

Transcriptional atlas of *Drosophila*
melanogaster imaginal discs
DEG

September 23, 2016

Outline

Introduction

- Overview of RNA-seq samples

- Gene Expression

Eye, leg and wing

- Variance Decomposition

- DEG

- Isoform Usage

Wing compartments

- DEG across wing compartments

- Single cell

Outline

Introduction

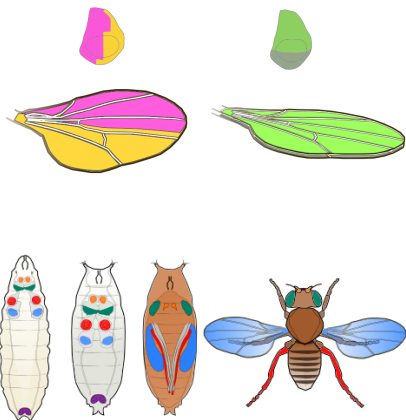
Overview of RNA-seq samples

Gene Expression

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

Outline

Introduction

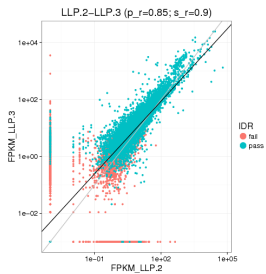
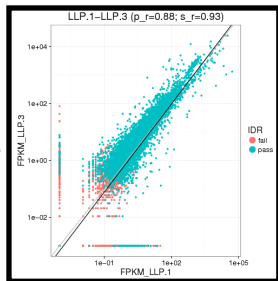
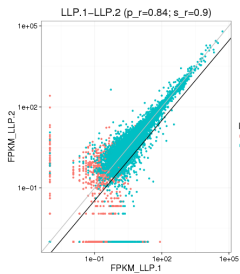
Overview of RNA-seq samples

Gene Expression

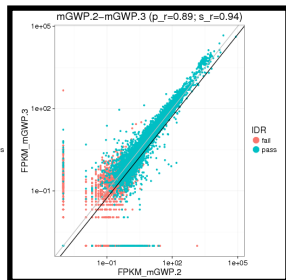
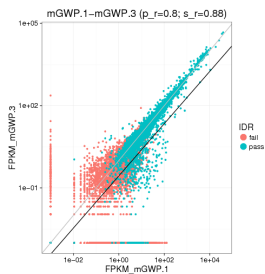
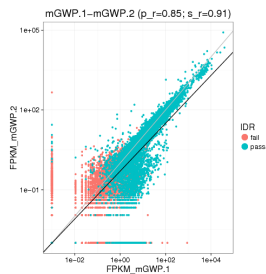
Eye, leg and wing

Wing compartments

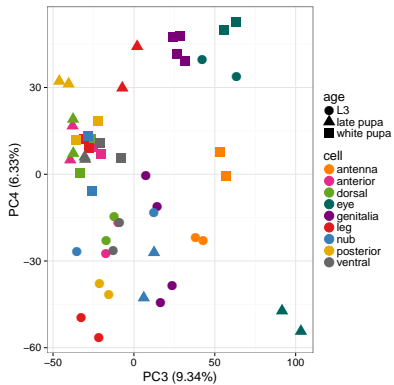
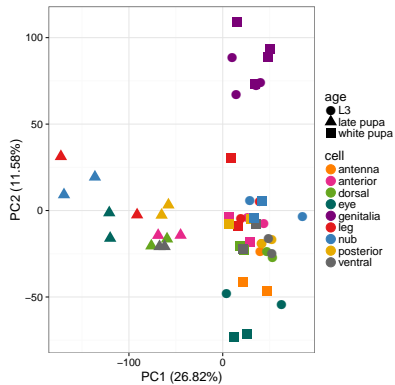
Improved correlation between replicates



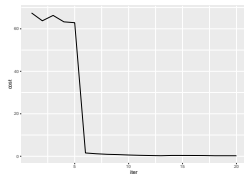
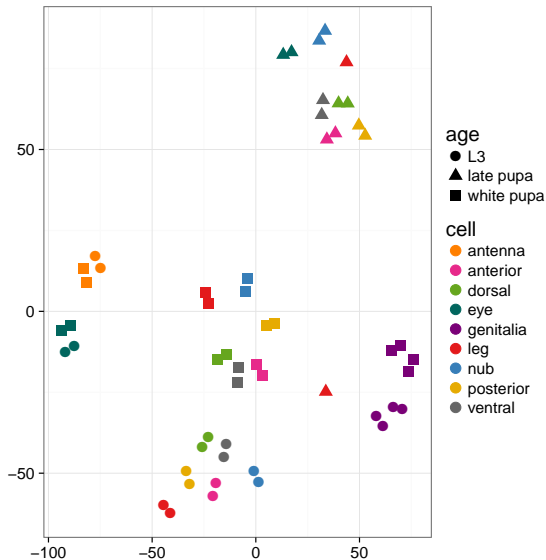
Improved correlation between replicates



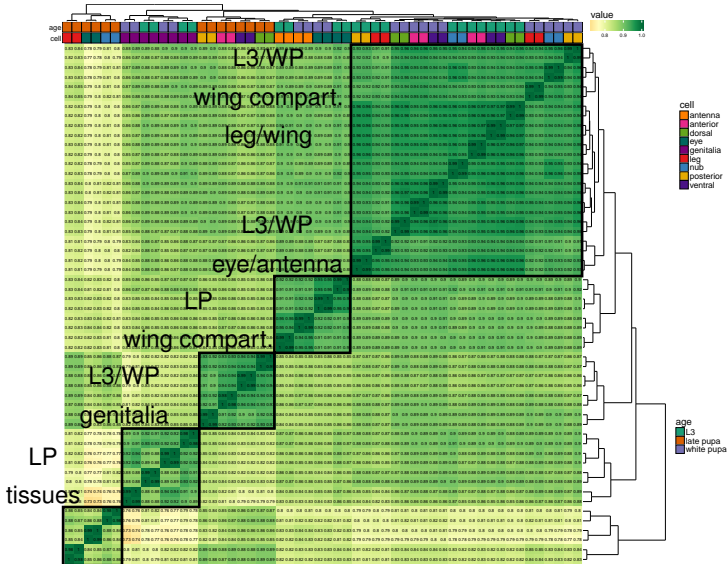
PCA



tSNE



Clustering of gene expression by time



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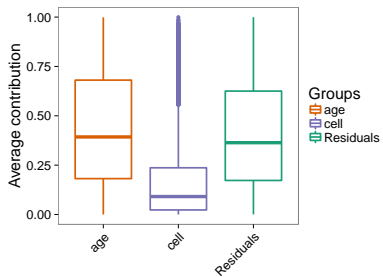
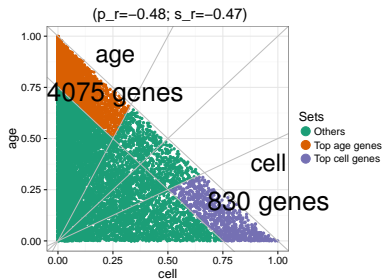
Variance Decomposition

DEG

Isoform Usage

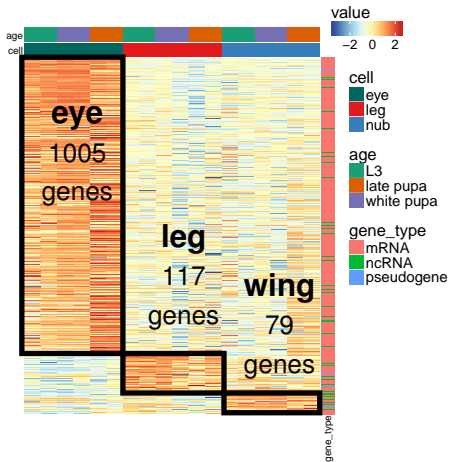
Wing compartments

Time is the main contributor



DEG across tissues

EdgeR - $FC > 1.5$, $FDR \leq 0.05$



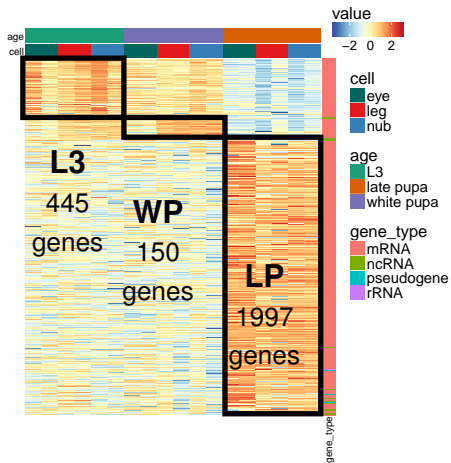
eye
visual perception
eye photoreceptor cell development

leg
imaginal disc-derived leg morphogenesis
leg disc development

wing
wing disc development
imaginal disc-derived wing morphogenesis

DEG across time

EdgeR - $FC > 1.5$, $FDR \leq 0.05$



L3

cell cycle

regulation of mitotic cell cycle

WP

mitotic spindle elongation

centrosome duplication

LP

chitin-based cuticle development

chitin metabolic process

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DEG

Isoform Usage

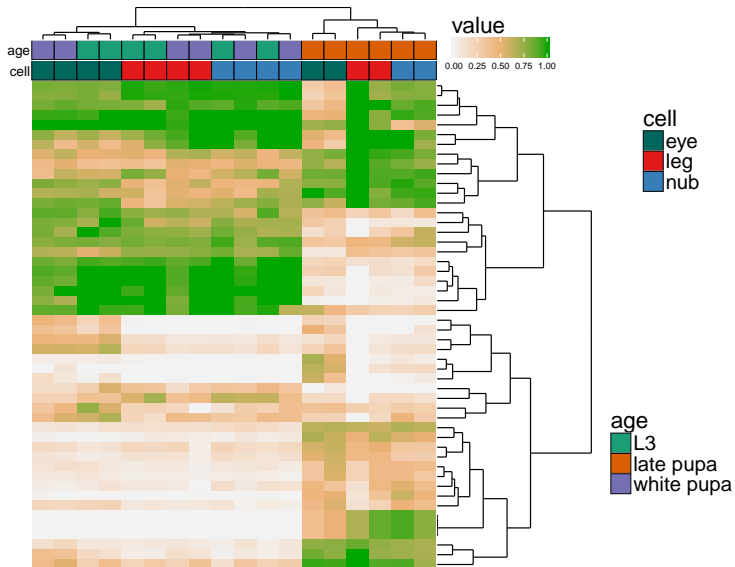
Wing compartments

Statistics of events in annotation FlyBase r6.05 and ERC data

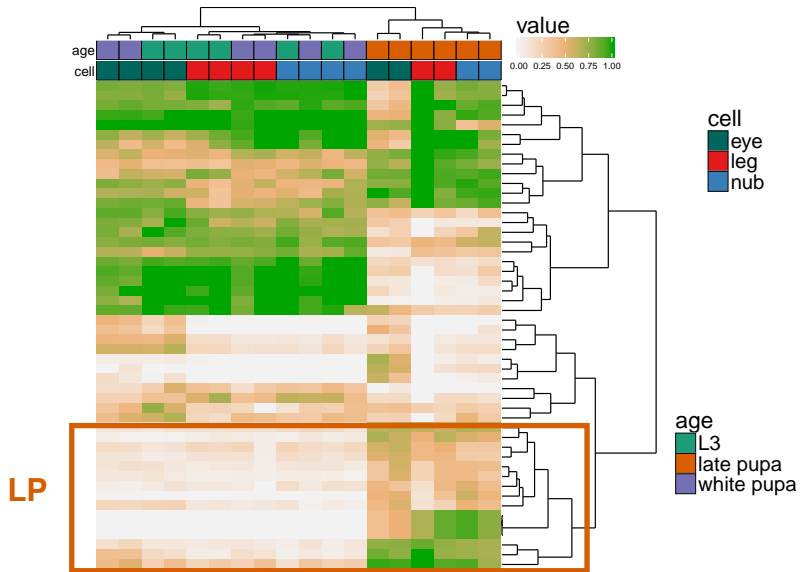
AStalavista: Alternative Splicing transcriptional landscape visualization tool
<http://genome.crg.es/astalavista/>

event	number	ERC
single cassette exon	2535	51
retained intron	1653	10
alternative donor	2598	6
alternative acceptor	2506	6
mutually exclusive	2180	12
multiple exon skipping	522	13
alternative first	3982	-
alternative last	607	-

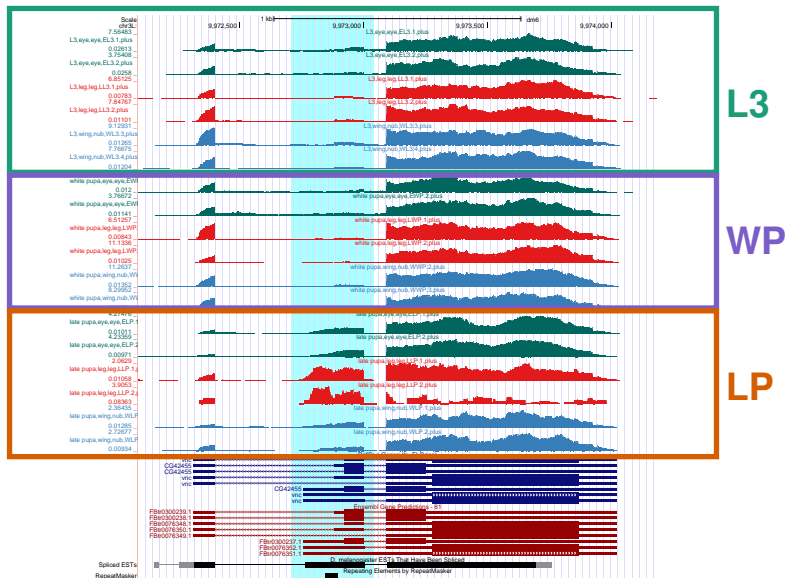
Single exon skipping



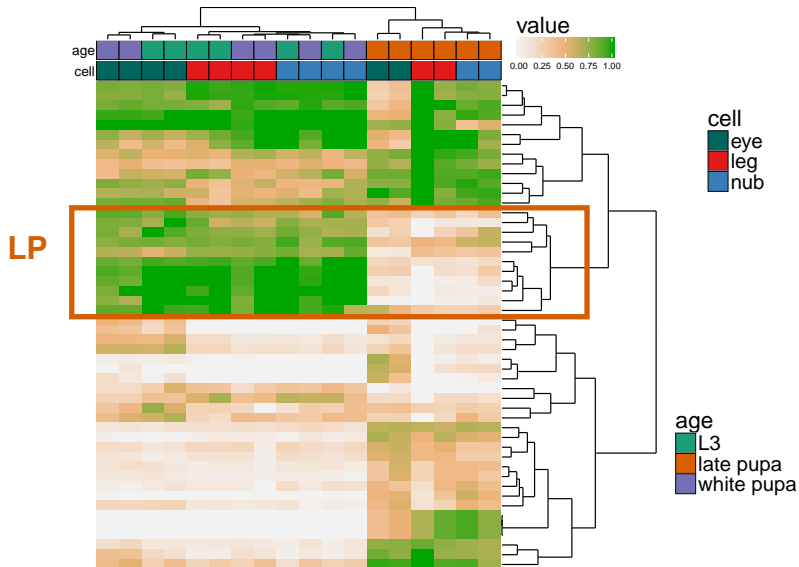
Single exon skipping



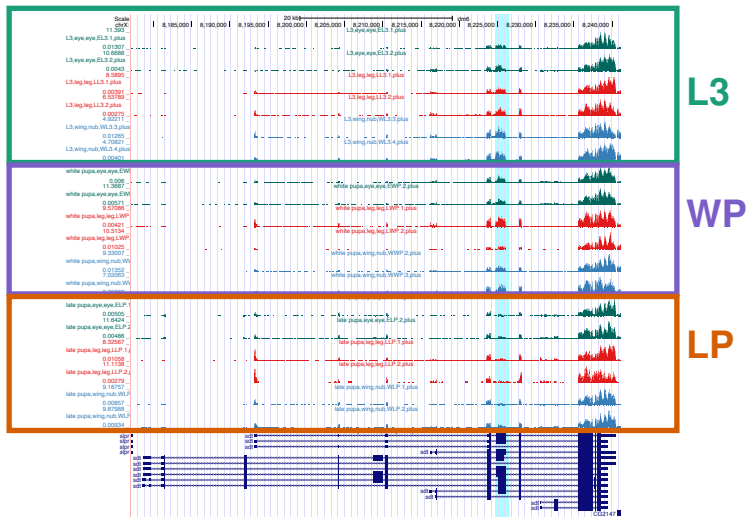
vnc: histone acetyltransferase involved in neurogenesis



Single exon skipping



sdt: neural development



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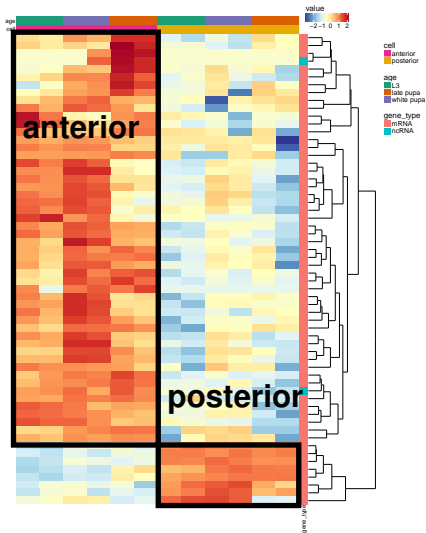
Wing compartments

DEG across wing compartments

Single cell

DEG across wing compartments - Anterior vs Posterior

EdgeR - $\log_{2}FC > 1.5$, $FDR \leq 0.05$



Anterior

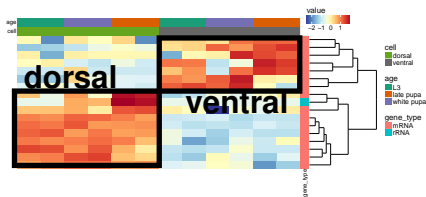
cellular developmental process
mesodermal cell fate determination

Posterior

wing disc anterior/posterior pattern formation
anterior/posterior lineage restriction, imaginal disc

DEG across wing compartments - Dorsal vs ventral

EdgeR - $\log_{2}FC > 1.5$, $FDR \leq 0.05$



Dorsal

purine ribonucleotide transport
nitrogen compound transport

Ventral

cell killing
disruption of cells of other organism

Single cell

