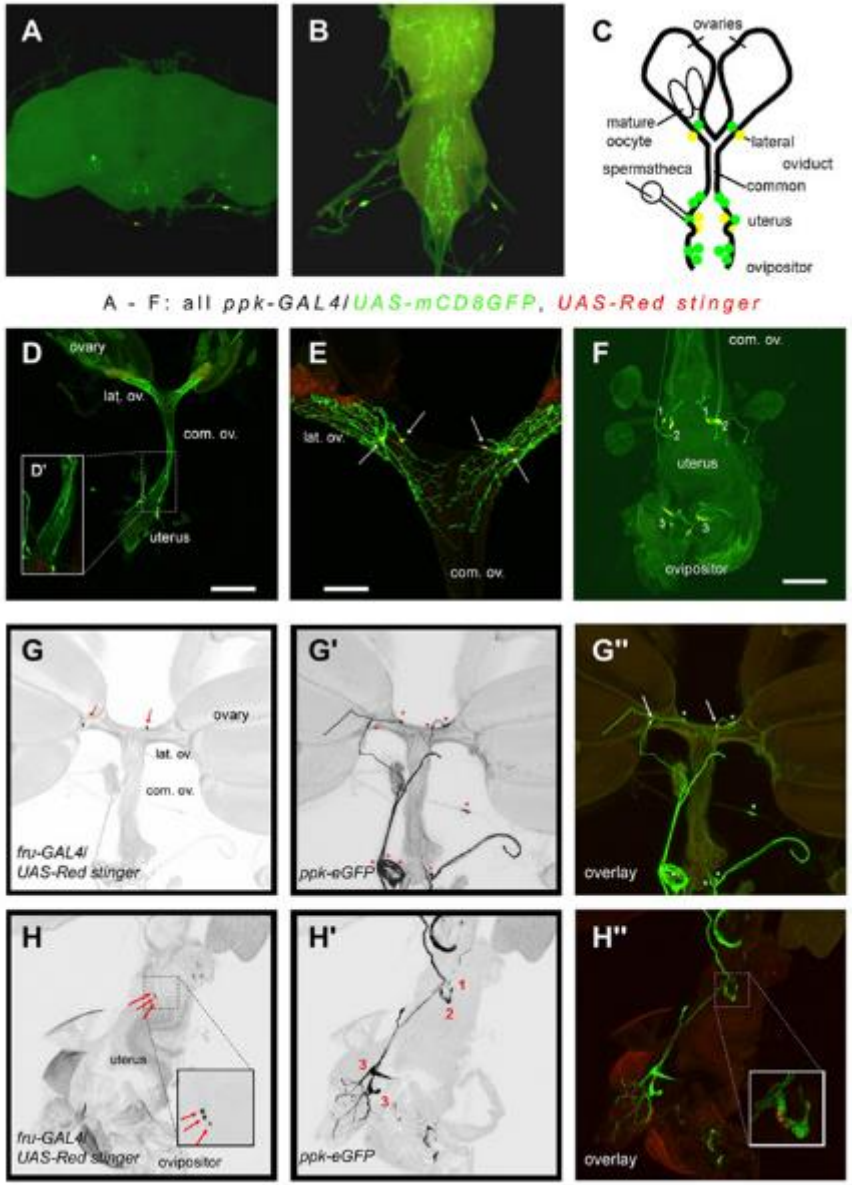
SPR expression in *ppk* neurons is necessary and sufficient for SP-induced post-mating behaviors

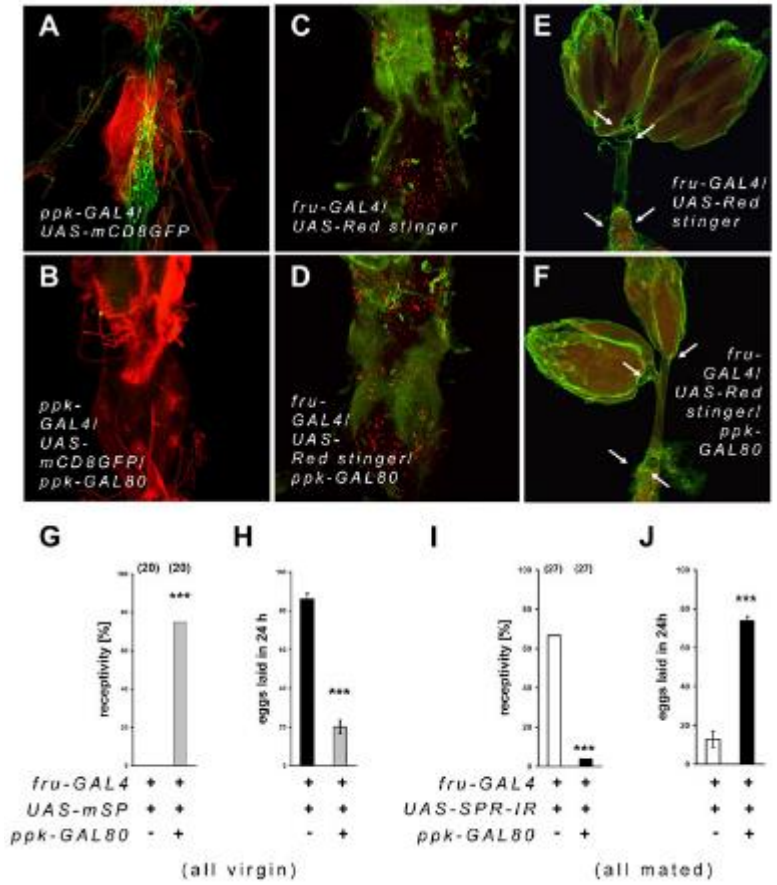


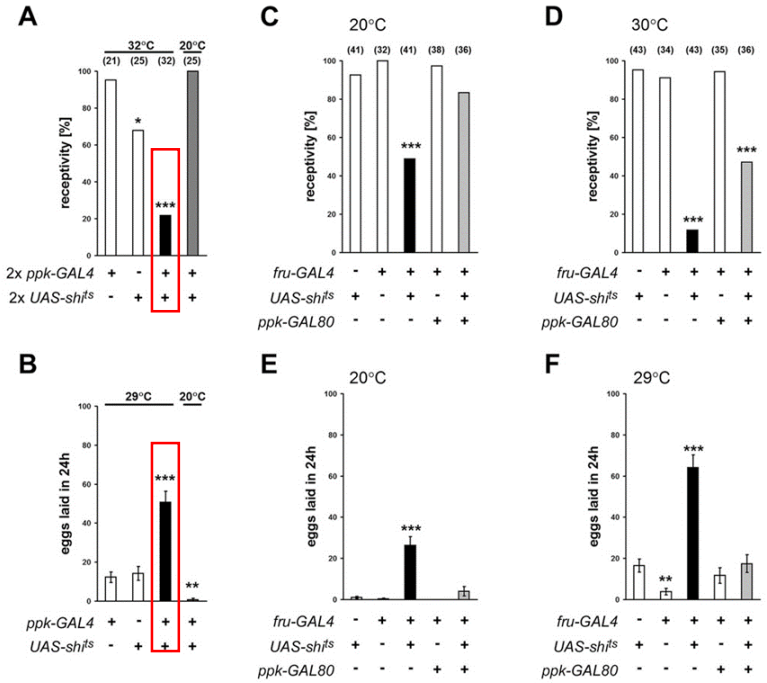
A-B: SP triggers the post-mating behavioral switch primarily by modulating the activity of a subset of the *fru* neurons

Chung-hui Yang . Et al., *Neuron*. 2009

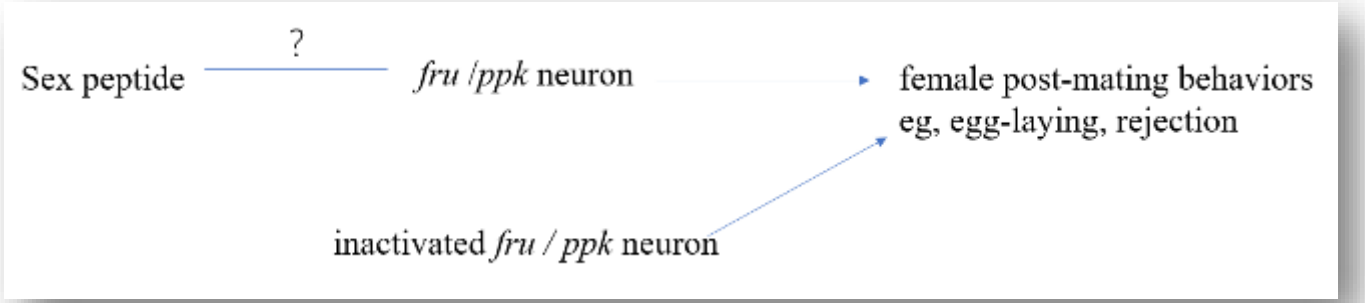
fru/ppk neurons on the reproductive tract are critical SP sensors that control post-mating behaviors





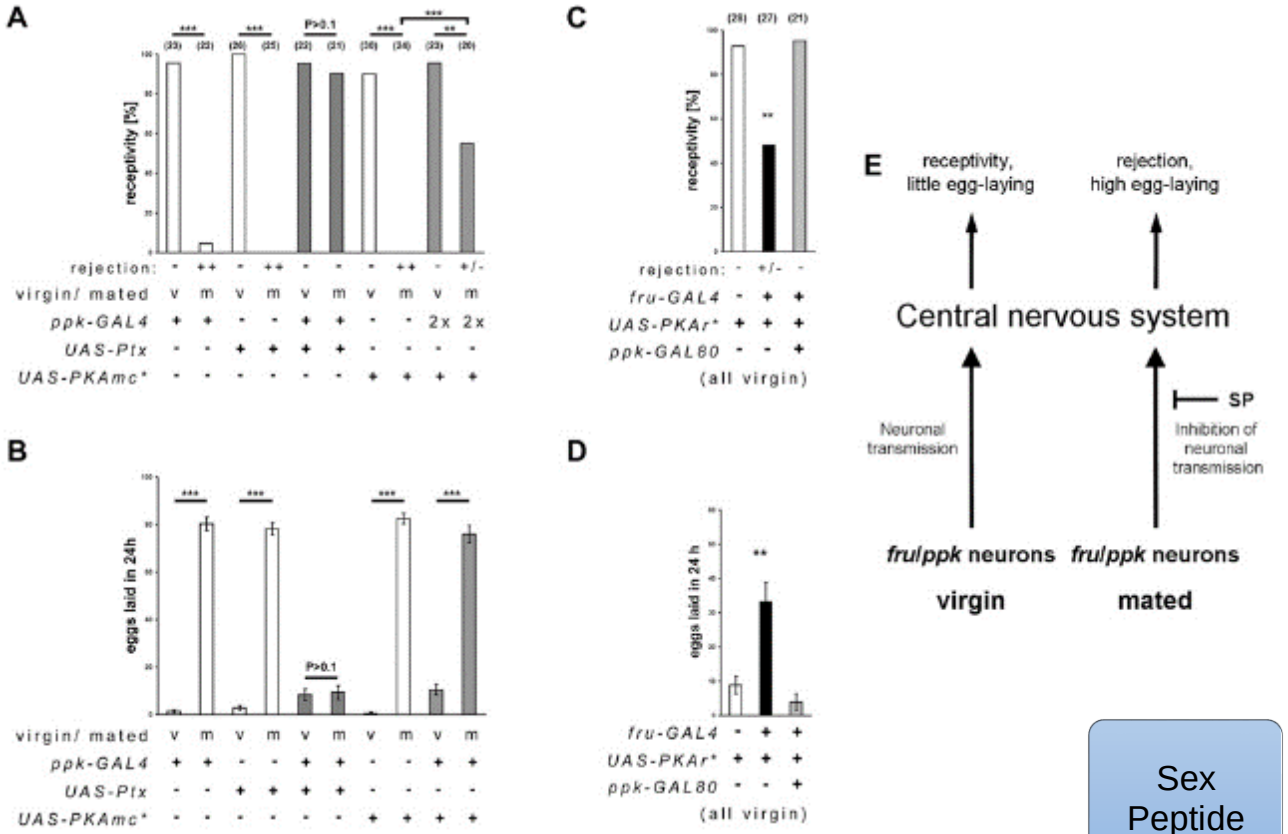


How dose sex peptide influence *fru / ppk* neurons to induce post-mating behaviors?



Hypothesis: SP inhibits *fru/ppk* neuronal activity, and How?

SP induces postmating behaviors by activating Gαi and inhibiting cAMP signaling in *fru/ppk* neurons



Pergamon
J. Insect Physiol. Vol. 42, Nos 11–12, pp. 1007–1015, 1996
PII: S0022-1910(96)00070-4

0022-1910/96 $15.00 + 0.00

Lack of Response to Sex-Peptide Results in Increased Cost of Mating in *dunce Drosophila melanogaster* Females

TRACEY CHAPMAN,*†§ YVES CHOFFAT,‡ WENDY E. LUCAS,* ERIC KUBLI,‡ LINDA PARTRIDGE*†

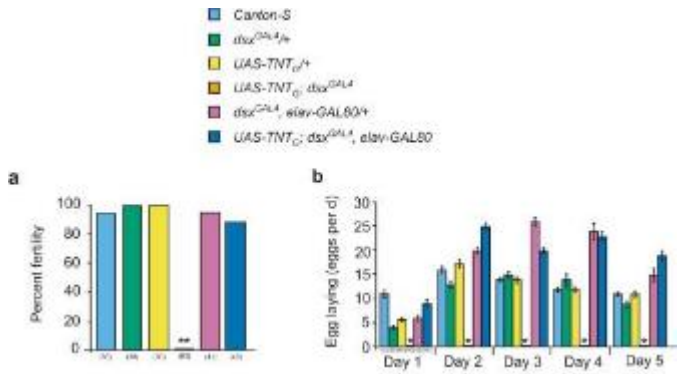
Received 22 January 1996; revised 16 May 1996

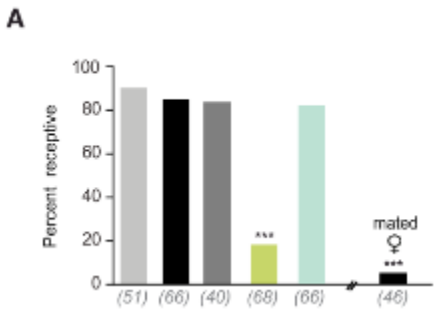
Sex Peptide → SPR-Gαi → inhibit cAMP-PKA → inhibit *fru/ppk* neuron → post-mating behaviors

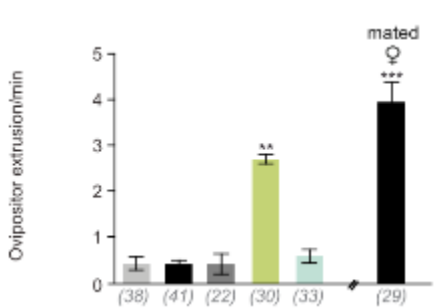
irreversible inhibitor of Gαi—Pertussis toxin (PTX)
active subunit of murine PKA —UAS-PKAmc*
PKA inhibitor— PKAr*

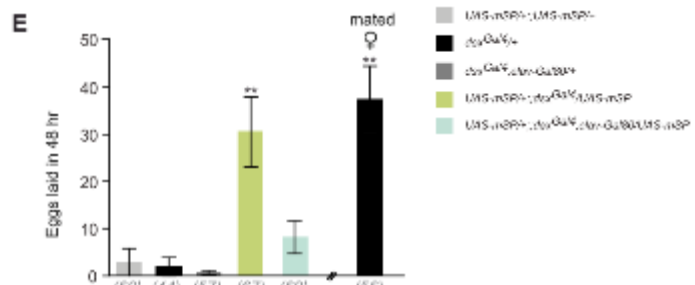
Chung-hui Yang . Et al., *Neuron*. 2009

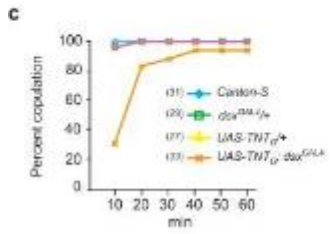
dsx neurons respond to SP-induced post-mating behaviors

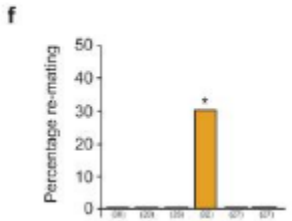


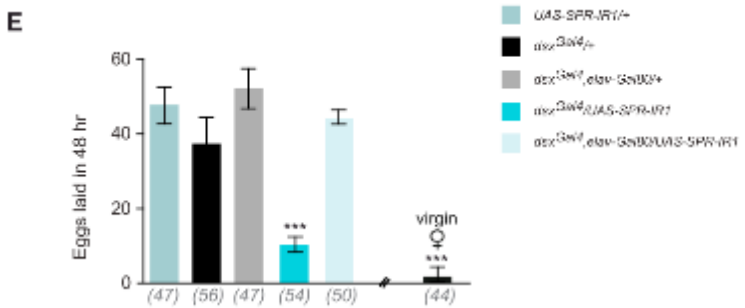


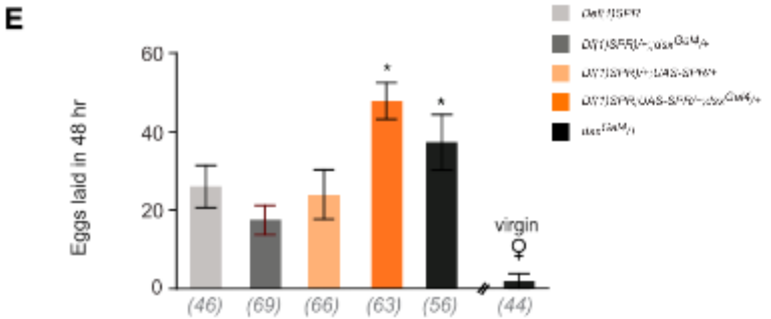








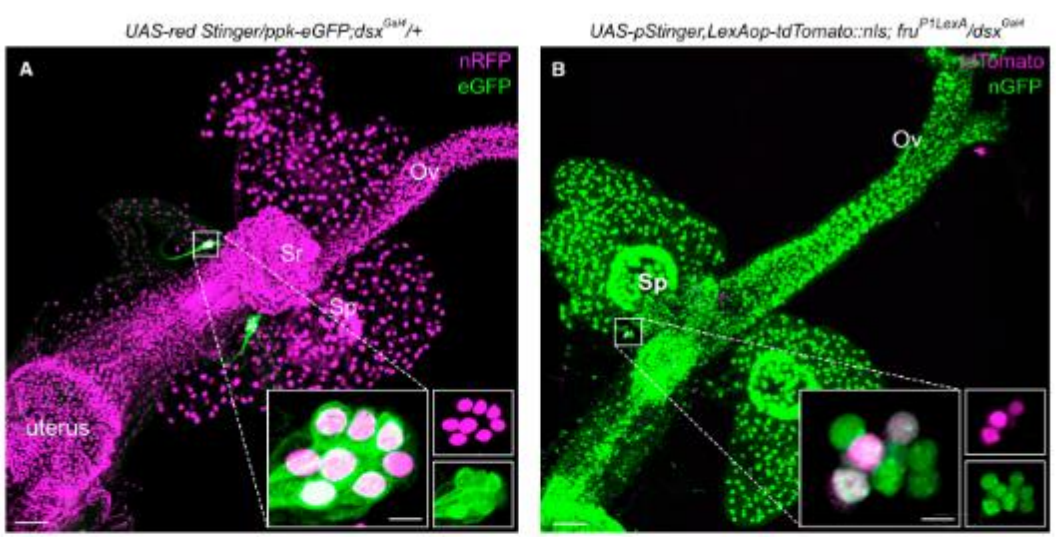


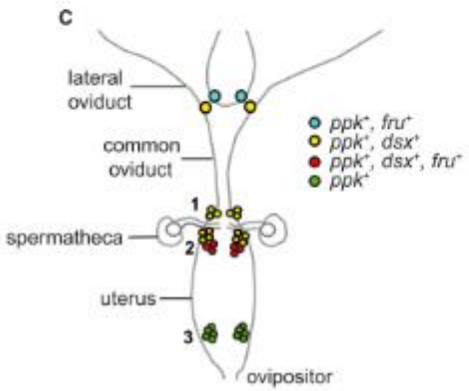


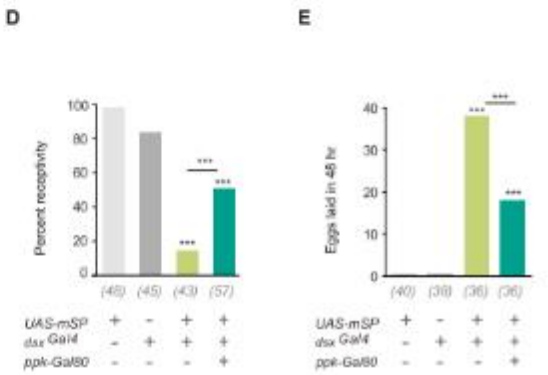
Rideout, E.J. et al. *Nat. Neurosci.* 2010

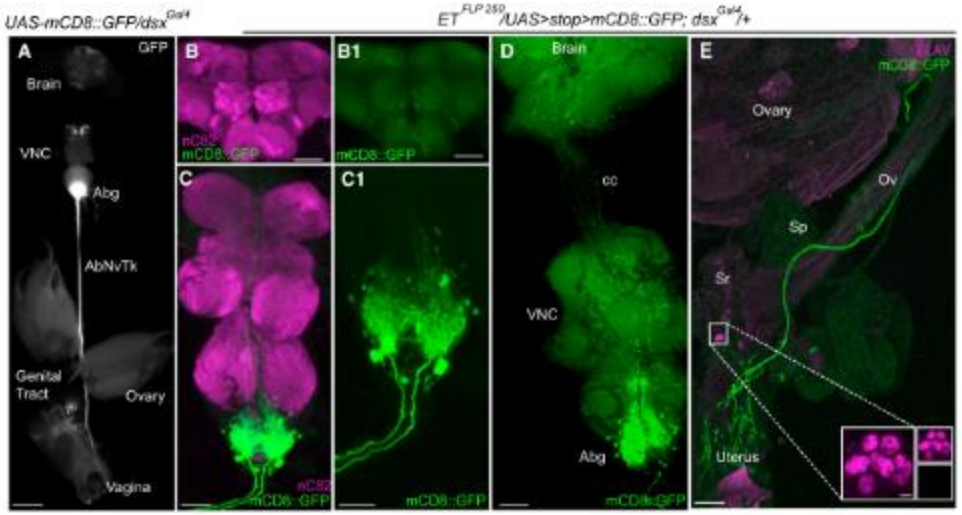
Carolina R., et al. *Curr Biol* . 2012

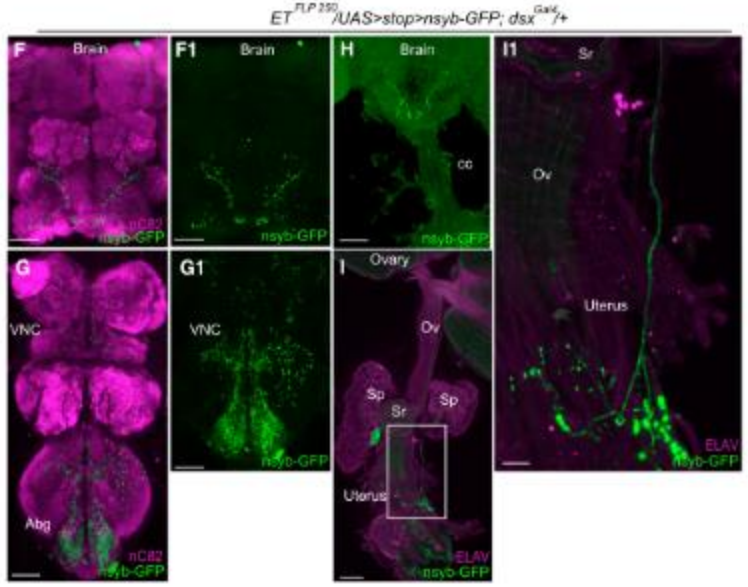
dsx neurons are part of the *fru+/ppk+* circuitry involved in sensing SP

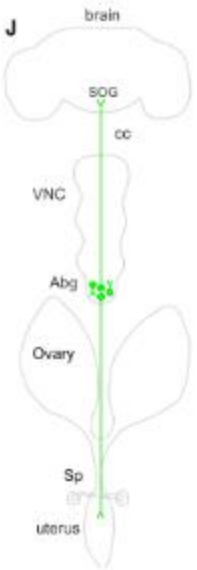












Carolina Reza´val., et al. *Curr Biol* . 2012

A. What are the differences between the egg-laying mechanisms of virgin and mated females?

B. How does mating behavior induce female to lay eggs?

C. What other external factors can positively affect a female's egg-laying behavior?

In addition to the copulation-induced increase in egg-laying, does external information encourage females to lay eggs, and how?

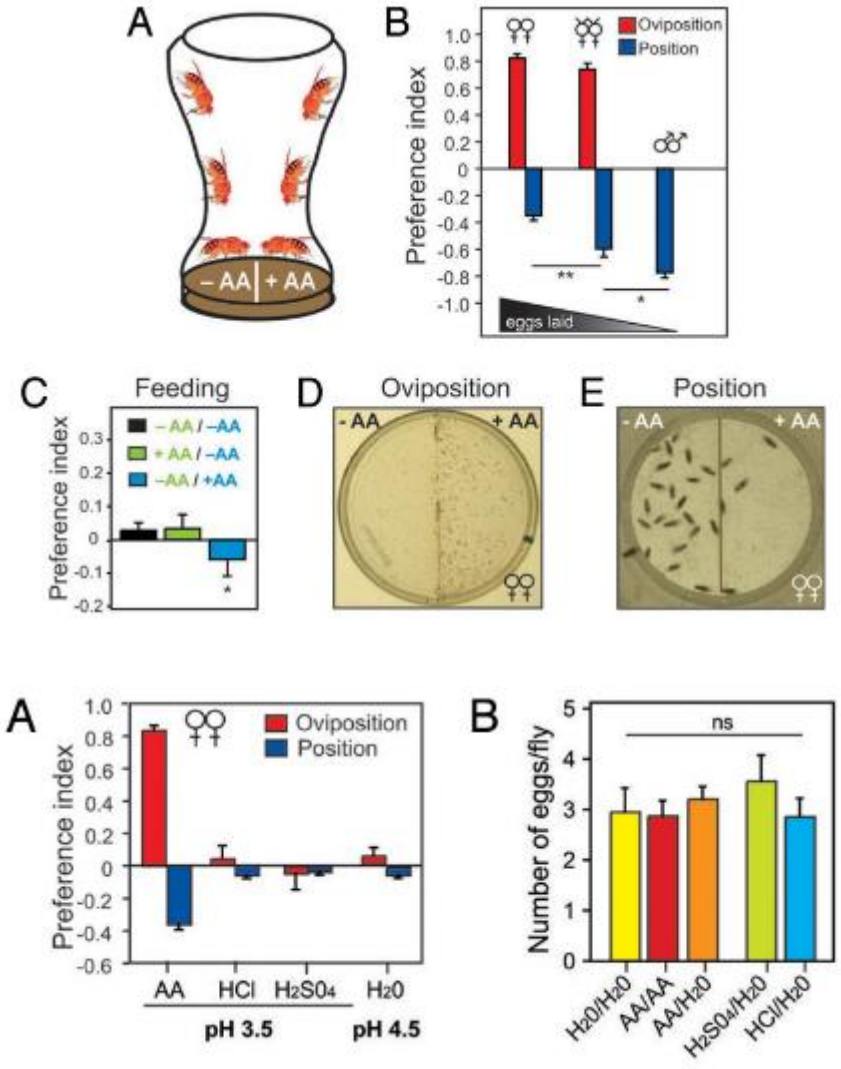
Substrate attraction

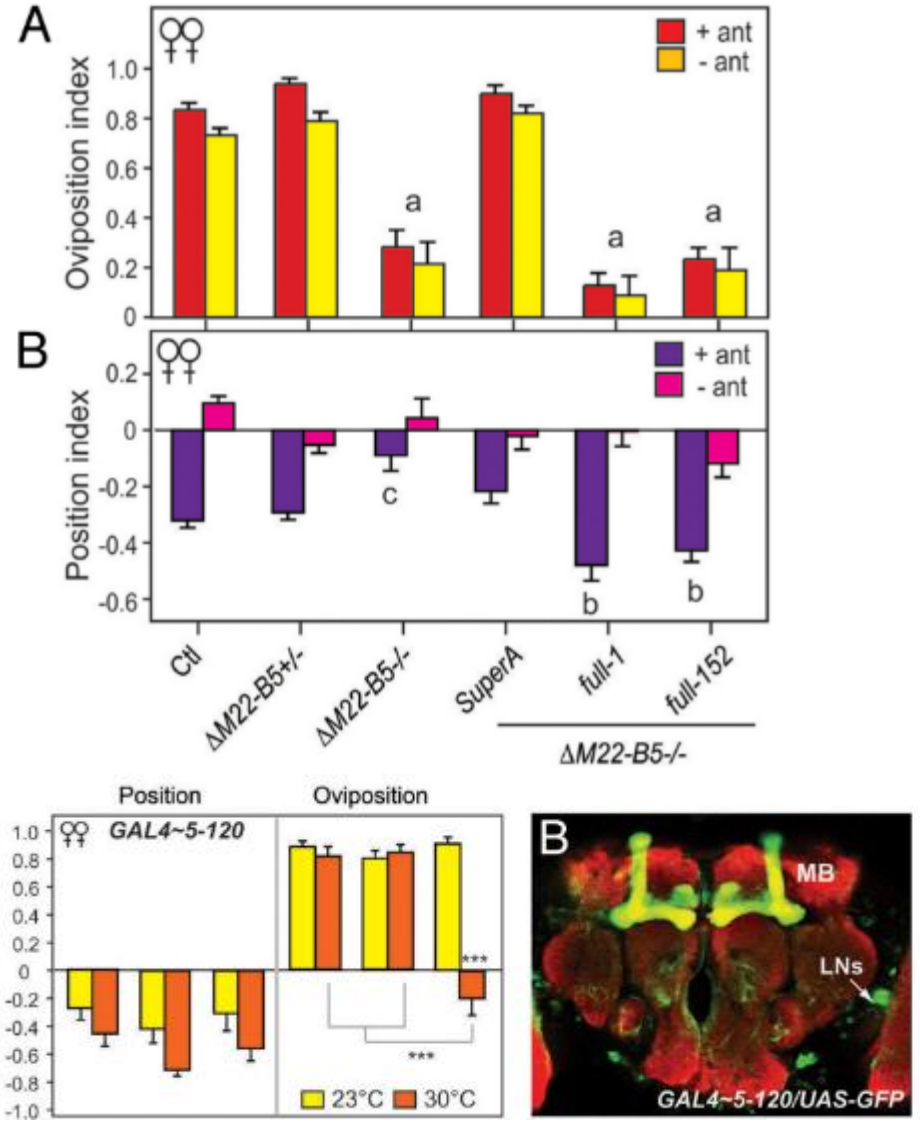
Acetic acid and other sour	IR25a, IR76b	Gustation
Lobeline	GR66a in pharynx	Gustation
Terpenes	OR19a	Olfaction

Social experience

9-tricosene	OR7a	Olfaction
Female flies	Photoreceptors	Vision

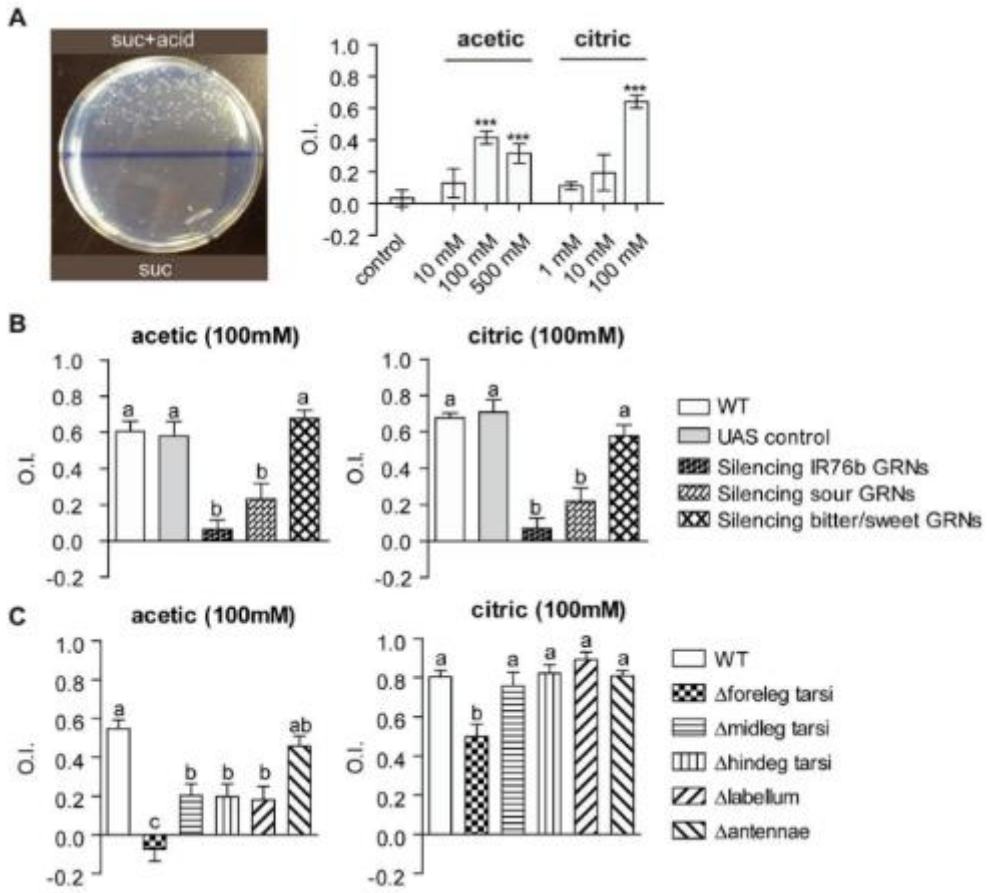
The gustatory system mediates oviposition attraction to acetic acid (AA)

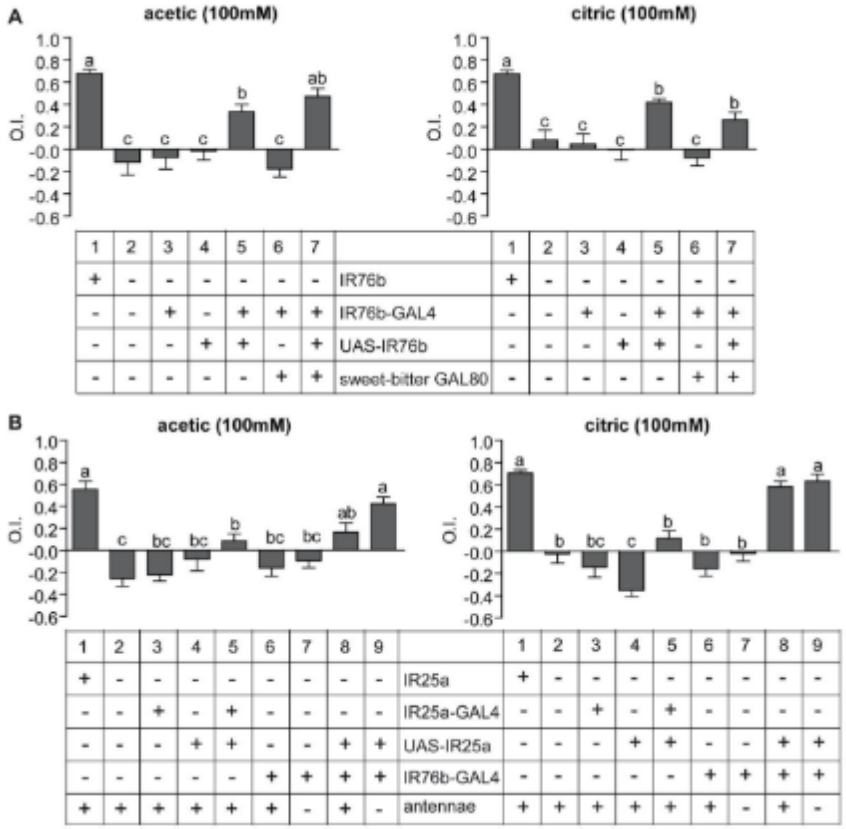




Ryan M. Joseph., et al. *PNAS*. 2009

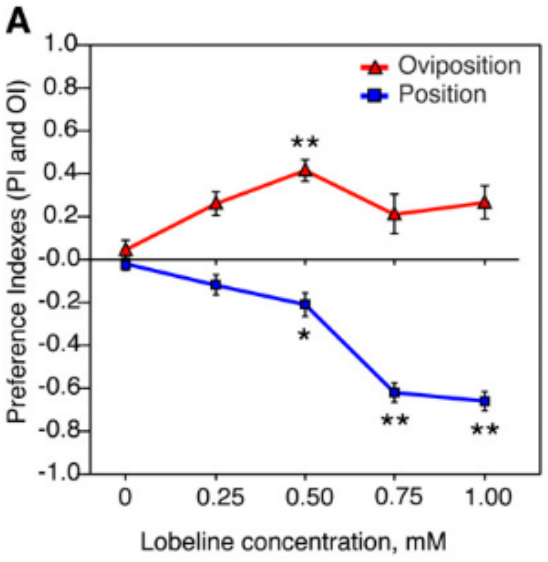
Oviposition preference is mainly mediated by tarsal sour GRNs: IR76b and IR25a

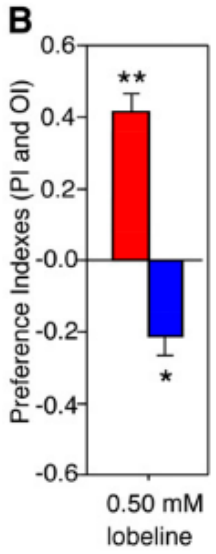


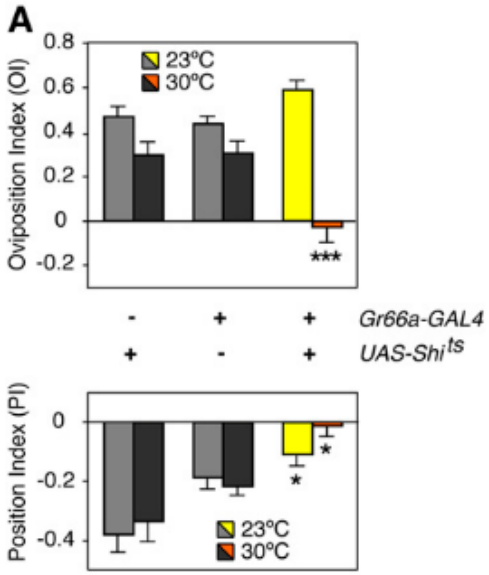


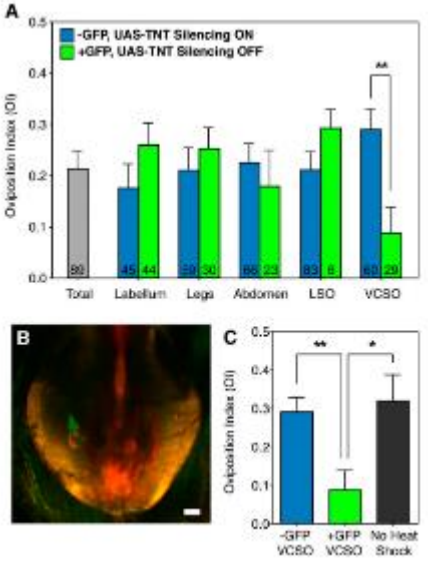
Yan Chen and Hubert Amrein. *Curr Biol*. 2017

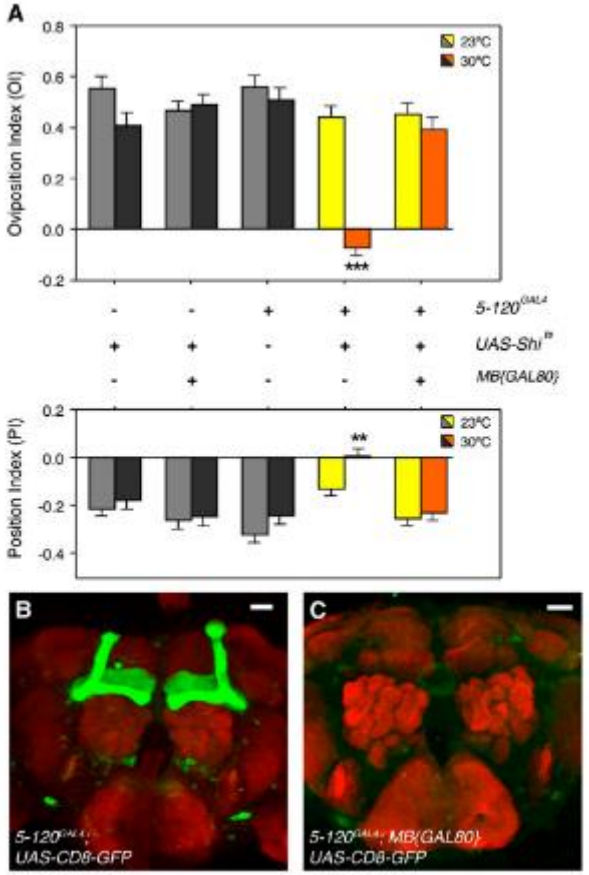
Gr66a neurons in the pharynx receive sensory input for egg-laying attraction to lobeline







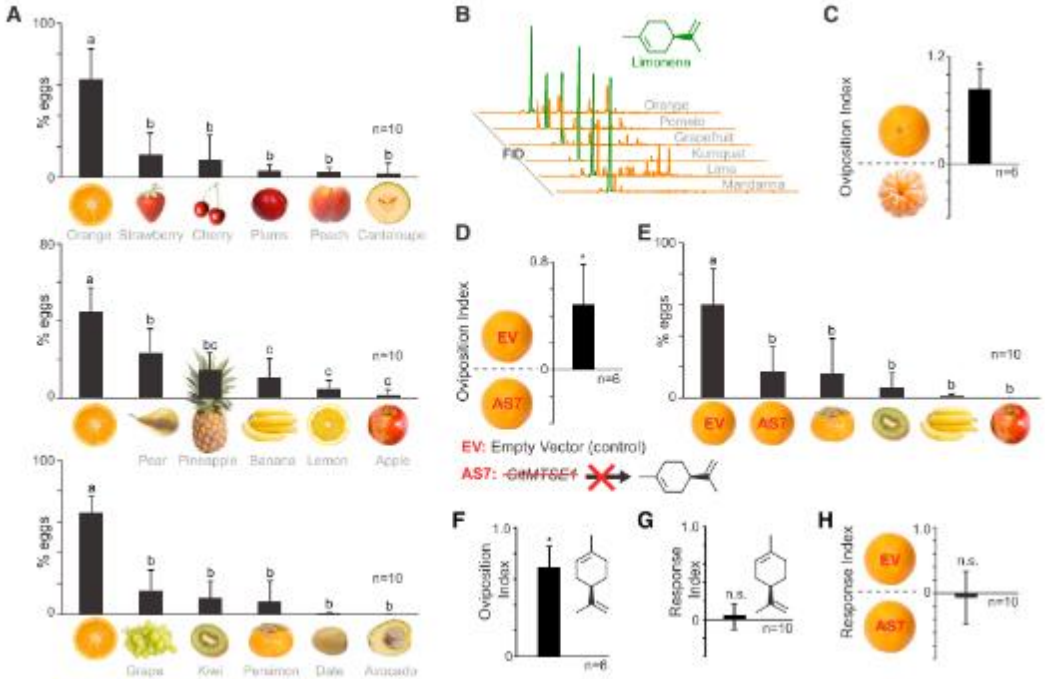


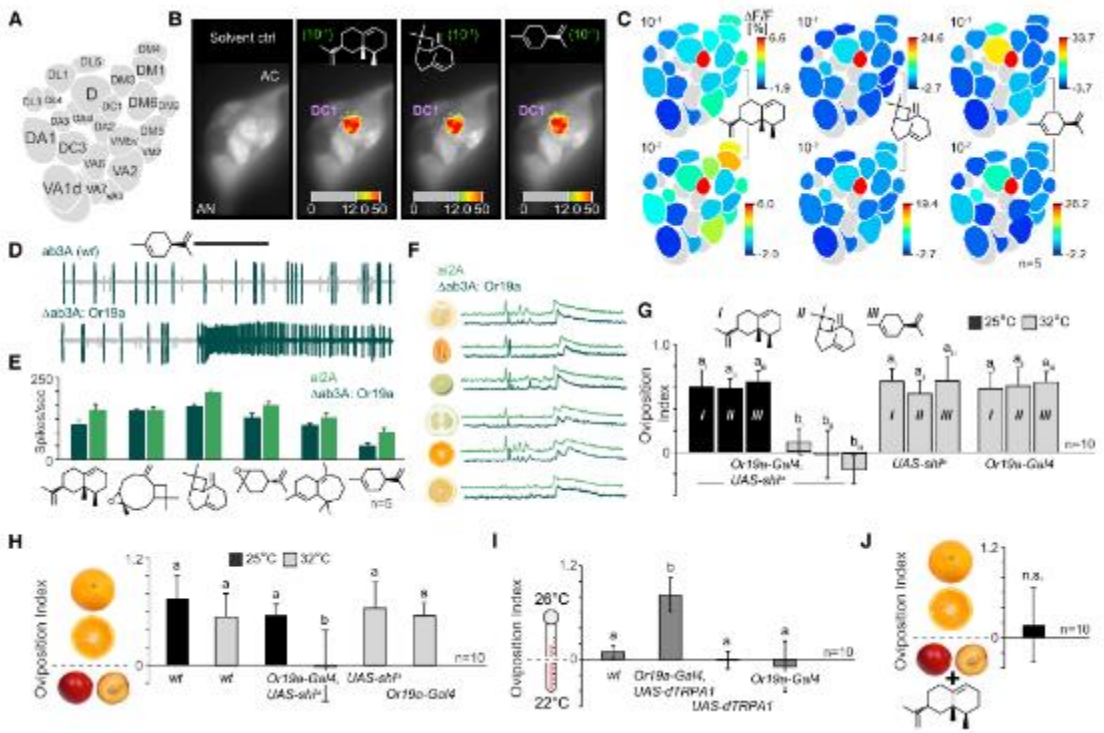


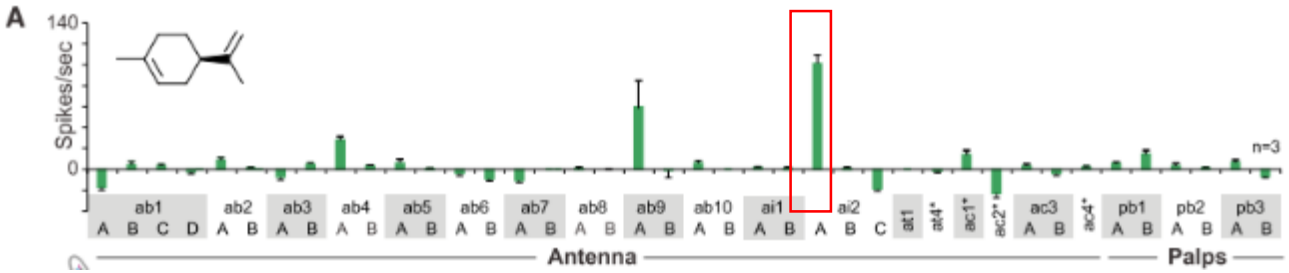
tubulin-FRT-GAL80-FRT; Gr66a-GAL4/UAS-TeTx;
heat shock FLP-recombinase/UAS-CD8-GFP

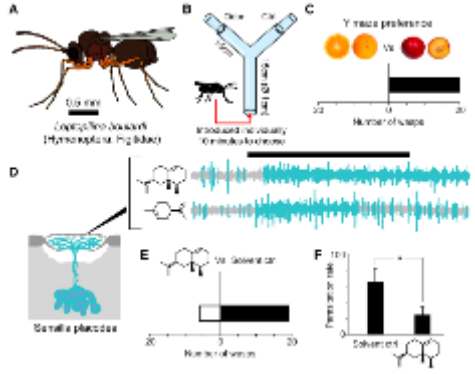
Ryan M. Joseph and Ulrike Heberlein. *Genetics*. 2012

From acetic acid to fruits： Do flies have an oviposition preference for fruits?









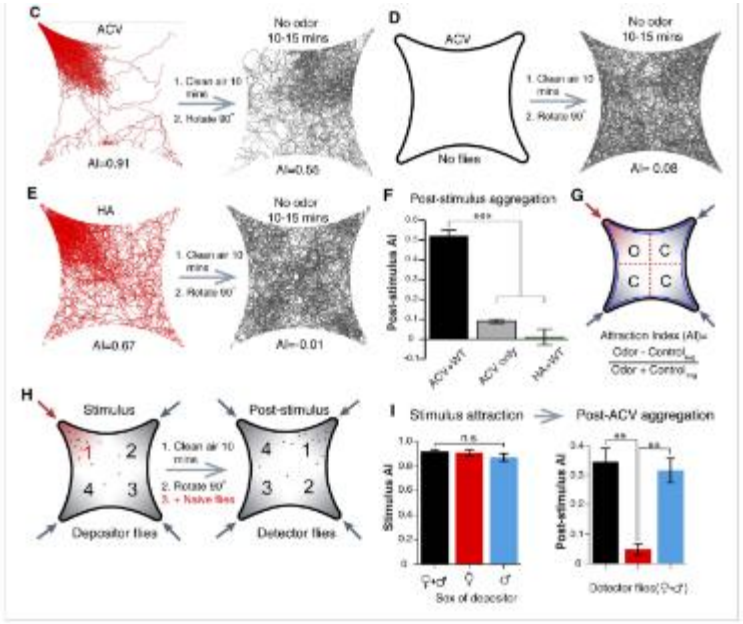
柠檬烯-lemonene

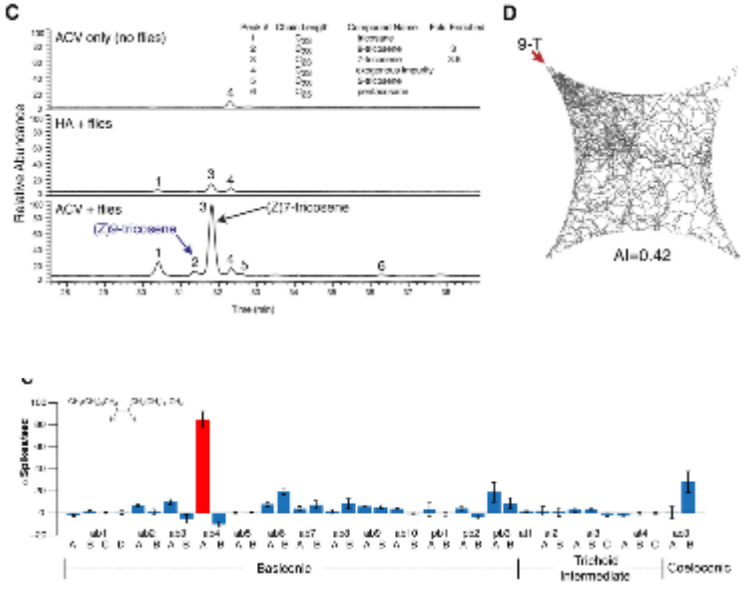
flies prefer Citrus fruits as oviposition substrate,

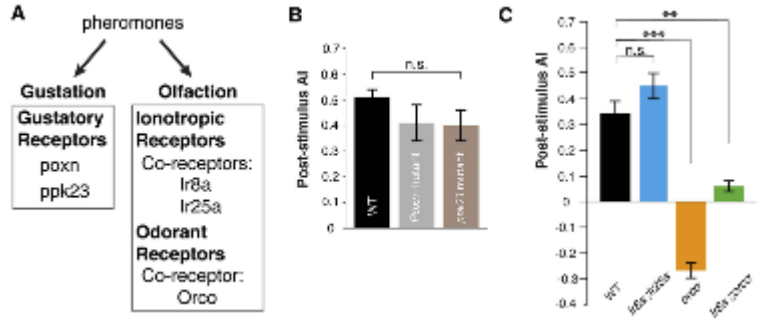
and Or19a are necessary and sufficient for the oviposition preference

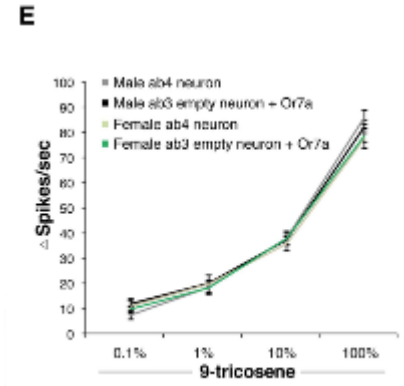
Dweck HK, et al. *Curr Biol*.. 2013

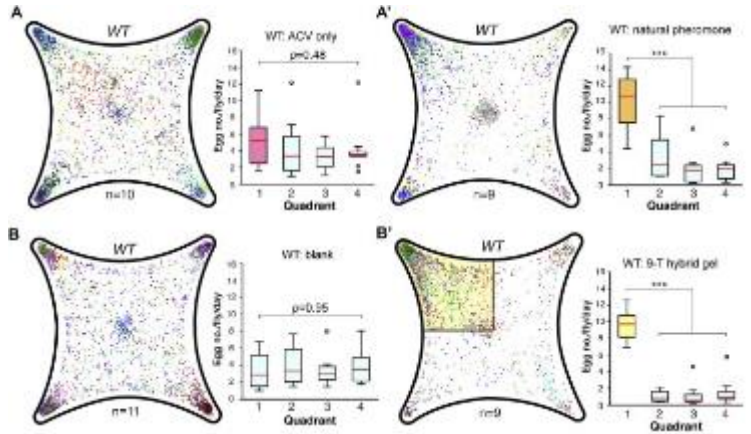
Food odors trigger Drosophila males to deposit 9-tricosene, which detected by Or7a that guides female oviposition decisions

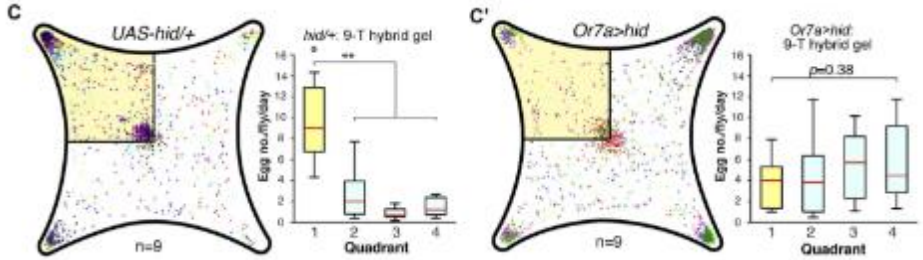


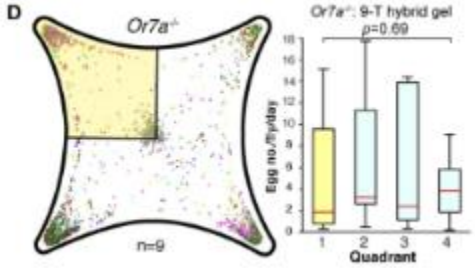






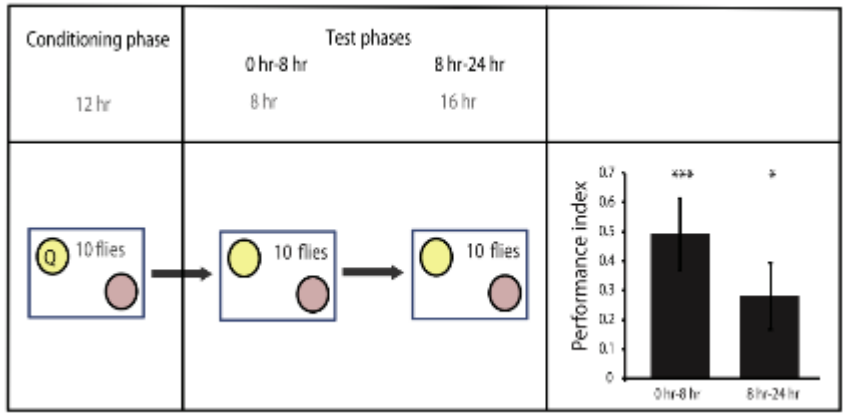


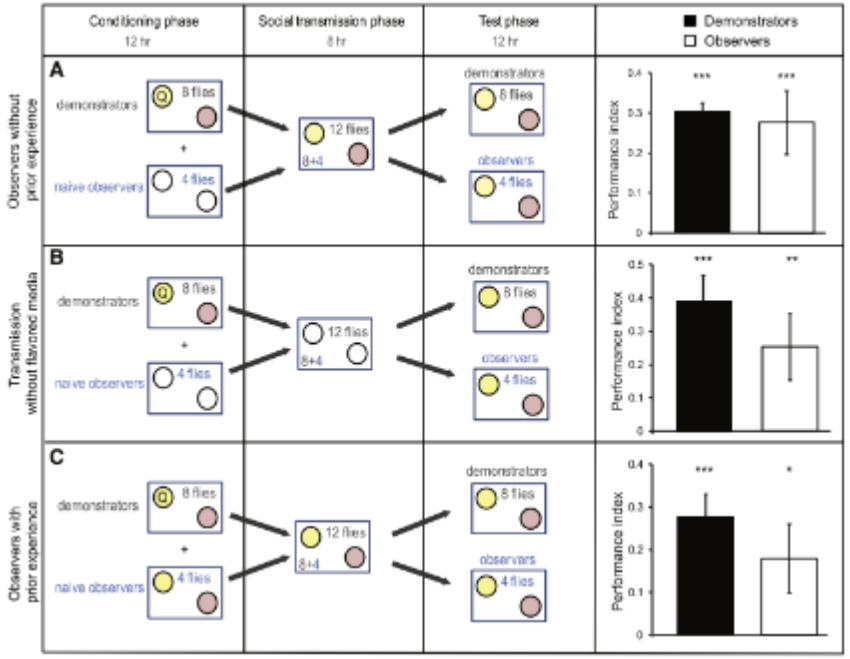


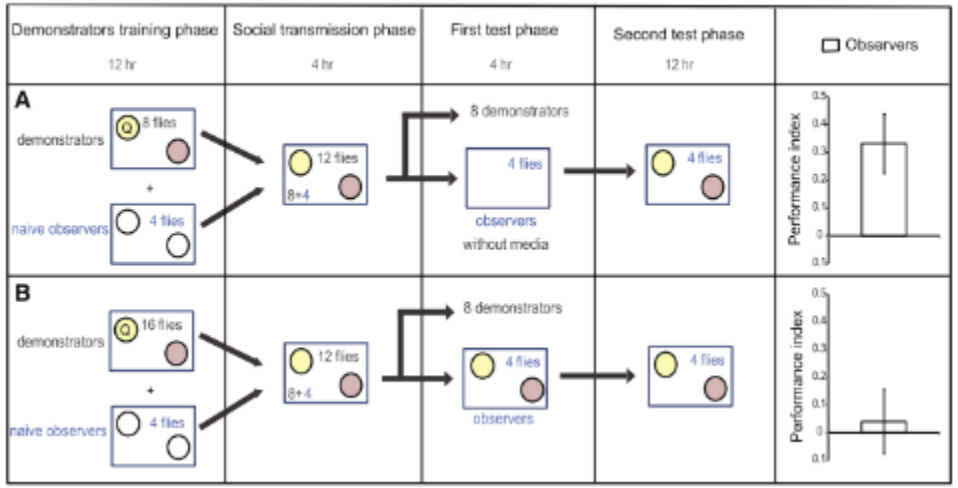


Chun-Chieh Lin. et al. *eLife.* 2015.

The egg-laying site preference can be influenced by the social transmission between females

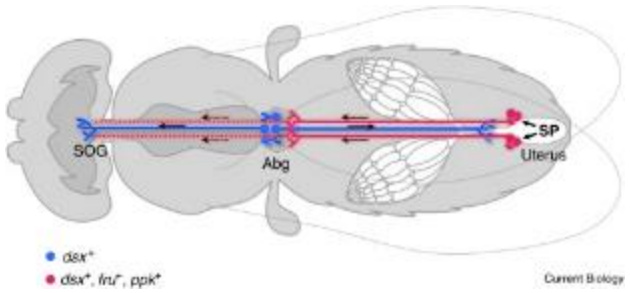


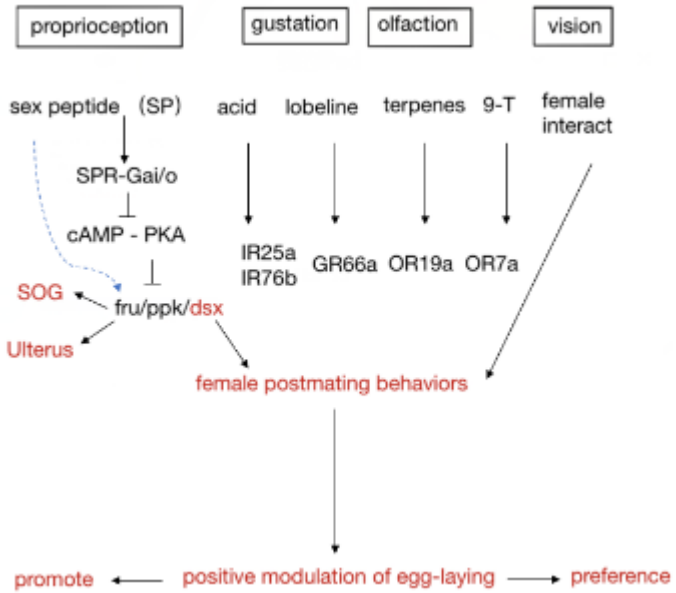




Marine Battesti., et al. *Curr Biol*. 2012

Discussion

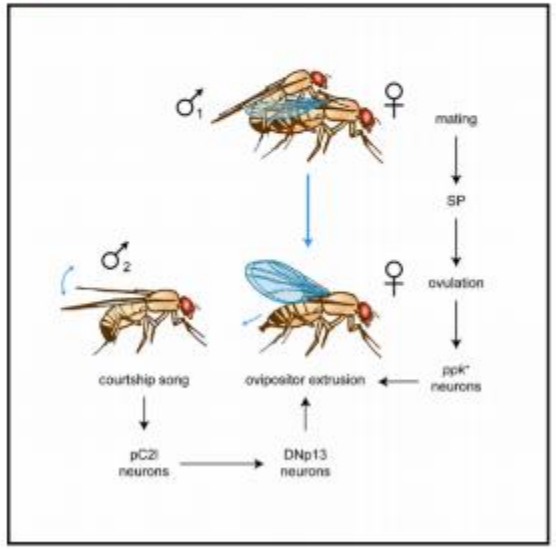




Current Biology

Circuit and Behavioral Mechanisms of Sexual Rejection by *Drosophila* Females

Graphical Abstract



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In Brief

After an initial mating, female flies often reject courtship from other males. Here, Wang et al. characterize the neural circuitry that controls a specific rejection behavior, ovipositor extrusion. Ovipositor extrusion occurs in response to a male's courtship song, provided the female has ovulated as a consequence of a previous mating.

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