Table S1. Tabular comparison of all proneural bHLH expression profile

A summary of the complete developmental expression patterns of the sole proneural Atonal ortholog *lin-32*, the sole NeuroD ortholog *cnd-1*, the sole neurogenin ortholog *ngn-1*, and three of the five AS-C homologs (*hlh-3, hlh-4, hlh-14*) has been generated using fosmid-based reporter transgenes and/or CRISPR/Cas9-engineered reporter alleles (Masoudi et al. 2018; Masoudi et al. 2021). Colored box indicates that the respective gene is expressed at any point in the lineage that generates the indicated neuron type.

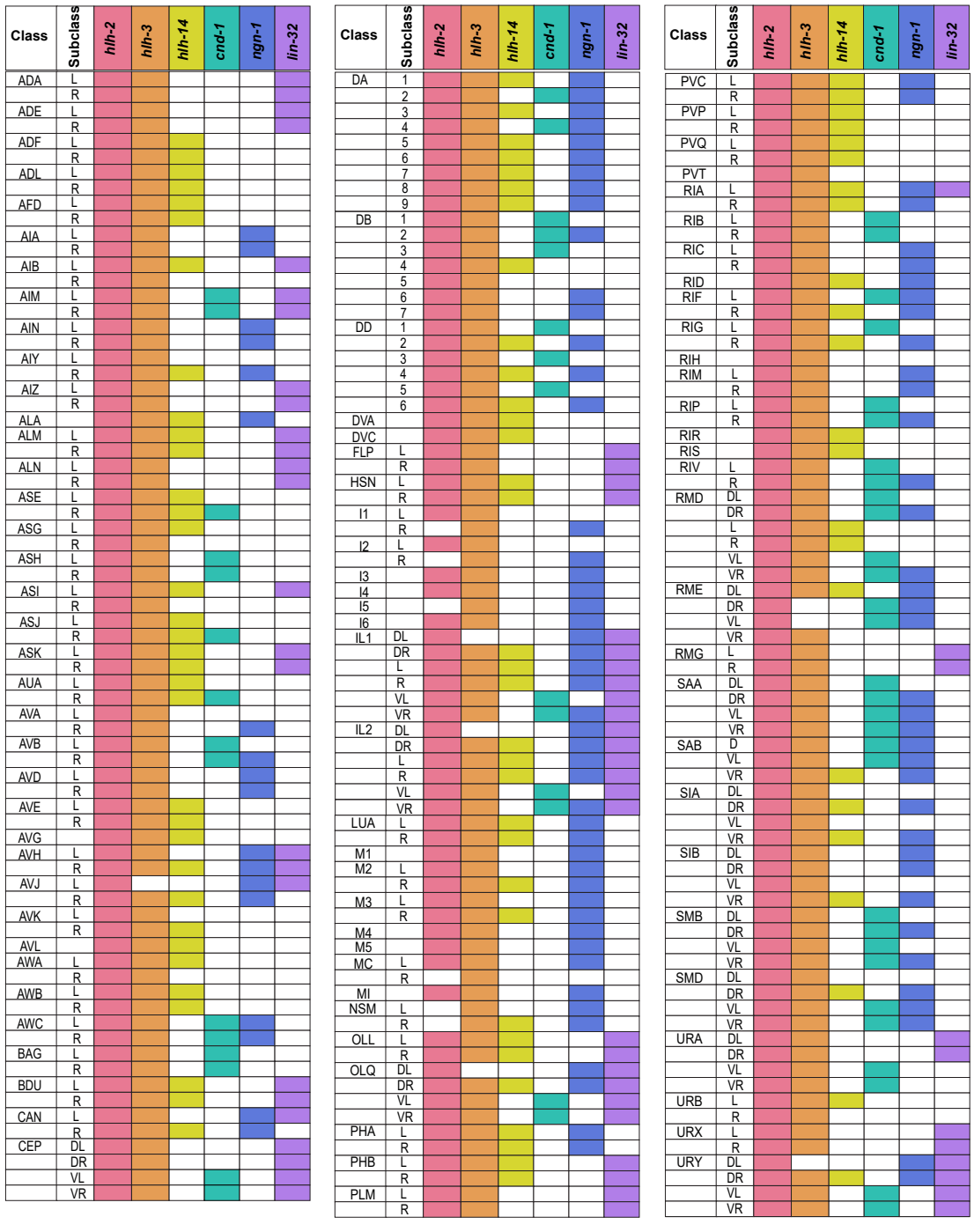

Table S2. Tabular summary of neuron cell fate loss in *hlh-2*$^{m/z}$ mutant animals. All embryonically generated neurons, their examined neurotransmitter identities and resident terminal selectors are shown (their expression is analyzed in **Fig.3**). Color coding indicates transformation to cell death and to hypodermal fate. Also see **Table S3** for a summary of cell fate transformation, organized by neuronal cell type.

Class	Neuron	Transform in *hlh-2(-)*	NT identity	Terminal selector
ADA	ADAL			
	ADAR			
ADE	ADEL			
	ADER			
ADF	ADFL			
	ADFR			
ADL	ADLL			
	ADLR			
AFD	AFDL			
	AFDR			
AIA	AIAL			
	AIAR			
AIB	AIBL			
	AIBR			
AIM	AIML			
	AIMR			
AIN	AINL			
	AINR			
AIY	AIYL			
	AIYR			
AIZ	AIZL			
	AIZR			
ALA	ALA			
ALM	ALML			
	ALMR			
ALN	ALNL			
	ALNR			
ASE	ASEL			
	ASER			
ASG	ASGL			
	ASGR			
ASH	ASHL			
	ASHR			
ASI	ASIL			
	ASIR			
ASJ	ASJL			
	ASJR			
ASK	ASKL			
	ASKR			
AUA	AUAL			
	AUAR			
AVA	AVAL			
	AVAR			
AVB	AVBL			
	AVBR			
AVD	AVDL			
	AVDR			
AVE	AVEL			
	AVER			
AVG	AVG			
AVH	AVHL			
	AVHR			
AVJ	AVJL			
	AVJR			
AVK	AVKL			
	AVKR			
AVL	AVL			
AWA	AWAL			
	AWAR			
AWB	AWBL			
	AWBR			
AWC	AWCL			
	AWCR			
BAG	BAGL			
	BAGR			
BDU	BDUL			
	BDUR			
CAN	CANL			
	CANR			
CEP	CEPDL			
	CEPDR			
	CEPVL			
	CEPVR			
DA	DA1			
	DA2			
	DA3			
	DA4			
	DA5			
	DA6			
	DA7			
	DA8			
	DA9			
DB	**DB1**/3			
	DB2			
	DB3/1			
	DB4			
	DB5			
	DB6			
	DB7			
DD	DD1			
	DD2			
	DD3			
	DD4			
	DD5			
	DD6			
DVA	DVA			
DVC	DVC			
FLP	FLPL			
	FLPR			
HSN	HSNL			
	HSNR			
I1	I1L			
	I1R			
I2	I2L			
	I2R			
I3	I3			
I4	I4			
I5	I5			
I6	I6			
IL1	IL1DL			
	IL1DR			
	IL1L			
	IL1R			
	IL1VL			
	IL1VR			
IL2	IL2DL			
	IL2DR			
	IL2L			
	IL2R			
	IL2VL			
	IL2VR			

Class	Neuron	Transform in *hlh-2(-)*	NT identity	Terminal selector
LUA	LUAL			
	LUAR			
M1	M1			
M2	M2L			
	M2R			
M3	M3L			
	M3R			
M4	M4			
M5	M5			
MC	MCL			
	MCR			
MI	MI			
NSM	NSML			
	NSMR			
OLL	OLLL			
	OLLR			
OLQ	OLQDL			
	OLQDR			
	OLQVL			
	OLQVR			
PHA	PHAL			
	PHAR			
PHB	PHBL			
	PHBR			
PLM	PLML			
	PLMR			
PVC	PVCL			
	PVCR			
PVP	PVPL			
	PVPR			
PVQ	PVQL			
	PVQR			
PVR	PVR			
PVT	PVT			
RIA	RIAL			
	RIAR			
RIB	RIBL			
	RIBR			
RIC	RICL			
	RICR			
RID	RID			
RIF	RIFL			
	RIFR			
RIG	RIGL			
	RIGR			
RIH	RIH			
RIM	RIML			
	RIMR			
RIP	RIPL			
	RIPR			
RIR	RIR			
RIS	RIS			
RIV	RIVL			
	RIVR			
RMD	RMDDL			
	RMDDR			
	RMDL			
	RMDR			
	RMDVL			
	RMDVR			
RME	RMED			
	RMEL			
	RMER			
	RMEV			
RMG	RMGL			
	RMGR			
SAA	SAADL			
	SAADR			
	SAAVL			
	SAAVR			
SAB	SABD			
	SABVL			
	SABVR			
SIA	SIADL			
	SIADR			
	SIAVL			
	SIAVR			
SIB	SIBDL			
	SIBDR			
	SIBVL			
	SIBVR			
SMB	SMBDL			
	SMBDR			
	SMBVL			
	SMBVR			
SMD	SMDDL			
	SMDDR			
	SMDVL			
	SMDVR			
URA	URADL			
	URADR			
	URAVL			
	URAVR			
URB	URBL			
	URBR			
URX	URXL			
	URXR			
URY	URYDL			
	URYDR			
	URYVL			
	URYVR			

Neuron fate
transformed to Hyp
transformed to CD
too late / ambigious

Glutamatergic (EAT-4(+))
Cholinergic (CHO-1(+))
UNC-42(+)
TTX-3(+)
UNC-86(+)
UNC-3(+)

122 neuron born
69 to Hypo
9 to CD
21 undetected

Table S3. Tabular summary of cell fate transformation in *hlh-2*$^{m/z}$ mutant animals. Like Table S2, this table extracts information from the lineage diagram of *hlh-2*$^{m/z}$ mutant animals (**Fig.2**), here with a focus on the name of blast cells transformed to alternative identities.

Transformation to cell death	Fate in N2	Fate in *hlh2*$^{m/z}$
AB pl/rpaapaap	AVB	CD
AB plppaappp	DB6	CD
AB prppapppa/p	DD4/ DD6	CD
AB pl/rpaapaaa	RIV	CD
ABalapaapaa/ ABalaapppaa	RIA	CD

Transformation from cell death	Fate in N2	Fate in *hlh2*$^{m/z}$
AB prppaaap	CD	Neuron
AB alppaapa	CD	Neuron
AB alaapappa	CD	Neuron
AB alaapapp	CD	Neuron
AB prppaaap	CD	Neuron
AB praaapaa	CD	Hypo
AB praaapap	CD	Hypo
AB prapaaaa	CD	Hypo
AB plapaaaa	CD	Hypo
AB plapappp	CD	Hypo
ABprapppaap	CD	Hypo
ABprapppap	CD	Hypo
ABplapppaap	CD	Hypo
ABpapppapa	CD	Hypo
ABpaaaapp	CD	Hypo
ABpraaapaap	CD	Hypo
ABpraaapapp	CD	Hypo
ABalpppaapp	CD	Hypo
ABalpppaap	CD	Hypo
ABalpppapp	CD	Hypo
ABalppaaap	CD	Hypo
ABalapapaa	CD	Hypo
Caapap	CD	Hypo
AB praaaapp	CD	Hypo
ABalppaaaa	CD	Mutant
ABalppaapa	CD	Mutant
ABalppaapa	CD	Mutant

Transformation in non-neuronal	Fate in N2	Fate in *hlh2*$^{m/z}$
	ILsoDR/DL	Hypo
	OLQshDL	Hypo
	CEPshDR	Hypo
	Tail spike	CD
	Hyp10	CD
MSppaaaaa/p	Muscle	CD
	GLRL/VR	Mutant

Transformation to Hypodermal cells	Fate in N2	Fate in *hlh2*$^{m/z}$
AB pl/rapaaaapp	ADA	Hypo
AB pl/rapaaaapa	ADE	Hypo
AB al/rpppppaa	ADF	Hypo
AB alpppaad / AB praaapaad	ADL	Hypo
AB alpppapav / AB praaaapav	AFD	Hypo
AB pl/raapappa	AIB	Hypo
AB pl/rapaaapav	AIZ	Hypo
AB alapppaaa	ALA	Hypo
AB arppa/pappa	ALM	Hypo
AB pl/rapapppppap	ALN	Hypo
AB alpppppppaa / AB praaapppaa	ASE	Hypo
AB pl/raapapap	ASG	Hypo
AB pl/raapapppa	ASI	Hypo
AB alpppppppa / AB praaapppa	ASJ	Hypo
AB alpppppppp / AB praaapppp	AUA	Hypo
AB alapa/ppppa	AVJ	Hypo
AB pl/raapapaa	AWA	Hypo
AB alpppppap / AB praaappap	AWB	Hypo
AB arppa/pappp	BDU	Hypo
AB alapaaapa / AB alappappa	CAN	Hypo
C aapaa	DVC	Hypo
AB pl/rapaaapad	FLP	Hypo
AB pl/rapppappa	HSN	Hypo
AB alpppapaa / AB praaapapaa	OLL	Hypo
AB pl/rapppappp	PHB	Hypo
AB pl/rapapppppaa	PLM	Hypo
AB pl/rapppaaa	PVQ	Hypo
C aappa	PVR	Hypo
AB alappaapa	RID	Hypo
AB pl/rapaaapp	RMG	Hypo

Asymmetric transformation to Hypodermal cells

AB praaaapppa	ASKR	Hypo
AB alappapaa	AVHR	Hypo
AB alapa/ppppaaa	IL1D	Hypo
AB alapa/ppppap	IL2D	Hypo
AB alapppapaa	OLQDR	Hypo
AB prppaapap	RIMR	Hypo
AB alpppapad/ AB praaaapad	RMDL/R	Hypo
AB alapppaap	RMED	Hypo
AB arpapaaaa	URADR	Hypo
AB alapppapp	URYDR	Hypo