Additional file 5

Table of content

Table S1: Genes found to be differentially expressed between *V1* and *V14* CNS.

Name	Biological or Cellular Function	Name	Biological or Cellular Function	Name	Biological or Cellular Function
αEst1	Hydrolase activity	*Antp*	transcription factor activity	*CG5037*	Integral membrane protein
Ash2	Transcription regulator activity	*Arp11*	Protein binding	*CG5080*	
Art3	Protein amino acid methylation	*Atu*	-	*CG5850*	
CG6388	tRNA processing	*Bap55*	Structural constituant of cytoskeleton	*CG6296*	Phopholipase A1 activity
CG7878	Nucleic acid binding	*blot*	Neurotransmitter transport	*CG6311*	
CG31731	transport	*caps*	Axon guidance	*CG7357*	Nucleic acid binding
CG8155	Small GTPase regulator	*Cdk4*	Cell cycle	*CG7971*	RNA splicing
CG31961	Protein binding	*cenB1A*	Regulation of GTPase	*CG8129*	Protein binding
CG31637	Sulfotransferase activity	*CG10184*	Amino acide metabolism	*CG8444*	Asymmetric protein localisation
CG3021	tRNA processing	*CG10681*	Protein binding	*CG9972*	
CG10632	Protein binding	*CG12009*	Chitin binding	*Cyp310a1*	Oxidoreductase activity
CG10671	unknown	*CG14230*	Nucleic acid binding	*Cyp6a13*	Oxidoreductase activity
DPAL1	Protein modification process	*CG1515*	Vesicul mediated transport	*dlg1*	
Ftz-F1	Ligand-dependant nuclear receptor	*CG15835*	Cell communication	*dyl*	Srucrtural constituant of cuticule
FK506-bp1	Protein folding	*CG1607*	transport	*elav*	
Hb	Transcription activator activity	*CG17068*	Protein binding	*fz*	Asymmetric protein localisation
Iap2	Protein binding	*CG17806*	Protein binding	*GM130*	Golgi organisation and biogenesis
Inx3	Gap junction channel activity	*CG1868*		*grk*	Cell fate commitment
Keren	MAPKKK cascade	*CG18769*		*Hrs*	Neurotransmitter secretion
Mbo	Protein nucleus import	*CG31301*	Nucleic acid binding	*Int6*	Translation initiation factor
Nak	Serine/threonine kinase	*CG3238*		*JhI-26*	Nucleic acid binding
Nej	Transcription coactivator	*CG3271*		*Klc*	Microtubule motor activity
Notch	Protein binding,	*CG3344*	Proteolysis and peptidolysis	*l(2)44DEa*	Fatty acid metabolism
pelo	unknown	*CG4168*	Transmission of nerve impulse	*Lac*	Cell adhesion
psq	Transcrition factor activity	*CG4500*	-	*mdy*	Regulation of nurse cells apoptosis
Rac1	Dendrite morphogenesis	*CG4527*	Serine/threonine kinase	*mei-S332*	Cell cycle
tollo	Serine/threonine kinase	*CG4707*	transcription regulator activity	*spin*	Programmed cell death
TfIIs	Transcription factor activity	*CG3704*	ATP binding	*Tor*	Insulin pathway/ growth
		CG4973	Protein ubiquitination	*unk*	Larval development fate commitment

We found 86 genes that are highly correlated (coeff> 0,9). Among the 86 genes, 28 were also found to be overexpressed in the *V1* AMC (column on the left, gene names are indicated in bold) and contain the common putative *pros* DNA motif in their promoter. The 58 genes present in the two columns on the right are specifically overexpressed in *V1* CNS as compared to *V14* CNS.

Table S2: Phenotype data related to the candidate genes involved in neurite outgrowth and/or synaptic transmission.

Genes	**Tissue/organ/development stages**	**Phenotypes**	**Ref**
αEst1	Microarray data on adult and embryo	Putative target of pumillo that involved in morphogenesis of larval peripheral sensory neurons.	1
Ash2	Third instar larval brain Larval motoneurons	Ash2 mutant present fasciculation defects in the ventral ganglion. Ash2 activation generates a reduced synapses and pathfinding defects.	2 3
Bnl	Larval and adult Dorsal Cluster Neurons (DCNs).	Axon retraction.	6
CaMKI	Various tissue for larvae , pupae and adult	A Ca2+ sensor for a broad diversity of retinal proteins, some of which are implicated in synaptic transmission.	8
CG6388	larval Neuromuscular Junction	Overexpression of CG6388 suppresses the NMJ overgrowth and restaure the normal morphology	11
DPAL1	Embryos, larvae and adult.	Associated with specific peptidergic neurons. Involved in neuropeptide biosynthesis.	13
EGFR	Larva/pupal/adult ocellar sensory neuron.	Expression of a dominant negative form of EGFR resulted in stalling of axon extension in ocellar sensory neurons. Axon sorting and extension	14
Gwl	Larval neuromuscular system (ISN) Larval brain	GOF phenotype: ISNb (intersegmental neurons) pathfinding defects, including ectopic synaptic branches. Larval brain neuroblasts are mitotic progression defective	3 21
LimK1	Adult antennal lobe Larval Neuromuscular jonction	Increase in Limk leads to petit synapses and to ectopic glomeruli Inhibit axons growth	50 26
loco	Embryos	defects in ensheathment of longitudinal axon tracts	29
Nej	Larval neuromuscular synapses	The presynaptic overexpression of CREB impaired neurotransmitter release Overexpression of Nej can act to inhibit presynaptic functional development	31 11
Notch	L3/pupal/Adult brain DC neurons. Adult. Larval/adult olfactory receptor neurons (ORNs).	Overexpression results in inhibition of axonal branching, a complete failure of innervation of the medulla and defects in the arborisation pattern. Overexpression produces an improvement in **olfactory** long-term memory Odorant receptor expression and the axonal targeting of ORNs were specified according to their Notch-mediated identities	32 33 35
Prosα7	Tird instar larva NMJ Tird instar larva Mushroom body gamma neurons	Inhibition of the proteasome causes a rapid strengthening of neurotransmission. Neuronal remodelling: involved in axon pruning (microarray data),	40 30
Prosβ2	Third instar larval (NMJ)	Constitutive expression of prosβ2 induce an increase of excitatory junctional current (EJC) amplitudes. Neuronal remodelling: involved in axon pruning (microarray data),	38 30

Table S2 continued

Prosα6	Tird instar larva NMJ	Inhibition of the proteasome causes a rapid strengthening of neurotransmission. Neuronal remodelling: involved in axon pruning (microarray data),	40 30
Prosα26	Tird instar larva NMJ	Inhibition of the proteasome causes a rapid strengthening of neurotransmission. Neuronal remodelling: involved in axon pruning (microarray data),	40 30
Pvr	CNS embryos	Required in midline glia (MG) during axon guidance and ultimately enabling axonal enwrapment. Required for axonal commissures to separate normally. Removing the function of Pvr, or disrupting Rac1 function, inhibits VNC condensation Pvr mutants have defects in axon scaffold formation in the CNS	44 51 52
Rac1	larval Dorsal Cluster Neurons (DCNs). Larval Neuromuscular jonction Larval PNS (da neurons) Larvae « da » neurons	Activation of Rac1 inhibits axon extension and induces a decreased number of DCN axons crossing the optic chiasm. Rac/Cdc42, (via effector kinases Rok or Pak), activate LIM kinase to inhibit axon growth Elevated Rac1 causes increases in dentritic branching and filopodia formation in all da neurons Overexpression of Rac1 promoted dendritic branching of "da" neurons	6 26 45 46
RPN1	Tird instar larva Mushroom body gamma neurons	Neuronal remodelling: involved in axon pruning (microarray data),	30
RPN2	Tird instar larva Mushroom body gamma neurons	Neuronal remodelling: involved in axon pruning (microarray data),	30
RPN5	Tird instar larva Mushroom body gamma neurons	Neuronal remodelling: involved in axon pruning (microarray data),	30
Tollo	Embryos/Larval	Heterochronic misexpression of Toll affects synaptogenesis and motoneuron growth cones	48

The criteria used for the description of the phenotypes were as follows: (1) if many larval phenotypes were available for a gene, we selected only those observed in the nervous system and preferentially in the peripheral nervous system (PNS). (2) If no larval phenotype was available for a gene, we selected those observed in the embryonic and/or adult PNS. (3) If available, the effect of the upregulation or downregulation of these genes is mentioned respectively for those that are overexpressed or underexpressed in *V1* AMC. (4) All studies mentioned were done in *Drosophila melanogaster*.

Table S3: Phenotype data related to the candidate genes involved in growth and autophagy.

Genes	**Tissue/organ/development stages**	Phenotyes	**Ref**
Ash2	Drosophila S2 cells	Resulted in an increased mean cell diameter when silenced Increase of *ash2* protein was observed in mTOR knockdown cells.	4
	Third instar larvae	Genetic mosaics, homozygous mutant cells show effects on both cell differentiation and cell size.	2
CG10702	Microarray data	Insulin-like growth factor receptor activity: up-regulated by increases in EGFR and downregulated by loss of *EGFR.*	9
	Larval salivary gland	Autophagy	10
Dok	Embryo/adult	Insulin receptor binding, regulation of cell shape	12
EGFR	Embryos/Larval fat body	Impeding EGF signaling decreases cell size; Spi/EGFR activity promotes cell survival and growth but acts at a level that limits both processes.	15
	Microarray data	Involved in autophagy in larval fat body (via keren ligand); insulin/TOR pathway regulates Neurogenesis and EGFR	16, 42
FK506-bp1	Fat body of feeding/wandering flies	Effect on autophagy, potentially through modulation of the transcription factor Foxo.	16
	Microarray data ; eye imaginal disc	Overexpression inhibits cell growth, developmental and starvation-induced autophagy.	
Ftz-F1	Salivary gland during developpement	Premature expression of *FTZ-F1* in larvae causes defects in the molting process. Mutations in the steroid-regulated gene *FTZ-F1* prevents authophagic programmed cell death in salivary gland.	19
Iap2	larval salivary gland	Involved in autophagic cell death (identified by SAGE approach)	23
Keren	Larval fat body (microarray data)	Upregulated during developmental autophagy in larval fat body	16
LK6	Larvae	Overexpression of Lk6 results in growth inhibition in an eIF4E-dependent manner.	28
		Regulation of growth	27
	Adult	Lk6, involve in the TOR/FOXO nutrient sensing pathway.	53
Nej	Larval salivary gland	Autophagy (identified by micrroarray ananlysis)	10
Notch	Embryo (ovaries)	Interact with LK6 which involve in the TOR/FOXO pathway (growth and autophagy)	20
	Third instar larvae	Notch coordinates in wing primordia tissue growth	49
PhKγ	Larvae	Glucose catabolic process	36
Pros β2	larval salivary gland	Autophagy (identified by micrroarray ananlysis)	10
Pros α7	larval salivary gland	Autophagy (identified by micrroarray ananlysis)	10
Prosα6	larval salivary gland	Autophagy (identified by micrroarray ananlysis)	10
Pros26	larval salivary gland	Autophagy (identified by micrroarray ananlysis)	10
Pros26.4	larval salivary gland	Autophagy (identified by micrroarray ananlysis)	10
RPN1	larval salivary gland	Autophagy (identified by micrroarray ananlysis)	10
RPN2	larval salivary gland	Autophagy (identified by micrroarray ananlysis)	10
RPN5	larval salivary gland	Autophagy (identified by micrroarray ananlysis)	10

The criteria used for the description of the phenotypes were the same as those for Table S2.

Table S4: Phenotype data related to the candidate genes involved in sensory organ development and most particularly in olfaction (in bold) .

Genes	**Tissue/organ/development stages**	**phenotypes**	**Ref**
Ash2	Wing imaginal disc	Preserve proper sensory organ organization. loss of ***ash2*** can yield ectopic sensory organs	5
CaMK1		Synaptic transmission	8
ckII$\boldsymbol{\alpha}$	Adult eye	Compromising CK2 elicits surpernumerary R8 photoreceptor, rough eye and defects in the interommatidial bristles.	37
Dok	Adult	Loss of bristles in the midline region of the thorax, unilateral or bilateral loss of anterior orbital bristles in the head region and irregularly placed bristles in the eyes.	12
EGFR	Larva/pupae/adult ocellar sensory neuron Pupae	Ocellar sensory neurons Regulates cell number in the third segment of the antennae	14, 56 25
Ftz-F1	Adult abdominal and sternopleural bristles phenotypes	Loss of bristles Mutants show an abnormal **olfactory** avoidance response.	54 41
Hb	embryos	Labial segment formation including sense organ	22
Iap2	Third instar larvae (wing disc)/adult notum	IAP2 overexpression results in additional macrochaetes Transcript level increases in GOF EGFR mutant	24 9
Keren	Adult eye	Participate in EGFR signalling in the eye, where it acts redundantly with Spitz to control R8 spacing, cell clustering and survival	56
LimK1	Adult antennal lobe	Increase in Limk leads to petit synapses presynaptic increase in Limk function leads to **ectopic glomeruli**	50
Mcr	Adult	P insertion in this gene induce **olfactory avoidance** behavior	17
Nak	Embryos chordotonal organ lineage	Overexpression of Nak causes both daughters of a normally asymmetric cell division to adopt the same cell fate and induces fate transformation from neuron to sheath cell.	18
Nej	P element insertion (3 kb up) effects on abdominal and sternopleural bristles	Gain of bristles	54
Notch	Pupae/adult antennae Second instar larvae (imaginal disc)	O**lfactory sense-organs** : High Notch signaling and the exclusion of seven up, pros and elav markers identifies PIIa; this cell gives rise to the shaft and socket. See also Table 5 Growth promoted by Notch promotes growth in eye-antenna	34 7
pelo	Adult eye	*Pelota* mutant affects patterning in the eye. The eye is substantially smaller, with rough and disordered ommatidia and bristles.	55
Pros $\boldsymbol{\beta}$**2**	Early pupal stage mechanosensory bristles	Decreased proteasome activity resulted inshaft-to-socket cell fate transformations and enhance Notch signaling activity in the sense organ lineage.	39

Table S4 continued

psq	Embryon/Larvae/ adult P element insertions effects on abdominal and sternopleural bristles	Identification of psq mutant that shows an **olfactory** avoidance response Loss of bristles	41 54
Pvr	Embryo/Larvae/adult	Macrochaete formation	43
Rac1	Embryos/larvae	Rac1 gain-of-function and loss-of-function mutants had both disruption of glial cell development and secondary effects on sensory axon fasciculation	47
tollo	Adult (P element insertions 5 kb up) Indirect evidence	Gain of bristles CD36 a co-factor of Tollo is expressed in a population of **olfactory** implicated in pheromone dedection	54 57

The criteria used for the description of the phenotypes were the same as those for Table S2.

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