

Transcriptional atlas of *Drosophila*
melanogaster imaginal discs

May 31, 2016

Outline

Introduction

- Overview of RNA-seq samples

Eye, leg and wing

- DEG across tissues and time

- Plot 3D

- Isoform Usage

Wing compartments

- DEG across wing compartments

Outline

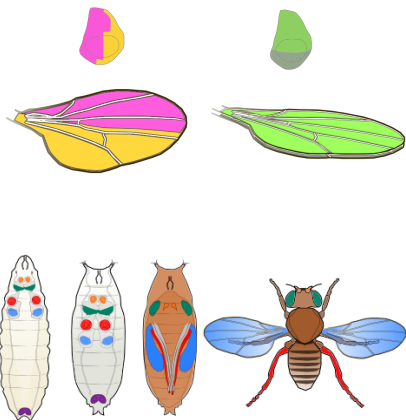
Introduction

Overview of RNA-seq samples

Eye, leg and wing

Wing compartments

Overview of processed RNA-seq samples



anterior	2	2	2
posterior	2	2	2
dorsal	2	2	2
ventral	2	2	2
wing	2	2	2
eye	2	2	2
antenna	2	2	-
female_genitalia	2	2	-
male_genitalia	2	2	-
leg	2	2	2
	L3	white pupa	late pupa

tissue

- antenna
- eye
- genitalia
- leg
- wing

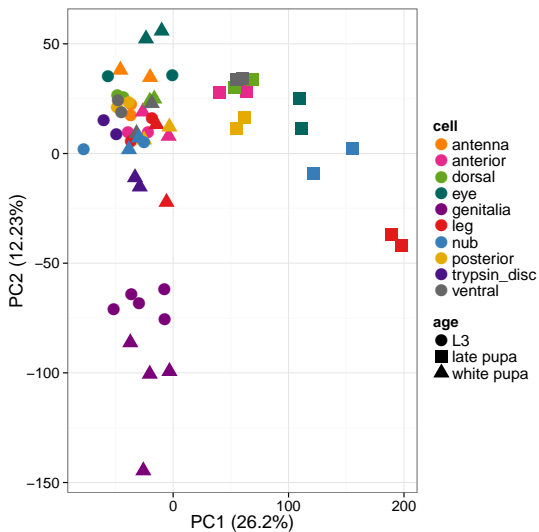
RNA-seq pipeline

- ▶ Assembly: dm6
- ▶ Annotation: FlyBase r6.05
 - ▶ 17,158 genes
 - ▶ 34,152 transcripts
 - ▶ 186,431 exons

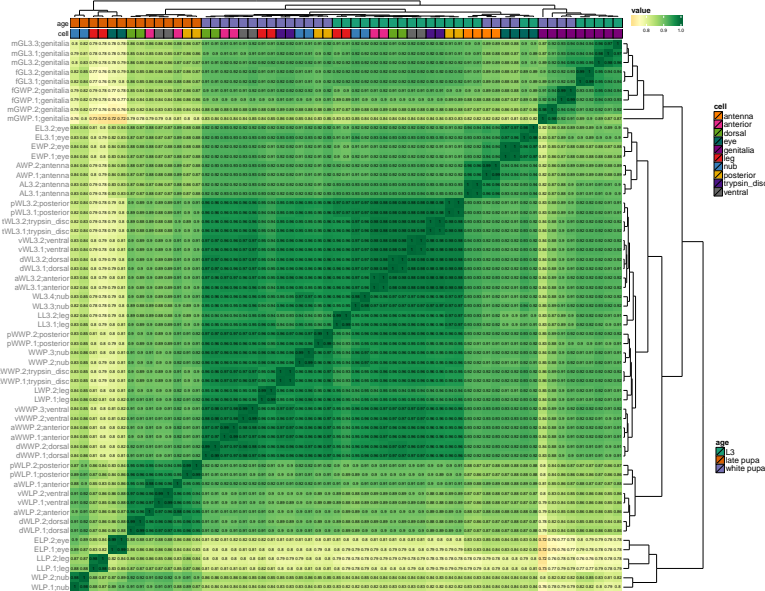
 - ▶ 13,920 mRNA
 - ▶ 2,470 ncRNA
 - ▶ 308 pseudogene
 - ▶ 147 rRNA
 - ▶ 313 tRNA
- ▶ TruSeq from Illumina
- ▶ 75bp
- ▶ stranded
- ▶ paired-end
- ▶ polyA

- ▶ Grape pipeline - STAR+RSEM
<https://github.com/guigolab/grape-nf>

Principal Component Analysis



Clustering by gene expression (Spearman)



Outline

Introduction

Eye, leg and wing

DEG across tissues and time

Time and space

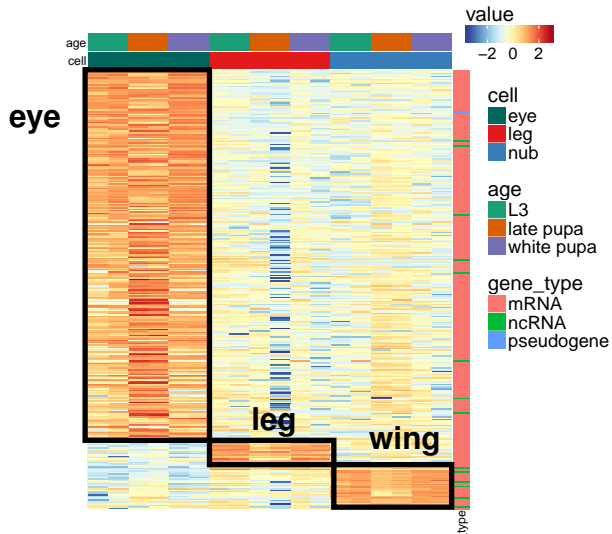
Plot 3D

Isoform Usage

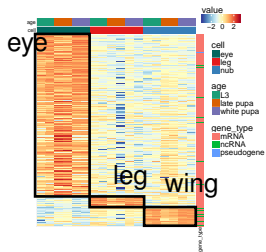
Wing compartments

DEG across tissues

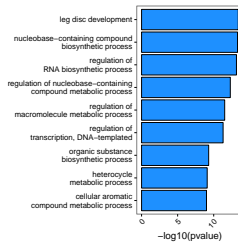
EdgeR - $\log_{2}FC > 1.5$, $FDR < 0.01$



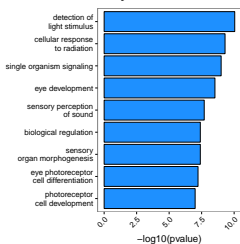
DEG across tissues



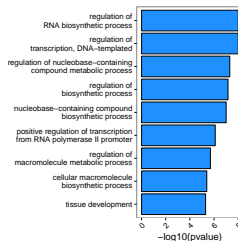
Leg



Eye

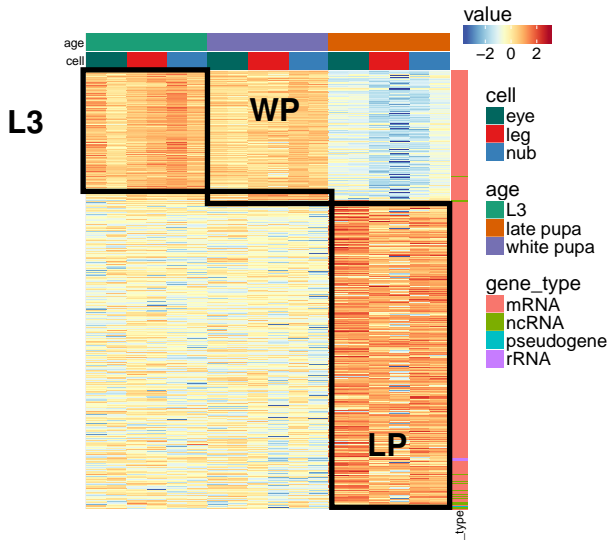


Wing

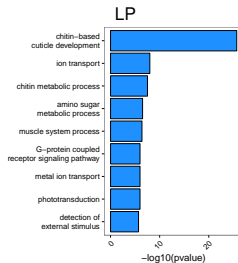
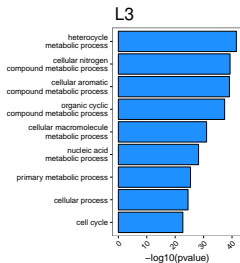
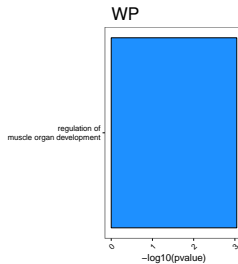
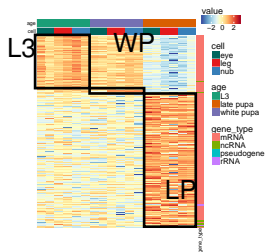


DEG across time

EdgeR - $\log_{2}FC > 2$, $FDR \leq 0.01$



DEG across time



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Eye, leg and wing

DEG across tissues and time

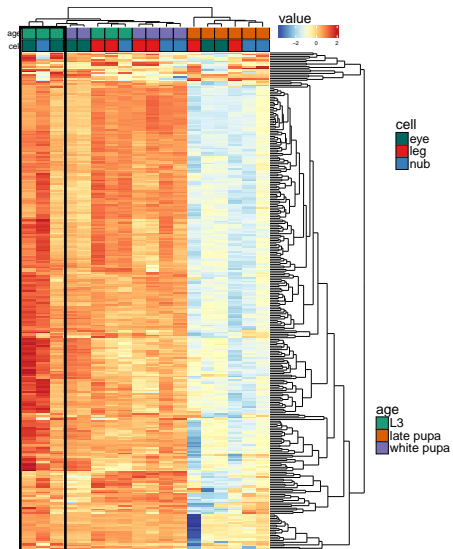
Time and space

Plot 3D

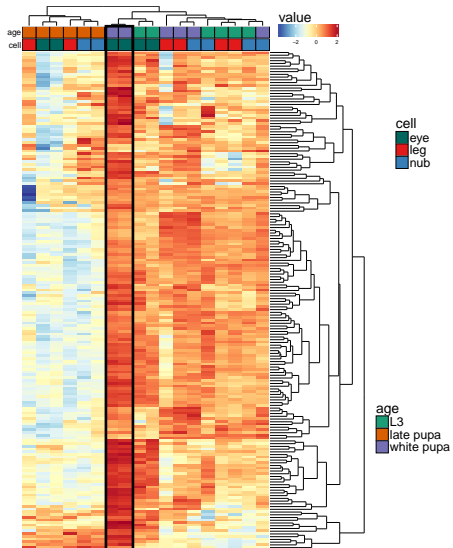
Isoform Usage

Wing compartments

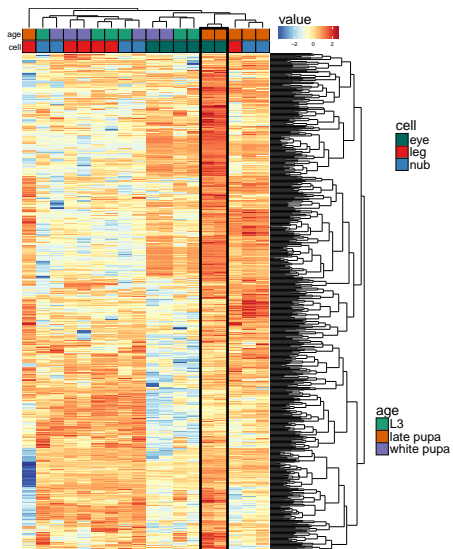
Eye L3 - 292 genes



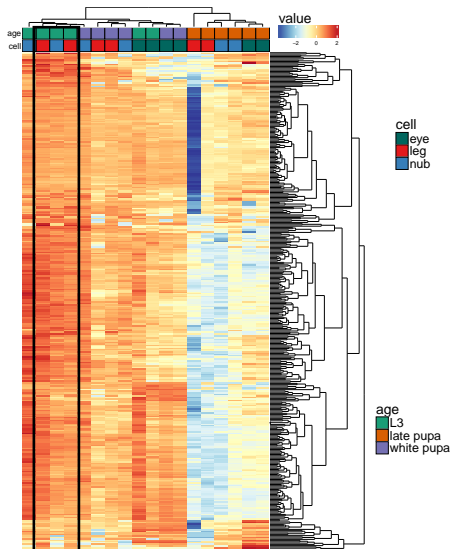
Eye WP - 182 genes



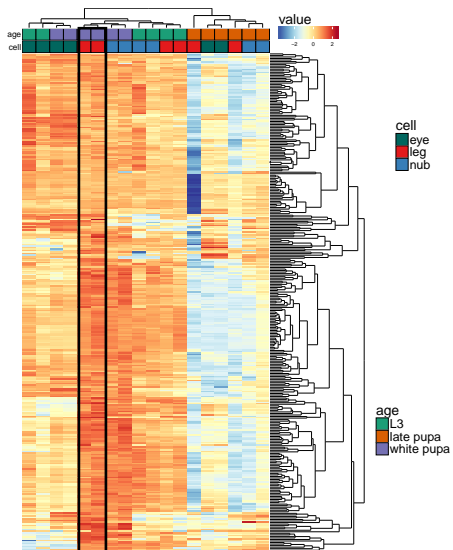
Eye LP - 580 genes



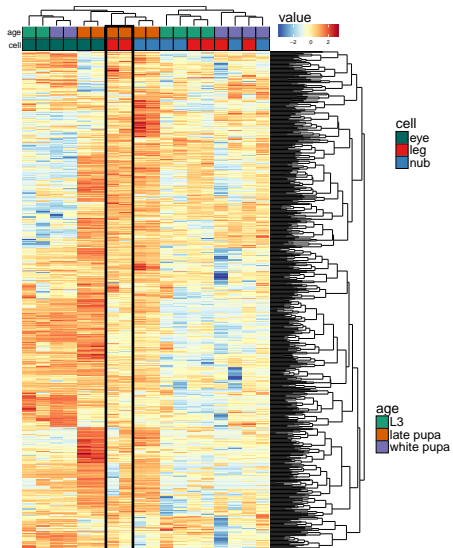
Leg L3 - 399 genes



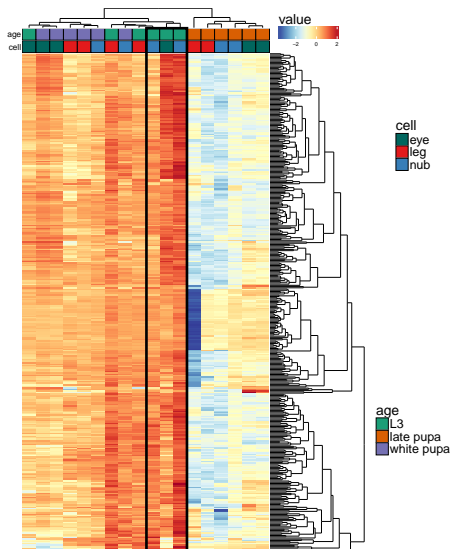
Leg WP - 324 genes



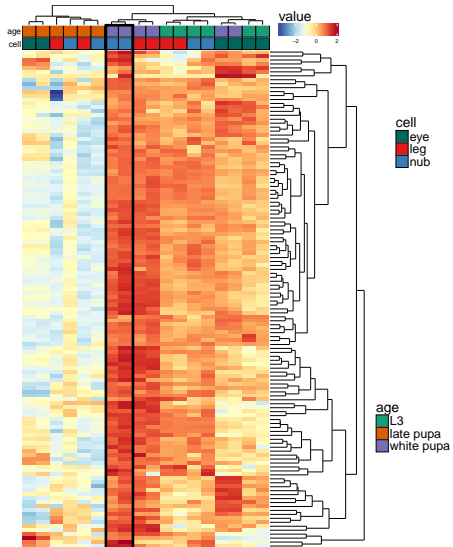
Leg LP - 615 genes



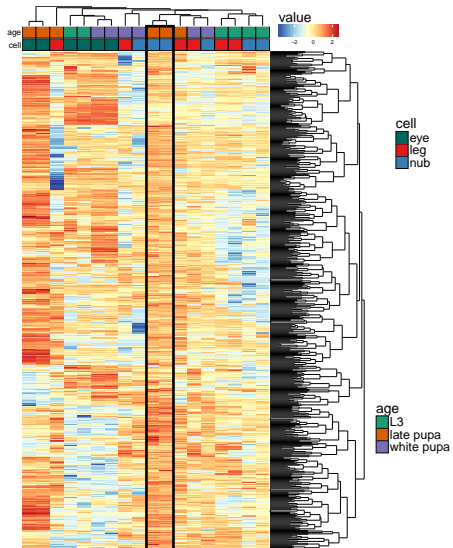
Wing L3 - 402 genes



Wing WP - 126 genes



Wing LP - 526 genes



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Eye, leg and wing

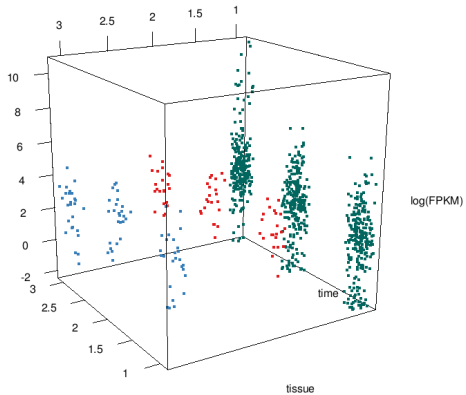
DEG across tissues and time

Plot 3D

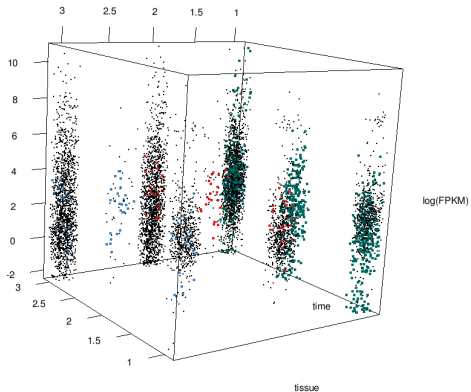
Isoform Usage

Wing compartments

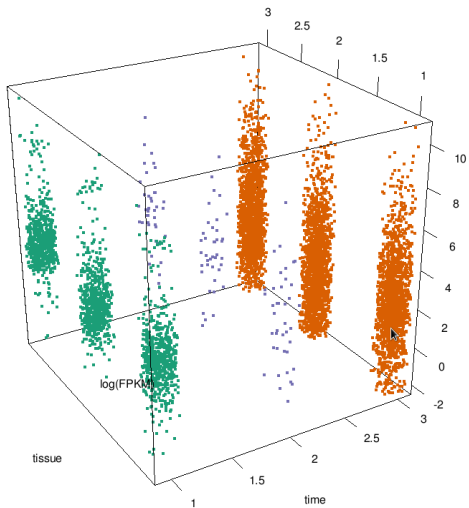
Space-specific genes



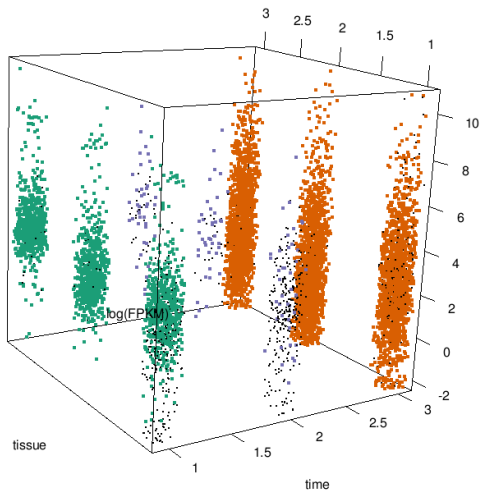
Space-specific genes



Time-specific genes



Time-specific genes



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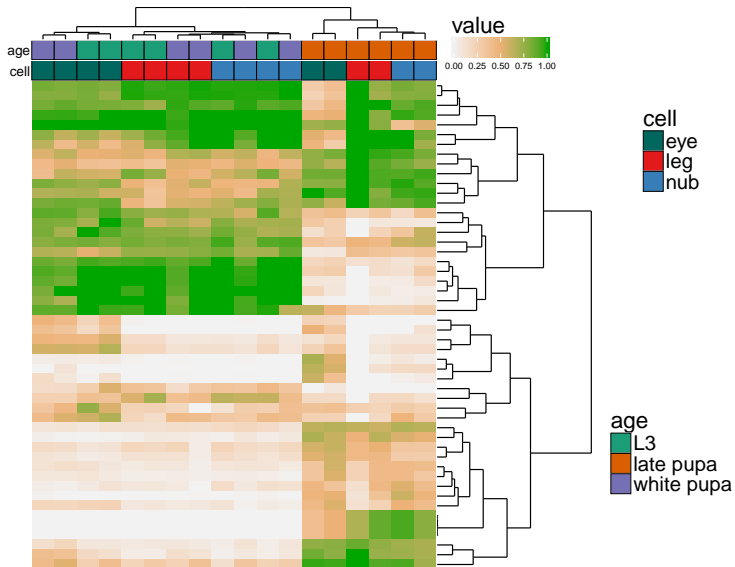
Wing compartments

Statistics of events in annotation FlyBase r6.05

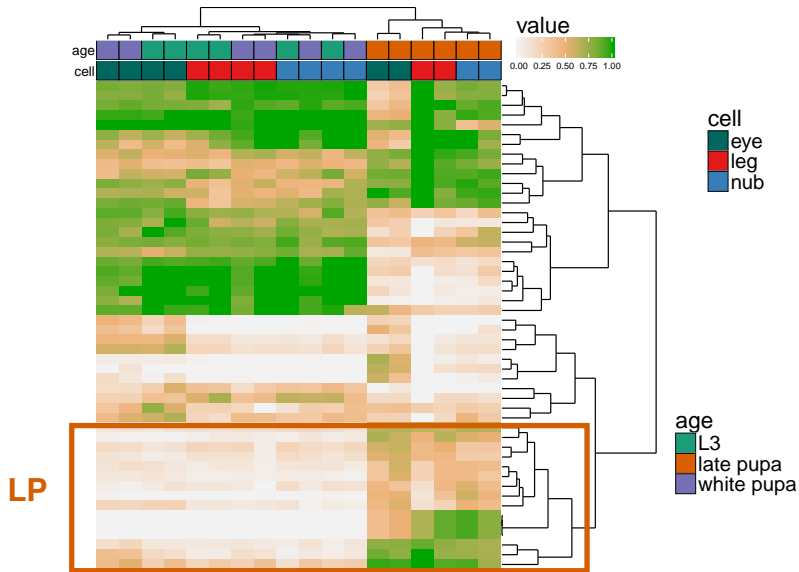
AStalavista: Alternative Splicing transcriptional landscape visualization tool
<http://genome.crg.es/astalavista/>

event	number
single cassette exon	2535
retained intron	1653
alternative donor	2598
alternative acceptor	2506
mutually exclusive	2180
multiple exon skipping	522
alternative first	3982
alternative last	607

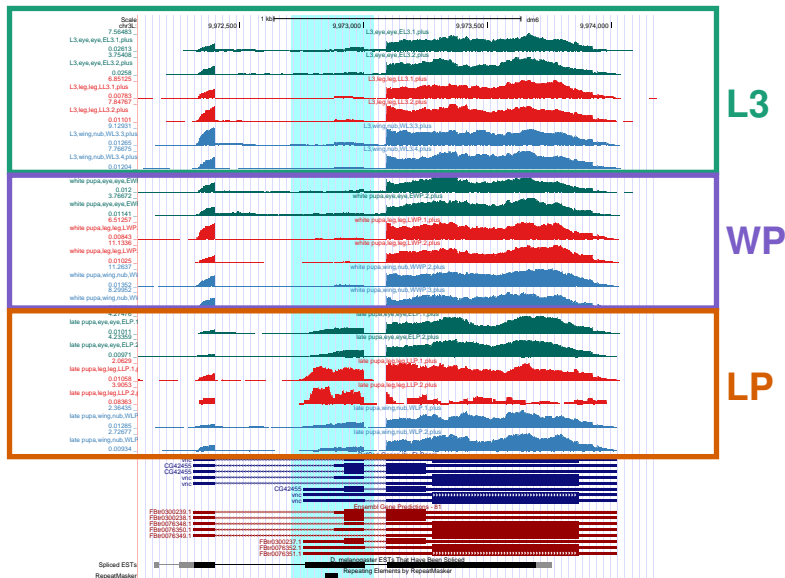
Single exon skipping



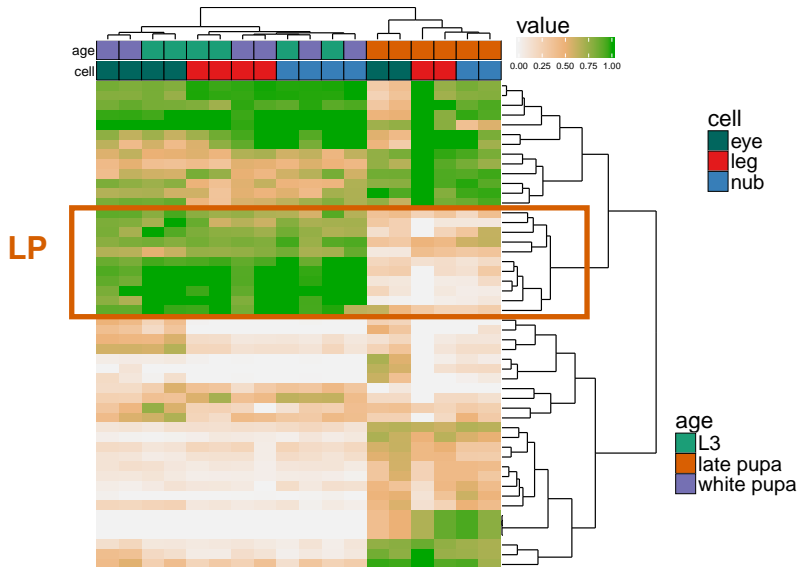
Single exon skipping



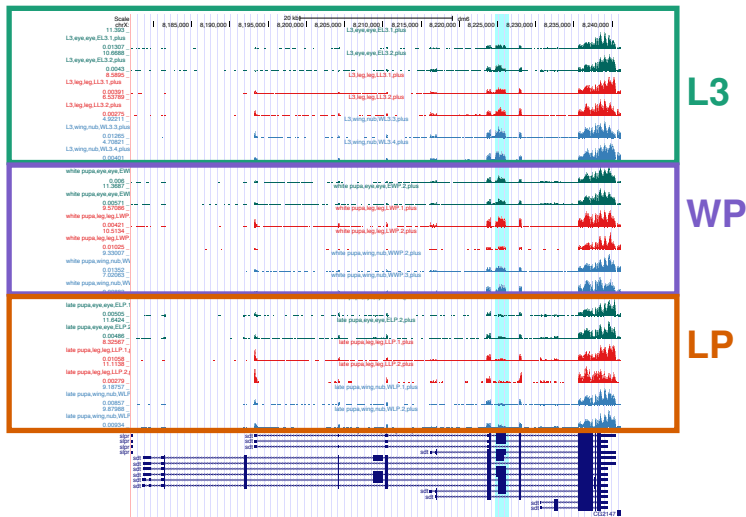
vnc: histone acetyltransferase involved in neurogenesis



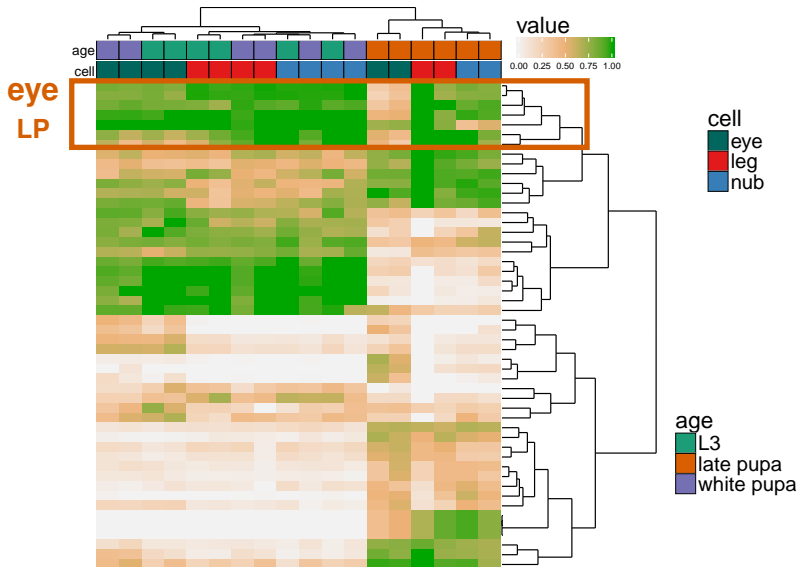
Single exon skipping



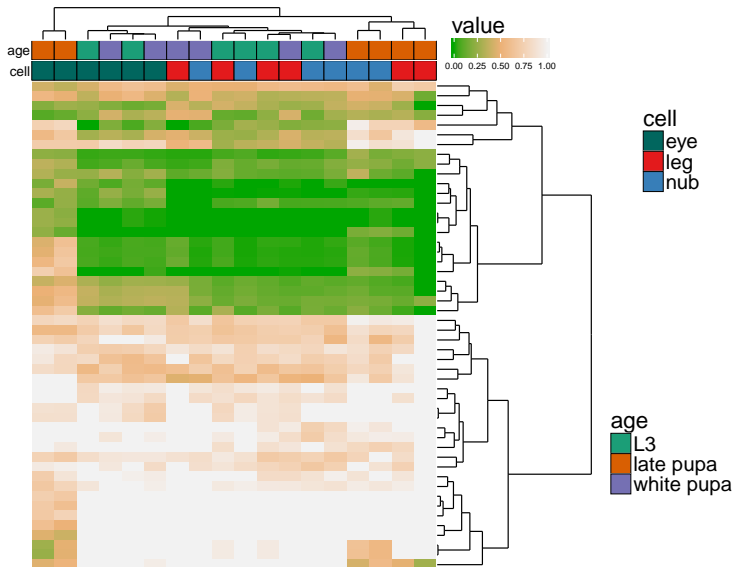
sdt: neural development



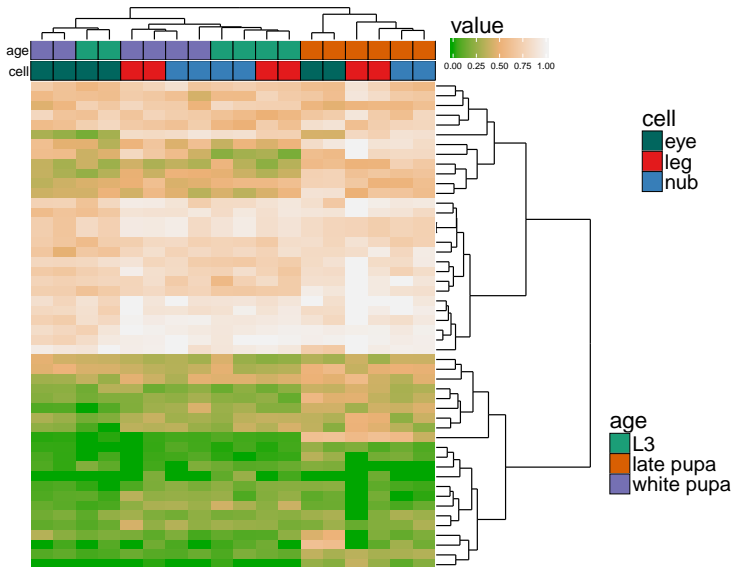
Single exon skipping



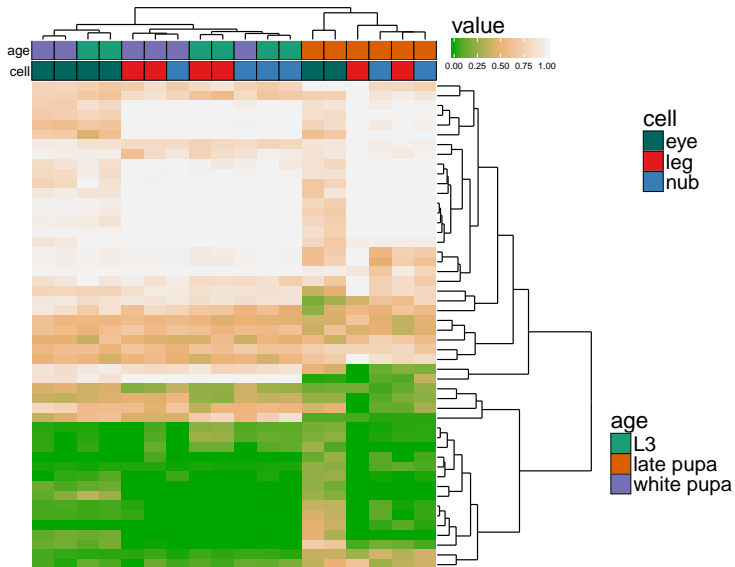
Multiple exon skipping



Retained intron



Mutually exclusive exon



syp (neurogenesis and splicing)



Outline

Introduction

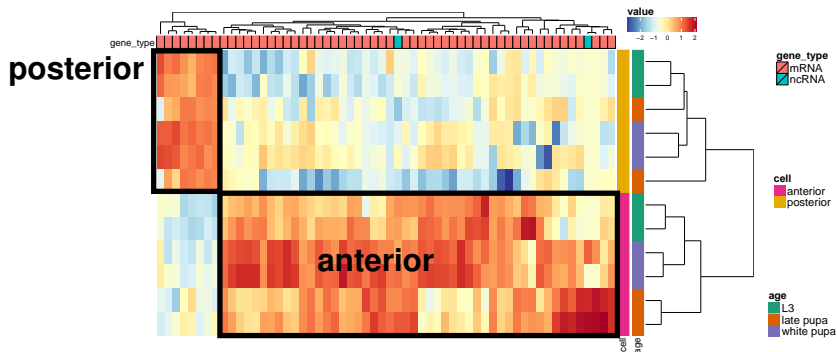
Eye, leg and wing

Wing compartments

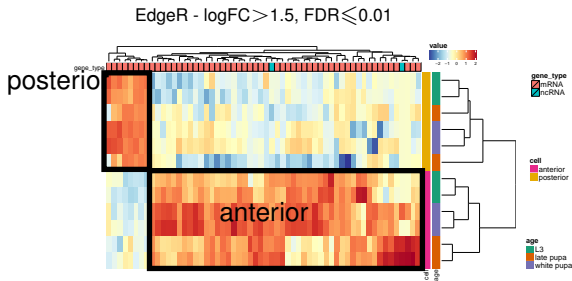
DEG across wing compartments

DEG across wing compartments - Anterior vs Posterior

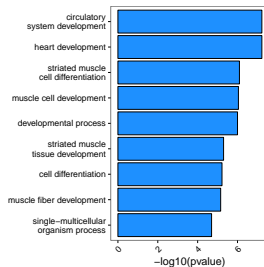
EdgeR - $\log_{2}FC > 2$, $FDR \leq 0.01$



DEG across wing compartments - Anterior vs Posterior



Anterior



Posterior

