

Type	Short name	Full genotype
wild-type	Canton S	<i>Canton S</i>
reporter	UAS-GFP	<i>20xUAS-IVS-mCD8::GFP in VK00005</i>
reporter	LexAop-GCaMP6s	<i>13xLexAop2-Syn21-GcaMP6s in su(Hw)attP8</i>
reporter	UAS-GCaMP6s	<i>20xUAS-GCaMP6s in VIE-260b; 20xUAS-GCaMP6s in VIE-57b</i>
reporter	UAS-myr-FLAG, UAS-syt-HA	<i>3xUAS-Syt::smGFP-HA in su(Hw)attP1, 5xUAS-IVS-myr::smGFP-FLAG in VK00005</i>
reporter	MCFO	<i>pJFRC201-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-HA in VK00005, pJFRC240-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-V5-THS-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-FLAG in su(Hw)attP1</i>
reporter	UAS-FRT-Kir2.1::tdTomato-FRT-mCD8::GFP	<i>20xUAS-IVS-FRT-Kir2.1::tdTomato-FRT-mCD8::GFP in VK00005</i>
reporter	UAS-CsChrimson-mVenus, UAS-syt-HA	<i>20xUAS-CsChrimson-mVenus, UAS-syt-HA in attP18</i>
reporter	UAS-CsChrimson-mVenus	<i>20xUAS-CsChrimson-mVenus in attP18</i>
reporter	UAS-HaloTag	<i>UAS-7xHaloTag::CAAX in VK00005<sup>39</sup></i>
effector	UAS-Chrimson	<i>10xUAS-Chrimson88-mVenus in attP2</i>
effector	UAS-Caspase3	<i>UAS-nz::Caspase3 in VIE-19a, UAS-Caspase3::cz in VIE-260b</i>
effector	UAS-Grim	<i>UAS-IVS-Grim-WPRE in su(Hw)attP6</i>
effector	UAS-TNT	<i>UAS-TNT-E<sup>41</sup></i>
effector	UAS-NaChBac	<i>UAS-NaChBac::EGFP<sup>10</sup></i>
effector	UAS-Kir2.1	<i>UAS-EGFP-Kir2.1<sup>5</sup></i>
effector	UAS-GtACR1	<i>UAS-GtACR1-EYFP in attP2<sup>42</sup></i>
effector	hs-Flp	<i>hs-FlpL2::PEST in attP3</i>
driver	oviDN-SS1	<i>VT050660-p65ADZp in attP40; VT028160-ZpGal4DBD in attP2</i>
driver	oviDN-SS2	<i>VT026873-p65ADZp in attP40; VT040574-ZpGal4DBD in attP2</i>
driver	oviDN-LexA	<i>VT040574-LexAGAD in attP40</i>
driver	SPSN-SS	<i>VT058873-p65ADZp in attP40; VT003810-ZpGal4DBD in attP2</i>
driver	SAG-SS	<i>VT050405-p65ADZp in attP40; VT007068-ZpGal4DBD in attP2<sup>5</sup></i>
driver	pC1-SS1	<i>VT002064-p65ADZp in attP40; VT008469-ZpGal4DBD in attP2</i>
driver	pC1-SS2	<i>VT002064-p65ADZp in attP2, dsx-ZpGal4DBD (dsx-ZpGal4DBD from ref. 29)</i>
driver	oviEN-SS1	<i>VT043086-p65ADZp in attP40; VT034612-ZpGal4DBD in attP2</i>
driver	oviEN-SS2	<i>VT034612-p65ADZp in attP40; VT050229-ZpGal4DBD in attP2</i>
driver	oviIN-SS1	<i>68A10-p65ADZp in attP40; VT010054-ZpGal4DBD in attP2</i>
driver	oviIN-SS2	<i>VT026347-p65ADZp in attP40; VT026035-ZpGal4DBD in attP2</i>
driver	fru-LexA	<i>fru-LexA<sup>40</sup></i>
driver	dsx-LexA	<i>dsx-LexAp65<sup>19</sup></i>
driver	dsx-Gal4	<i>dsx-Gal4<sup>43</sup></i>
driver	oviIN-LexA	<i>VT026347-LexAGAD in attP40</i>

## Supplementary Table 1 | Fly Stocks

Figure	Short genotype	Full genotype
1a	<i>oviDN-SS1 &gt; UAS-myr-FLAG, UAS-syt-HA</i>	<i>w-; VT050660-p65ADZp in attP40/+; VT028160-ZpGal4DBD in attP2/3xUAS-Syt::smGFP-HA in su(Hw)attP1, 5xUAS-IVS-myr::smGFP-FLAG in VK00005</i>
1b	<i>oviDN-SS1 &gt; MCFO</i>	<i>pBPhsFlp2::PEST in attP3/w-; VT050660-p65ADZp in attP40/+; VT028160-ZpGal4DBD in attP2/pJFRC201-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-HA in VK00005,pJFRC240-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-V5-THS-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-FLAG in su(Hw)attP1</i>
1c, 1d, 2c-e	<i>oviDN-SS2 &gt; UAS-Chrimson</i>	<i>w+/w-; VT026873-p65ADZp in attP40/+; VT040574-ZpGal4DBD in attP2/10xUAS-Chrimson-mVenus in attP2</i>
1d	<i>oviDN-SS1 &gt; UAS-Chrimson</i>	<i>w+/w-; VT050660-p65ADZp in attP40/+; VT028160-ZpGal4DBD in attP2/10xUAS-Chrimson-mVenus in attP2</i>
1d-f, 2b	<i>oviDN-SS1</i>	<i>w+/w-; VT050660-p65ADZp in attP40/+; VT028160-ZpGal4DBD in attP2/+</i>
1d, 1e, 3b, 3g	<i>oviDN-SS2</i>	<i>w+/w-; VT026873-p65ADZp in attP40/+; VT040574-ZpGal4DBD in attP2/+</i>
1d	<i>UAS-Chrimson</i>	<i>w+/w-; 10xUAS-Chrimson-mVenus in attP2/+</i>
1e, 1f, 2b	<i>oviDN-SS1 &gt; UAS-Caspase3</i>	<i>w+/w-; VT050660-p65ADZp in attP40/UAS-nz::Caspase3 in VIE-19a, UAS-Caspase3::cz in VIE-260b; VT028160-ZpGal4DBD in attP2/+</i>
1e	<i>oviDN-SS2 &gt; UAS-Caspase3</i>	<i>w+/w-; VT026873-p65ADZp in attP40/UAS-nz::Caspase3 in VIE-19a, UAS-Caspase3::cz in VIE-260b; VT040574-ZpGal4DBD in attP2/+</i>
1e	<i>oviDN-SS1 &gt; UAS-Grim</i>	<i>w+/w-; VT050660-p65ADZp in attP40/UAS-Grim in su(Hw)attP6; VT028160-ZpGal4DBD in attP2/+</i>
1e, 3b	<i>oviDN-SS2 &gt; UAS-Grim</i>	<i>w+/w-; VT026873-p65ADZp in attP40/UAS-Grim in su(Hw)attP6; VT040574-ZpGal4DBD in attP2/+</i>
1e	<i>oviDN-SS1 &gt; UAS-TNT</i>	<i>w+/w-; VT050660-p65ADZp in attP40/UAS-TNT-E; VT028160-ZpGal4DBD in attP2/+</i>
1e	<i>oviDN-SS2 &gt; UAS-TNT</i>	<i>w+/w-; VT026873-p65ADZp in attP40/UAS-TNT-E; VT040574-ZpGal4DBD in attP2/+</i>
1e, 1f, 2b	<i>UAS-Caspase3</i>	<i>w+/w-; +/UAS-nz::Caspase3 in VIE-19a, UAS-Caspase3::cz in VIE-260b</i>
1e, 3b, 3g	<i>UAS-Grim</i>	<i>w+/w-; +/UAS-Grim in su(Hw)attP6</i>
1e, 4g, 4i	<i>UAS-TNT</i>	<i>w+/w-; +/UAS-TNT-E</i>
1g	<i>hs-Flp, oviDN-SS1 &gt; UAS-FRT-Kir2.1::tdTomato-FRT-mCD8::GFP</i>	<i>pBPhsFlp2::PEST in attP3/w-; VT050660-p65ADZp in attP40/+; VT028160-ZpGal4DBD in attP2/20xUAS-IVS-FRT-Kir2.1::tdTomato-FRT-mCD8::GFP in VK00005</i>
2a, 3b, 3g	<i>Canton S</i>	<i>Canton S</i>
3a, 3h, 4h, 4j	<i>UAS-NaChBac</i>	<i>w+/w-; +/UAS-NaChBac::EGFP</i>
3a, 3b	<i>SPSN-SS</i>	<i>w+/w-; VT058873-p65ADZp in attP40/+; VT003280-ZpGal4DBD in attP2/+</i>
3a, 3b	<i>SAG-SS</i>	<i>w+/w-; VT050405-p65ADZp in attP40/+; VT007068-ZpGal4DBD in attP2/+</i>
3a	<i>SPSN-SS &gt; UAS-NaChBac</i>	<i>w+/w-; VT058873-p65ADZp in attP40/UAS-NaChBac::EGFP; VT003280-ZpGal4DBD in attP2/+</i>
3a	<i>SAG-SS &gt; UAS-NaChBac</i>	<i>w+/w-; VT050405-p65ADZp in attP40/UAS-NaChBac::EGFP; VT007068-ZpGal4DBD in attP2/+</i>
3b	<i>SPSN-SS &gt; UAS-Grim</i>	<i>w+/w-; VT058873-p65ADZp in attP40/UAS-Grim in su(Hw)attP6; VT003280-ZpGal4DBD in attP2/+</i>
3b	<i>SAG-SS &gt; UAS-Grim</i>	<i>w+/w-; VT050405-p65ADZp in attP40/UAS-Grim in su(Hw)attP6; VT007068-ZpGal4DBD in attP2/+</i>
3b	<i>SPSN-SS, oviDN-SS2 &gt; UAS-Grim</i>	<i>w+/w-; VT058873-p65ADZp in attP40/UAS-Grim in su(Hw)attP6, VT026873-p65ADZp in attP40; VT003280-ZpGal4DBD in attP2/VT040574-ZpGal4DBD in attP2</i>
3b	<i>SAG-SS, oviDN-SS2 &gt; UAS-Grim</i>	<i>w+/w-; VT050405-p65ADZp in attP40/UAS-Grim in su(Hw)attP6, VT026873-p65ADZp in attP40; VT007068-ZpGal4DBD in attP2/VT040574-ZpGal4DBD in attP2</i>
3c	<i>SAG-SS &gt; MCFO</i>	<i>pBPhsFlp2::PEST in attP3/w-; VT050405-p65ADZp in attP40/+; VT007068-ZpGal4DBD in attP2/pJFRC201-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-HA in VK00005,pJFRC240-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-V5-THS-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-FLAG in su(Hw)attP1</i>
3d	<i>pC1-SS1 &gt; MCFO</i>	<i>pBPhsFlp2::PEST in attP3/w-; VT002064-p65ADZp in attP40/+; VT008469-ZpGal4DBD in attP2/pJFRC201-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-HA in VK00005,pJFRC240-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-V5-THS-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-FLAG in su(Hw)attP1</i>
3d	<i>pC1-SS2 &gt; MCFO</i>	<i>pBPhsFlp2::PEST in attP3/w-; +/+; VT002064-p65ADZp in attP2, dsx-ZpGal4DBD/pJFRC201-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-HA in VK00005,pJFRC240-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-V5-THS-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-FLAG in su(Hw)attP1</i>
3d, 3e, 3f	<i>SAG-SS &gt; UAS-Chrimson, dsx-LexA &gt; LexAop-GCaMP6s</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; VT050405-p65ADZp in attP40/+; VT007068-ZpGal4DBD in attP2/dsx-LexAop65</i>
3g, 3h	<i>pC1-SS1</i>	<i>w+/w-; VT002064-p65ADZp in attP40/+; VT008469-ZpGal4DBD in attP2/+</i>
3g, 3h	<i>pC1-SS2</i>	<i>w+/w-; +/+; VT002064-p65ADZp in attP2, dsx-ZpGal4DBD/+</i>

3g	<i>pC1-SS1 &gt; UAS-Grim</i>	<i>w+/w-; VT002064-p65ADZp in attP40/UAS-Grim in su(Hw)attP6; VT008469-ZpGal4DBD in attP2/+</i>
3g	<i>pC1-SS2 &gt; UAS-Grim</i>	<i>w+/w-; +/UAS-Grim in su(Hw)attP6; VT002064-p65ADZp in attP2, dsx-ZpGal4DBD/+</i>
3g	<i>pC1-SS1, oviDN-SS2 &gt; UAS-Grim</i>	<i>w+/w-; VT002064-p65ADZp in attP40/UAS-Grim in su(Hw)attP6, VT026873-p65ADZp in attP40; VT008469-ZpGal4DBD in attP2/VT040574-ZpGal4DBD in attP2</i>
3g	<i>pC1-SS2, oviDN-SS2 &gt; UAS-Grim</i>	<i>w+/w-; +/UAS-Grim in su(Hw)attP6, VT026873-p65ADZp in attP40; VT002064-p65ADZp in attP2, dsx-ZpGal4DBD/VT040574-ZpGal4DBD in attP2</i>
3h	<i>pC1-SS1 &gt; UAS-NaChBac</i>	<i>w+/w-; VT002064-p65ADZp in attP40/UAS-NaChBac::EGFP; VT008469-ZpGal4DBD in attP2/+</i>
3h	<i>pC1-SS2 &gt; UAS-NaChBac</i>	<i>w+/w-; +/UAS-NaChBac::EGFP; VT002064-p65ADZp in attP2, dsx-ZpGal4DBD/+</i>
3i, 3j	<i>pC1-SS1 &gt; UAS-Chrimson, oviDN-LexA &gt; LexAop-GCaMP6s</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; VT002064-p65ADZp in attP40/VT040574-LexAGAD in attP40; VT008469-ZpGal4DBD in attP2/+</i>
4c	<i>oviEN-SS1 &gt; UAS-CsChrimson-mVenus, UAS-syt-HA</i>	<i>UAS-Syt-HA, 20xUAS-CsChrimson-mVenus in attP18/w-; VT034612-p65ADZp in attP40/+; VT050229-ZpGal4DBD in attP2/+</i>
4c	<i>oviIN-SS1 &gt; UAS-CsChrimson-mVenus, UAS-syt-HA</i>	<i>UAS-Syt-HA, 20xUAS-CsChrimson-mVenus in attP18/w-; VT026347-p65ADZp in attP40/+; VT026035-ZpGal4DBD in attP2/+</i>
4d	<i>oviEN-SS1 &gt; UAS-Chrimson, oviDN-LexA &gt; LexAop-GCaMP6s</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; VT034612-p65ADZp in attP40/VT040574-LexAGAD in attP40; VT050229-ZpGal4DBD in attP2/+</i>
4e	<i>oviIN-SS1 &gt; UAS-Chrimson, oviDN-LexA &gt; LexAop-GCaMP6s</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; VT026347-p65ADZp in attP40/VT040574-LexAGAD in attP40; VT026035-ZpGal4DBD in attP2/+</i>
4f	<i>pC1-SS1 &gt; UAS-Chrimson, oviIN-LexA &gt; LexAop-GCaMP6s</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; VT002064-p65ADZp in attP40/VT026347-LexAGAD in attP40; VT008469-ZpGal4DBD in attP2/+</i>
4f	<i>pC1-SS2 &gt; UAS-Chrimson, oviIN-LexA &gt; LexAop-GCaMP6s</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; +/VT026347-LexAGAD in attP40; VT002064-p65ADZp in attP2, dsx-ZpGal4DBD/+</i>
4g, 4h	<i>oviEN-SS1</i>	<i>w+/w-; VT043086-p65ADZp in attP40/+; VT034612-ZpGal4DBD in attP2/+</i>
4g, 4h	<i>oviEN-SS2</i>	<i>w+/w-; VT034612-p65ADZp in attP40/+; VT050229-ZpGal4DBD in attP2/+</i>
4g	<i>oviEN-SS1 &gt; UAS-TNT</i>	<i>w+/w-; VT043086-p65ADZp in attP40/UAS-TNT-E; VT034612-ZpGal4DBD in attP2/+</i>
4g	<i>oviEN-SS2 &gt; UAS-TNT</i>	<i>w+/w-; VT034612-p65ADZp in attP40/UAS-TNT-E; VT050229-ZpGal4DBD in attP2/+</i>
4h	<i>oviEN-SS1 &gt; UAS-NaChBac</i>	<i>w+/w-; VT043086-p65ADZp in attP40/ UAS-NaChBac::EGFP; VT034612-ZpGal4DBD in attP2/+</i>
4h	<i>oviEN-SS2 &gt; UAS-NaChBac</i>	<i>w+/w-; VT034612-p65ADZp in attP40/ UAS-NaChBac::EGFP; VT050229-ZpGal4DBD in attP2/+</i>
4i	<i>UAS-Kir2.1</i>	<i>w+/w-; +/+; UAS-EGFP-Kir2.1/+</i>
4i, 4j	<i>oviIN-SS1</i>	<i>w+/w-; 68A10-p65ADZp in attP40/+; VT010054-ZpGal4DBD in attP2/+</i>
4i, 4j	<i>oviIN-SS2</i>	<i>w+/w-; VT026347-p65ADZp in attP40/+; VT026035-ZpGal4DBD in attP2/+</i>
4i	<i>oviIN-SS1 &gt; UAS-TNT</i>	<i>w+/w-; 68A10-p65ADZp in attP40/UAS-TNT-E; VT010054-ZpGal4DBD in attP2/+</i>
4i	<i>oviIN-SS2 &gt; UAS-TNT</i>	<i>w+/w-; VT026347-p65ADZp in attP40/UAS-TNT-E; VT026035-ZpGal4DBD in attP2/+</i>
4i	<i>oviIN-SS1 &gt; UAS-Kir2.1</i>	<i>w+/w-; 68A10-p65ADZp in attP40/+; VT010054-ZpGal4DBD in attP2/UAS-EGFP-Kir2.1</i>
4i	<i>oviIN-SS2 &gt; UAS-Kir2.1</i>	<i>w+/w-; VT026347-p65ADZp in attP40/+; VT026035-ZpGal4DBD in attP2/UAS-EGFP-Kir2.1</i>
4j	<i>oviIN-SS1 &gt; UAS-NaChBac</i>	<i>w+/w-; 68A10-p65ADZp in attP40/ UAS-NaChBac::EGFP; VT010054-ZpGal4DBD in attP2/+</i>
4j	<i>oviIN-SS2 &gt; UAS-NaChBac</i>	<i>w+/w-; VT026347-p65ADZp in attP40/ UAS-NaChBac::EGFP; VT026035-ZpGal4DBD in attP2/+</i>
4l	<i>oviDN-SS1 &gt; UAS-GCaMP6s</i>	<i>w+/w-; VT050660-p65ADZp in attP40/UAS-GCaMP6s in VIE-260b; VT028160-ZpGal4DBD in attP2/UAS-GCaMP6s in VIE-57b</i>
4m	<i>oviIN-SS2 &gt; UAS-GCaMP6s</i>	<i>w+/w-; VT026347-p65ADZp in attP40/UAS-GCaMP6s in VIE-260b; VT026035-ZpGal4DBD in attP2/UAS-GCaMP6s in VIE-57b</i>
4n	<i>oviEN-SS1 &gt; UAS-GCaMP6s</i>	<i>w+/w-; VT043086-p65ADZp in attP40/UAS-GCaMP6s in VIE-260b; VT034612-ZpGal4DBD in attP2/UAS-GCaMP6s in VIE-57b</i>
Extended Data Fig. 1	<i>oviDN-SS1 &gt; UAS-myrFLAG, UAS-sytHA</i>	<i>w-; VT050660-p65ADZp in attP40/+; VT028160-ZpGal4DBD in attP2/3xUAS-Syt::smGFP-HA in su(Hw)attP1, 5xUAS-IVS-myr::smGFP-FLAG in VK00005</i>
Extended Data Fig. 1	<i>oviDN-SS2 &gt; UAS-myrFLAG, UAS-sytHA</i>	<i>w-; VT026873-p65ADZp in attP40/+; VT040574-ZpGal4DBD in attP2/3xUAS-Syt::smGFP-HA in su(Hw)attP1, 5xUAS-IVS-myr::smGFP-FLAG in VK00005</i>
Extended Data Fig. 1	<i>SPSN-SS &gt; UAS-myrFLAG, UAS-sytHA</i>	<i>w-; VT058873-p65ADZp in attP40/+; VT003280-ZpGal4DBD in attP2/3xUAS-Syt::smGFP-HA in su(Hw)attP1, 5xUAS-IVS-myr::smGFP-FLAG in VK00005</i>
Extended Data Fig. 1	<i>SAG-SS &gt; UAS-myrFLAG, UAS-sytHA</i>	<i>w-; VT050405-p65ADZp in attP40/+; VT007068-ZpGal4DBD in attP2/3xUAS-Syt::smGFP-HA in su(Hw)attP1, 5xUAS-IVS-myr::smGFP-FLAG in VK00005</i>
Extended Data Fig. 1	<i>pC1-SS1 &gt; UAS-myrFLAG, UAS-sytHA</i>	<i>w-; VT002064-p65ADZp in attP40/+; VT008469-ZpGal4DBD in attP2/3xUAS-Syt::smGFP-HA in su(Hw)attP1, 5xUAS-IVS-myr::smGFP-FLAG in VK00005</i>

Extended Data Fig. 1	<i>pC1-SS2 &gt; UAS-CsChrimson-mVenus, UAS-syt-HA</i>	<i>20xUAS-CsChrimson-mVenus, UAS-syt-HA in attP18 /w-; +/+; VT002064-p65ADZp, dsx-ZpGal4DBD/+</i>
Extended Data Fig. 1	<i>oviEN-SS1 &gt; UAS-CsChrimson-mVenus, UAS-syt-HA</i>	<i>20xUAS-CsChrimson-mVenus, UAS-syt-HA in attP18 /w-; VT043086-p65ADZp in attP40/+; VT034612-ZpGal4DBD in attP2/+</i>
Extended Data Fig. 1	<i>oviEN-SS2 &gt; UAS-CsChrimson-mVenus, UAS-syt-HA</i>	<i>20xUAS-CsChrimson-mVenus, UAS-syt-HA in attP18 /w-; VT034612-p65ADZp in attP40/+; VT050229-ZpGal4DBD in attP2/+</i>
Extended Data Fig. 1	<i>oviIN-SS1 &gt; UAS-CsChrimson-mVenus, UAS-syt-HA</i>	<i>20xUAS-CsChrimson-mVenus, UAS-syt-HA in attP18 /w-; 68A10-p65ADZp in attP40/+; VT010054-ZpGal4DBD in attP2/+</i>
Extended Data Fig. 1	<i>oviIN-SS2 &gt; UAS-CsChrimson-mVenus, UAS-syt-HA</i>	<i>20xUAS-CsChrimson-mVenus, UAS-syt-HA in attP18 /w-; VT026347-p65ADZp in attP40/+; VT026035-ZpGal4DBD in attP2/+</i>
Extended Data Fig. 2	<i>oviDN-SS1 &gt; UAS-tdTomato, fru-LexA &gt; LexAop-GCaMP6s</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; VT050660-p65ADZp in attP40/+; VT028160-ZpGal4DBD in attP2/fru-LexA</i>
Extended Data Fig. 2	<i>oviDN-SS2 &gt; UAS-tdTomato, fru-LexA &gt; LexAop-GCaMP6s</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; VT026873-p65ADZp in attP40/+; VT040574-ZpGal4DBD in attP2/fru-LexA</i>
Extended Data Fig. 2	<i>pC1-SS1 &gt; UAS-tdTomato, fru-LexA &gt; LexAop-GCaMP6s</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; VT002064-p65ADZp in attP40/+; VT008469-ZpGal4DBD in attP2/fru-LexA</i>
Extended Data Fig. 2	<i>oviDN-SS1 &gt; UAS-tdTomato, dsx-LexA &gt; LexAop-GCaMP6s</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; VT050660-p65ADZp in attP40/+; VT028160-ZpGal4DBD in attP2/dsx-LexA p65</i>
Extended Data Fig. 2	<i>oviDN-SS2 &gt; UAS-tdTomato, dsx-LexA &gt; LexAop-GCaMP6s</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; VT026873-p65ADZp in attP40/+; VT040574-ZpGal4DBD in attP2/dsx-LexA p65</i>
Extended Data Fig. 2	<i>pC1-SS1 &gt; UAS-tdTomato, dsx-LexA &gt; LexAop-GCaMP6s</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; VT002064-p65ADZp in attP40/+; VT008469-ZpGal4DBD in attP2/dsx-LexA p65</i>
Extended Data Fig. 3	<i>oviDN-SS2 &gt; UAS-HaloTag</i>	<i>w-; VT026873-p65ADZp in attP40/+ ; VT040574-ZpGal4DBD in attP2/UAS-7xHaloTag::CAAX in VK00005</i>
Extended Data Fig. 3	<i>SAG-SS &gt; UAS-HaloTag</i>	<i>w-; VT050405-p65ADZp in attP40/+ ; VT007068-ZpGal4DBD in attP2/UAS-7xHaloTag::CAAX in VK00005</i>
Extended Data Fig. 3	<i>pC1-SS1 &gt; UAS-HaloTag</i>	<i>w-; VT002064-p65ADZp in attP40/+ ; VT008469-ZpGal4DBD in attP2/UAS-7xHaloTag::CAAX in VK00005</i>
Extended Data Fig. 3	<i>oviEN-SS1 &gt; UAS-HaloTag</i>	<i>w-; VT043086-p65ADZp in attP40/+ ; VT034612-ZpGal4DBD /UAS-7xHaloTag::CAAX in VK00005</i>
Extended Data Fig. 3	<i>oviIN-SS1 &gt; UAS-HaloTag</i>	<i>w-; 68A10-p65ADZp in attP40/+ ; VT010054-ZpGal4DBD in attP2/UAS-7xHaloTag::CAAX in VK00005</i>
Extended Data Fig. 4a	<i>oviDN-SS1 &gt; UAS-GFP</i>	<i>w-; VT050660-p65ADZp in attP40/+; VT028160-ZpGal4DBD, 20xUAS-IVS-mCD8::GFP in VK00005/+</i>
Extended Data Fig. 4a	<i>oviDN-SS2 &gt; UAS-GFP</i>	<i>w-; VT026873-p65ADZp in attP40/+; VT040574-ZpGal4DBD, 20xUAS-IVS-mCD8::GFP in VK00005/+</i>
Extended Data Fig. 4a	<i>oviDN-SS1 &gt; UAS-GFP, UAS-Grim</i>	<i>w-; VT050660-p65ADZp in attP40/UAS-Grim in su(Hw)attP6; VT028160-ZpGal4DBD, 20xUAS-IVS-mCD8::GFP in VK00005/+</i>
Extended Data Fig. 4a	<i>oviDN-SS2 &gt; UAS-GFP, UAS-Grim</i>	<i>w-; VT026873-p65ADZp in attP40/UAS-Grim in su(Hw)attP6; VT040574-ZpGal4DBD, 20xUAS-IVS-mCD8::GFP in VK00005/+</i>
Extended Data Fig. 4b	<i>oviDN-SS1</i>	<i>w-; VT050660-p65ADZp in attP40/+; VT028160-ZpGal4DBD/+</i>
Extended Data Fig. 4b, 4c	<i>oviDN-SS2</i>	<i>w-; VT026873-p65ADZp in attP40/+; VT040574-ZpGal4DBD/+</i>
Extended Data Fig. 4b, 4c	<i>UAS-Caspase3</i>	<i>w+/w-; +/UAS-nz::Caspase3 in VIE-19a, UAS-Caspase3::cz in VIE-260b</i>
Extended Data Fig. 4b	<i>oviDN-SS1 &gt; UAS-Caspase3</i>	<i>w+/w-; VT050660-p65ADZp in attP40/UAS-nz::Caspase3 in VIE-19a, UAS-Caspase3::cz in VIE-260b; VT028160-ZpGal4DBD in attP2/+</i>
Extended Data Fig. 4b, 4c	<i>oviDN-SS2 &gt; UAS-Caspase3</i>	<i>w+/w-; VT026873-p65ADZp in attP40/UAS-nz::Caspase3 in VIE-19a, UAS-Caspase3::cz in VIE-260b; VT040574-ZpGal4DBD in attP2/+</i>
Extended Data Fig. 5a	<i>oviDN-SS1 &gt; MCFO</i>	<i>pBPhsFlp2::PEST in attP3/w-; VT050660-p65ADZp in attP40/+; VT028160-ZpGal4DBD in attP2/pJFRC201-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-HA in VK00005, pJFRC240-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-V5-THS-10xUAS-FRT&gt;STOP&gt;FRT-myr::smGFP-FLAG in su(Hw)attP1</i>
Extended Data Fig. 5b	<i>hs-FlpL::PEST, oviDN-SS1 &gt; UAS-FRT-Kir2.1::tdTomato-FRT-mCD8::GFP</i>	<i>pBPhsFlp2::PEST in attP3/w-; VT050660-p65ADZp in attP40/+; VT028160-ZpGal4DBD in attP2/20xUAS-IVS-FRT-Kir2.1::tdTomato-FRT-mCD8::GFP in VK00005</i>
Extended Data Fig. 5c	<i>hs-FlpL::PEST, oviDN-SS2 &gt; UAS-FRT-Kir2.1::tdTomato-FRT-mCD8::GFP</i>	<i>pBPhsFlp2::PEST in attP3/w-; VT026873-p65ADZp in attP40/+; VT040574-ZpGal4DBD in attP2/20xUAS-IVS-FRT-Kir2.1::tdTomato-FRT-mCD8::GFP in VK00005</i>
Extended Data Fig. 5d	<i>pC1-SS1 &gt; UAS-Chrimson, oviDN-LexA &gt; LexAop-GCaMP6s</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; VT002064-p65ADZp in attP40/VT040574-LexAGAD in attP40; VT008469-ZpGal4DBD in attP2/+</i>
Extended Data Fig. 6	<i>oviDN-SS2 &gt; UAS-Chrimson</i>	<i>w+/w-; VT026873-p65ADZp in attP40/+; VT040574-ZpGal4DBD in attP2/10xUAS-Chrimson-mVenus in attP2</i>
Extended Data Fig. 7a	<i>pC1-SS1 &gt; MCFO</i>	<i>pBPhsFlp2::PEST in attP3/w-; VT002064-p65ADZp in attP40/+; VT008469-ZpGal4DBD in attP2/pJFRC201-10xUAS -FRT&gt;STOP&gt;FRT-myr::smGFP-HA in VK00005, pJFRC240-</i>

Extended Data Fig. 7a	<i>pC1-SS2 &gt; MCFO</i>	<i>10xUAS -FRT&gt;STOP&gt;FRT-myr::smGFP-V5-THS-10xUAS -FRT&gt;STOP&gt;FRT-myr::smGFP-FLAG in su(Hw)attP1</i>
Extended Data Fig. 7b	<i>SAG-SS &gt; UAS-Chrimson, dsx-LexA &gt; LexAop-GCaMP6s</i>	<i>pBPhsFlp2::PEST in attP3/w-; +/-; VT002064-p65ADZp in attP2, dsx-ZpGal4DBD/pJFRC201-10xUAS -FRT&gt;STOP&gt;FRT-myr::smGFP-HA in VK00005,pJFRC240-10xUAS -FRT&gt;STOP&gt;FRT-myr::smGFP-V5-THS-10xUAS -FRT&gt;STOP&gt;FRT-myr::smGFP-FLAG in su(Hw)attP1</i>
Extended Data Fig. 7c, 7d	<i>UAS-GtACR1</i>	<i>10xUAS-Chrimson88-tdTomato in attP18, 13xLexAop2-Syn21-GCaMP6s in su(Hw)attP8/w-; VT050405-p65ADZp in attP40/+; VT007068-ZpGal4DBD in attP2/dsx-LexAp65</i>
Extended Data Fig. 7c, 7d	<i>SAG-SS</i>	<i>w+/w-; VT050405-p65ADZp in attP40/+; VT007068-ZpGal4DBD in attP2/+</i>
Extended Data Fig. 7c, 7d	<i>pC1-SS1</i>	<i>w+/w-; VT002064-p65ADZp in attP40/+; VT008469-ZpGal4DBD in attP2/+</i>
Extended Data Fig. 7c, 7d	<i>SAG-SS &gt; UAS-GtACR1</i>	<i>w+/w-; VT050405-p65ADZp in attP40/+; VT007068-ZpGal4DBD in attP2/UAS-GtACR1-EYFP in attP2</i>
Extended Data Fig. 7c, 7d	<i>pC1-SS1 &gt; UAS-GtACR1</i>	<i>w+/w-; VT002064-p65ADZp in attP40/+; VT008469-ZpGal4DBD in attP2/UAS-GtACR1-EYFP in attP2</i>
Extended Data Fig. 7e	<i>dsx-Gal4 &gt; UAS-GCaMP6s</i>	<i>w+/w-; UAS-GCaMP6s in VIE-260b/+; dsx-Gal4/UAS-GCaMP6s in VIE-57b</i>
Extended Data Fig. 8a-c	<i>Canton S</i>	<i>Canton S</i>
Extended Data Fig. 8d, 8e	<i>oviDN-SS1 &gt; UAS-GCaMP6s</i>	<i>w+/w-; VT050660-p65ADZp in attP40/UAS-GCaMP6s in VIE-260b; VT028160-ZpGal4DBD in attP2/UAS-GCaMP6s in VIE-57b</i>
Extended Data Fig. 8d, 8e	<i>oviIN-SS2 &gt; UAS-GCaMP6s</i>	<i>w+/w-; VT026347-p65ADZp in attP40/UAS-GCaMP6s in VIE-260b; VT026035-ZpGal4DBD in attP2/UAS-GCaMP6s in VIE-57b</i>
Extended Data Fig. 8d, 8e	<i>oviEN-SS1 &gt; UAS-GCaMP6s</i>	<i>w+/w-; VT043086-p65ADZp in attP40/UAS-GCaMP6s in VIE-260b; VT034612-ZpGal4DBD in attP2/UAS-GCaMP6s in VIE-57b</i>

## Supplementary Table 2 | Fly genotypes in figures