

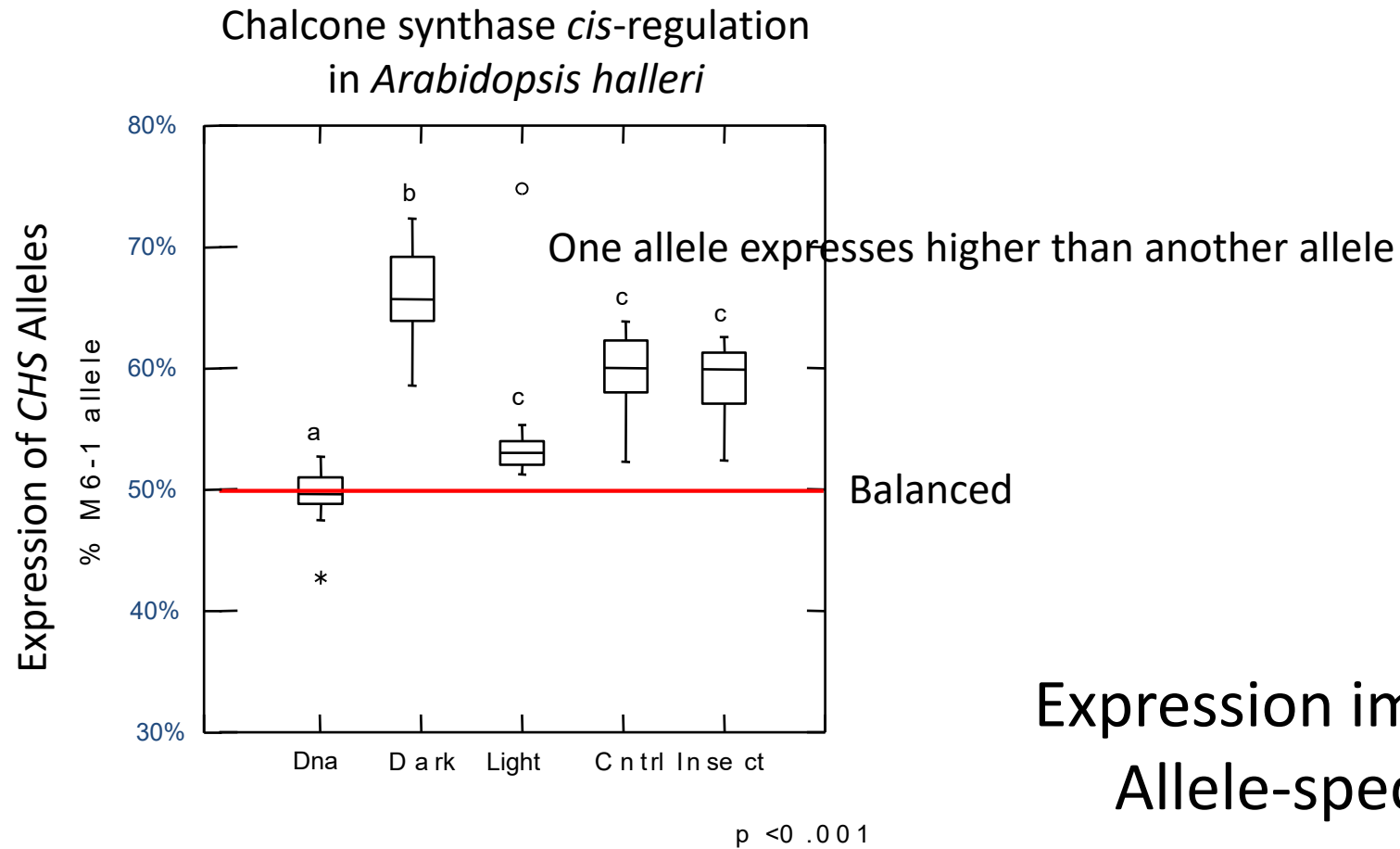
# Allele-specific expression in resynthesized *Brassica napus* lines

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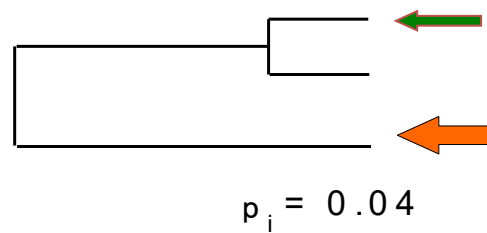
Plant Breeding Department

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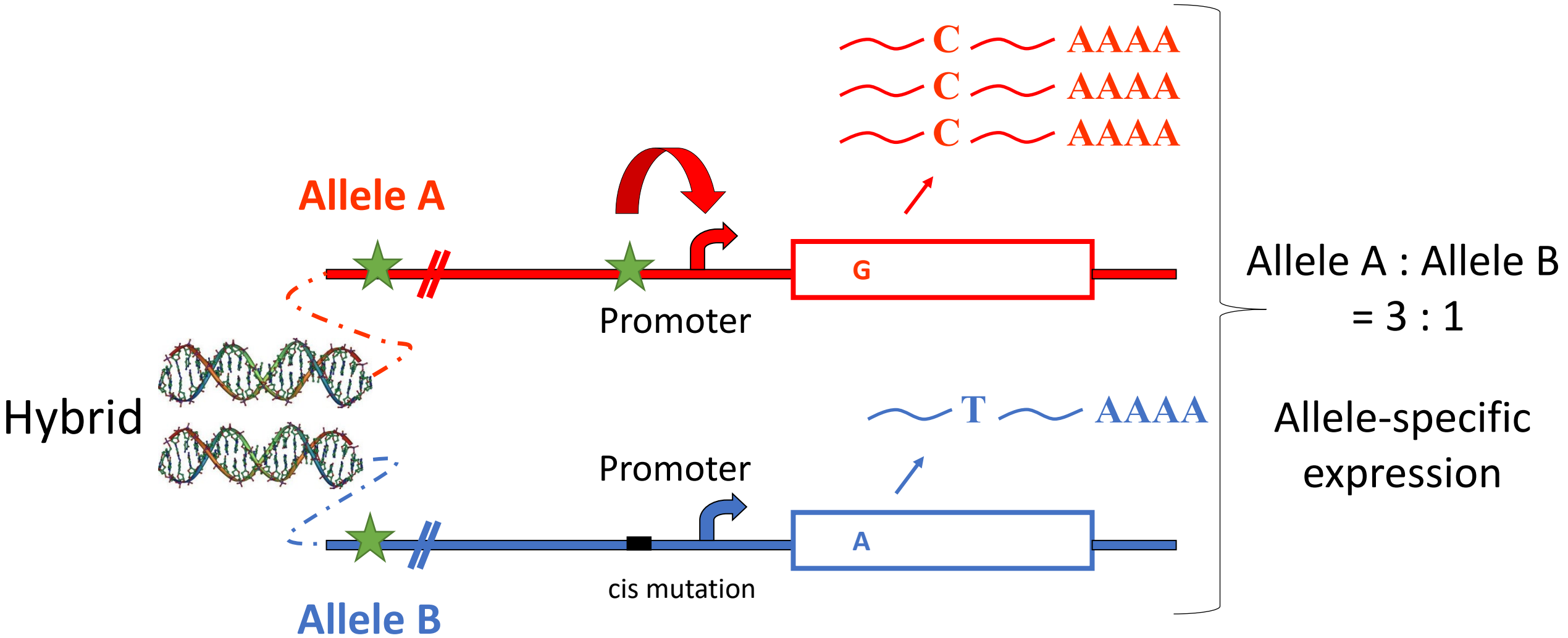
# What is allele-specific expression (ASE)?



Expression imbalance of two alleles!  
Allele-specific expression (ASE)



# Allele-specific expression can be characterized in hybrids



Allele Specific Expression (ASE) = cis-regulatory differences

# Resynthesised rapeseed: interspecific hybrids



*Brassica rapa*



$2n = AA = 20$

+



*Brassica oleracea*



$2n = CC = 18$

=



*Brassica napus*



$2n = AACC = 38$

# Key questions

- How does allele-specific expression work in resynthesized *B. napus*?
- Do we see cis or trans effects on gene regulation between subgenomes or in relation to the parent genotypes?
- Are there allele-specific expression differences between tissue types or between different genotypes in resynthesized rapeseed?

# Experimental design



Resynthesized  
rapeseed:  
6 lines



*B. rapa* parents:  
3 lines



*B. oleracea*  
parents: 2 lines

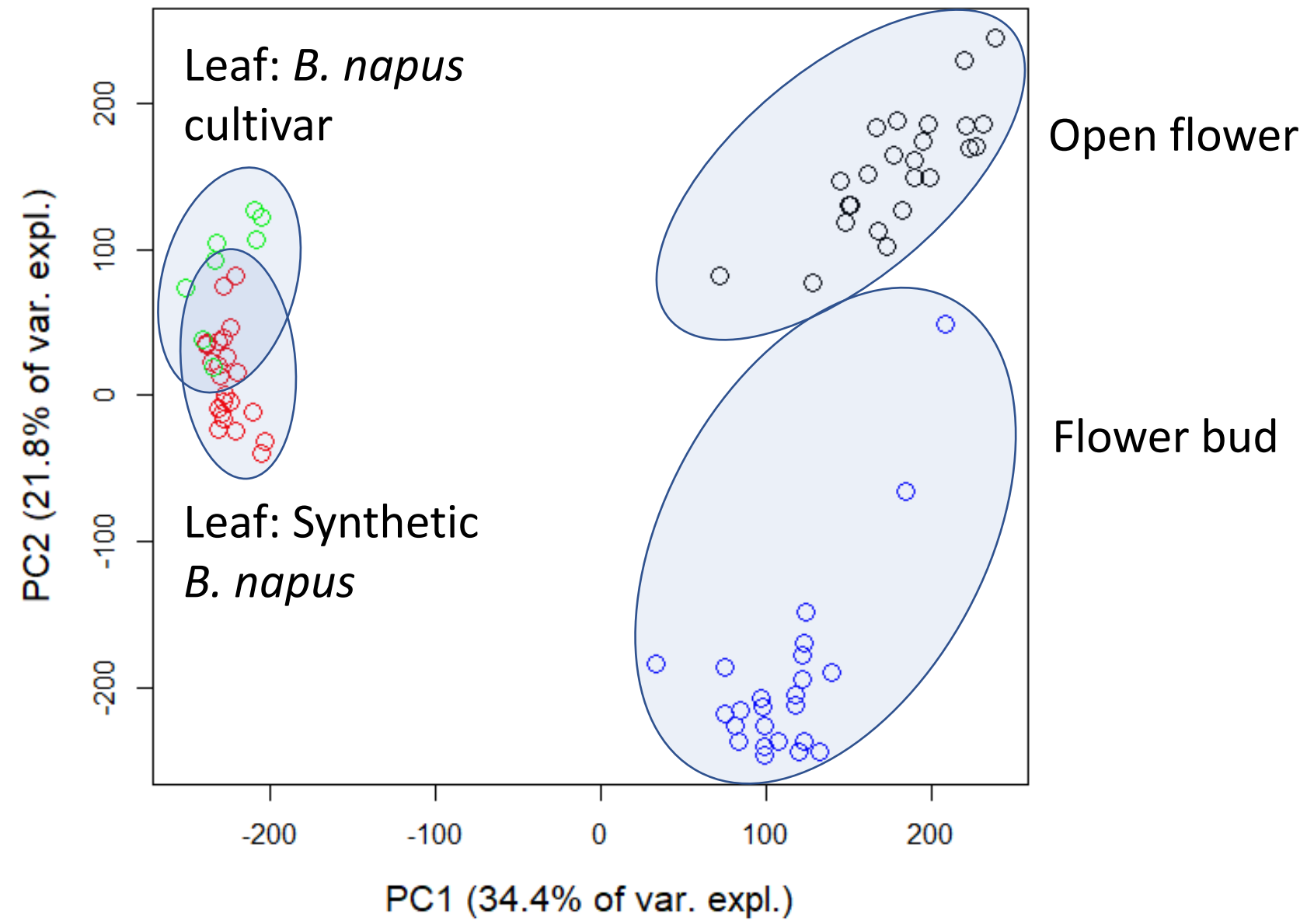


*B. napus*:  
2 cultivars

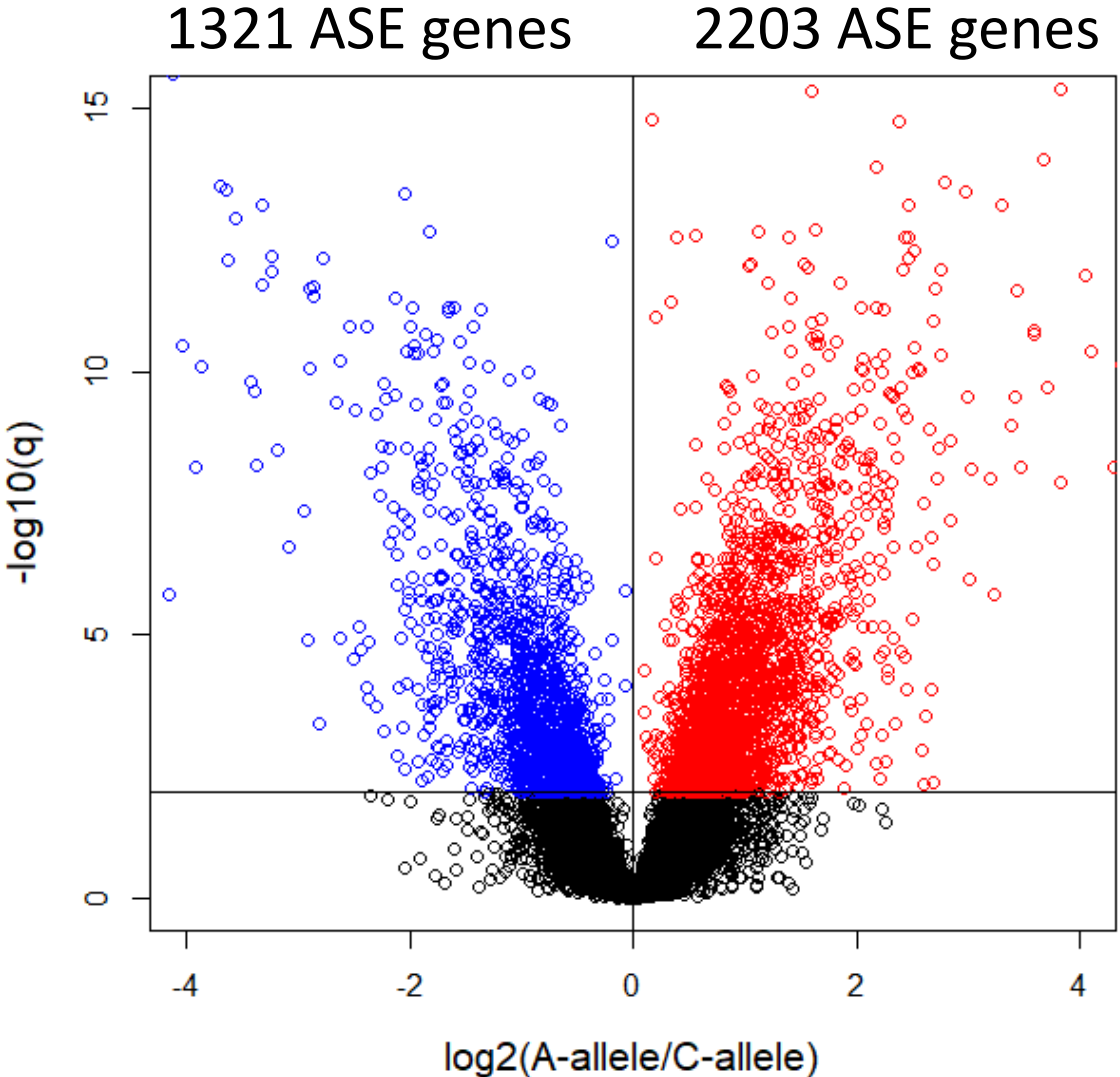
## RNAseq

- 13 genotypes
- 3 tissues (leaf, bud and open flower)
- 4 replicates
- De novo seq6000 (2 x 150 bp reads)

# Gene expression is firstly tissue dependent, then genotype-dependent



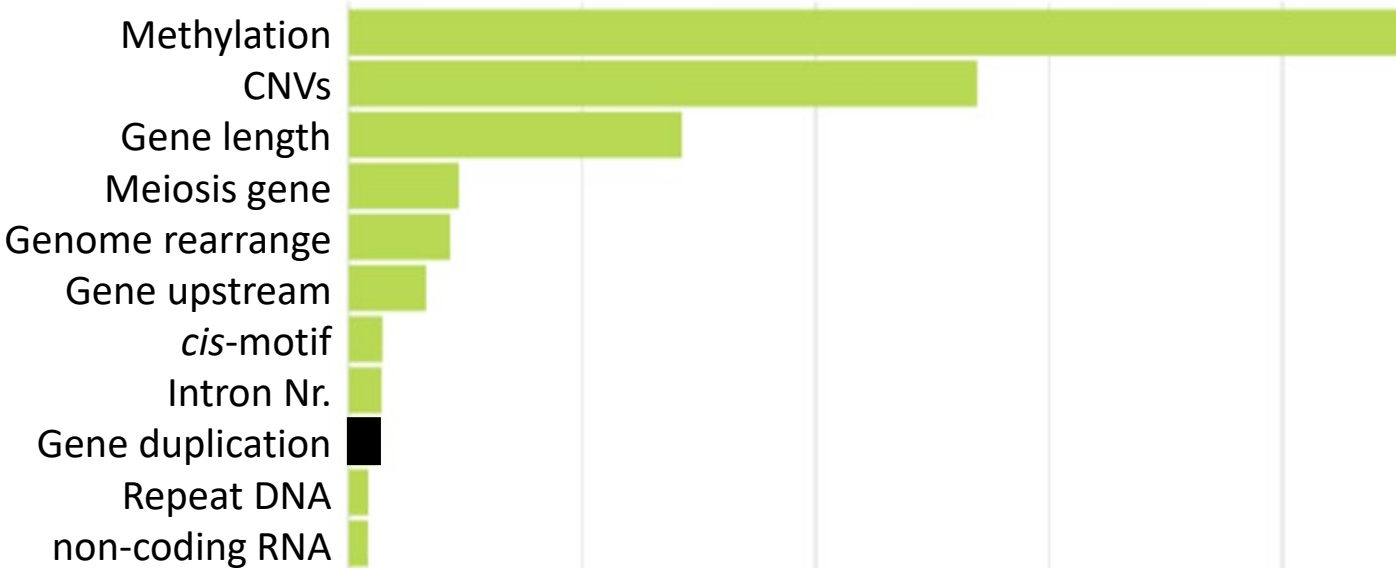
A-subgenome alleles are dominantly expressed over C-subgenome alleles in resynthesized *B. napus*



# Allele-specific expression correlates with cis-regulatory variants

significant? ■ FALSE ■ TRUE

## Key factors for ASE



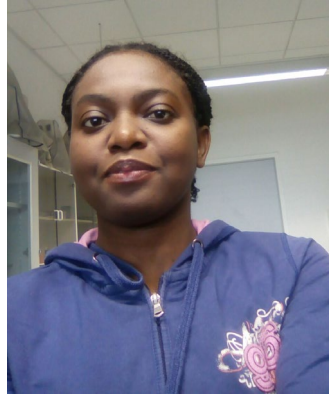
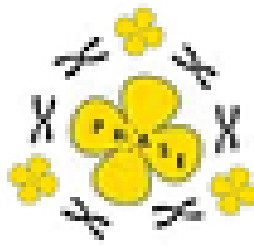
Hypergeometric test

## Top 5 GO enriched categories.

Gene Ontology Category	P value
Chromatin silencing	4.5e-16
Gene regulation	2.0e-11
DNA methylation	4.3e-11
Stress response	9.2e-11
Metabolic process	6.3e-10

***Support for the omnigenic model...***

# Acknowledgements



Elizabeth Ihien



All members in the  
Plant Breeding  
Department at the  
University of Bonn



Emeritus Professor  
Heiko Becker



Dr. Antje Schierholt



Prof. Shengyi Liu  
Dr. Yuanyuan Zhang  
Oil Crops Research Institute  
of CAAS, China

