



The 75th EAAP Annual Meeting

1/5 September 2024 - Florence, Italy



«Feather's transcriptome analysis in local chickens fed two different diets: a possible marker to study lipid metabolism»

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**UNIVERSITÀ
DI TORINO**



Why feathers?

✓ NON invasive biological sample





Why feathers?

- ✓ NON invasive biological sample
 - ✓ Suitable for genetic analysis
-





Why feathers?

- ✓ NON invasive biological sample
 - ✓ Suitable for genetic analysis
 - ✓ Many epithelial cells
-



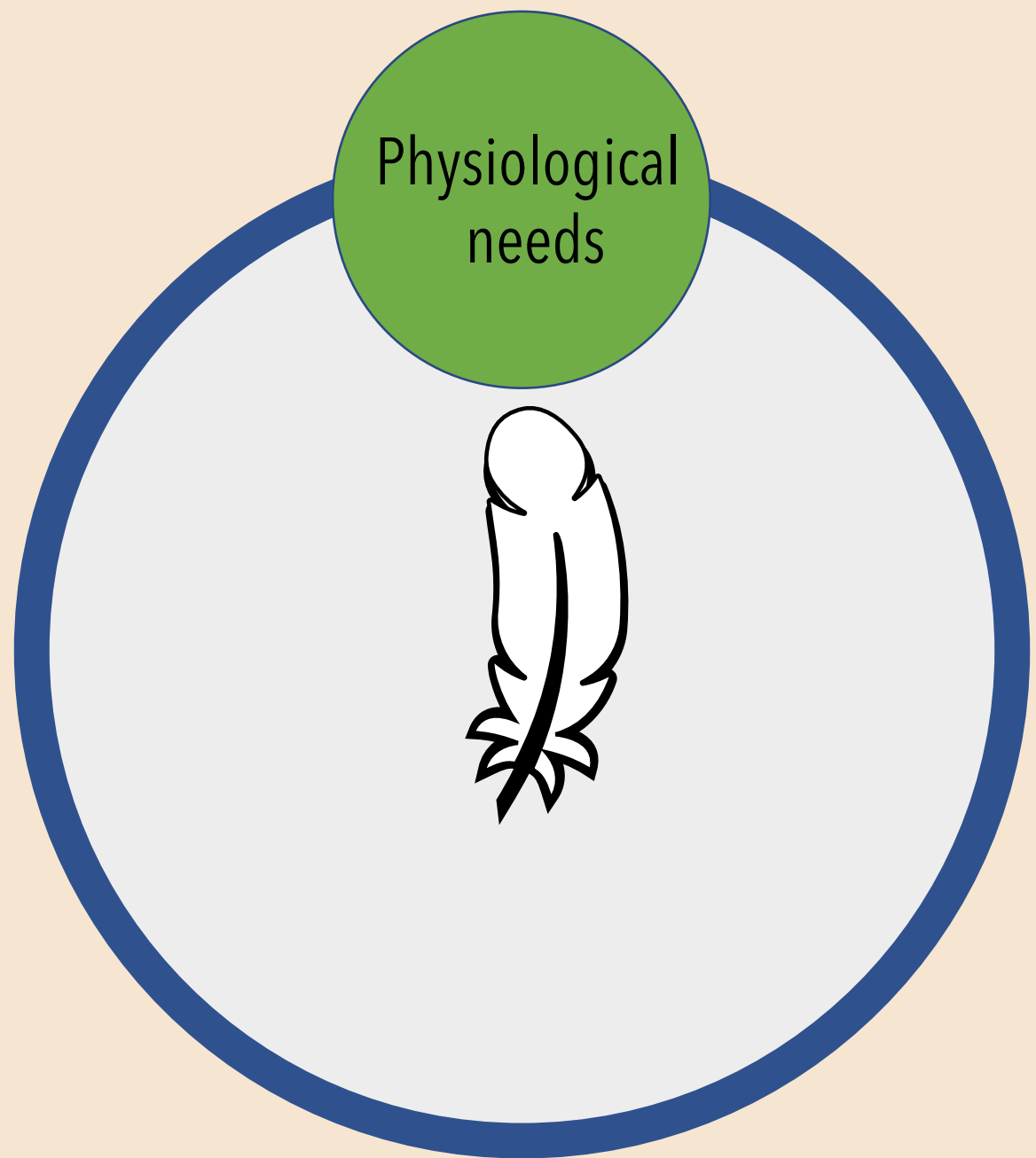


Why feathers?

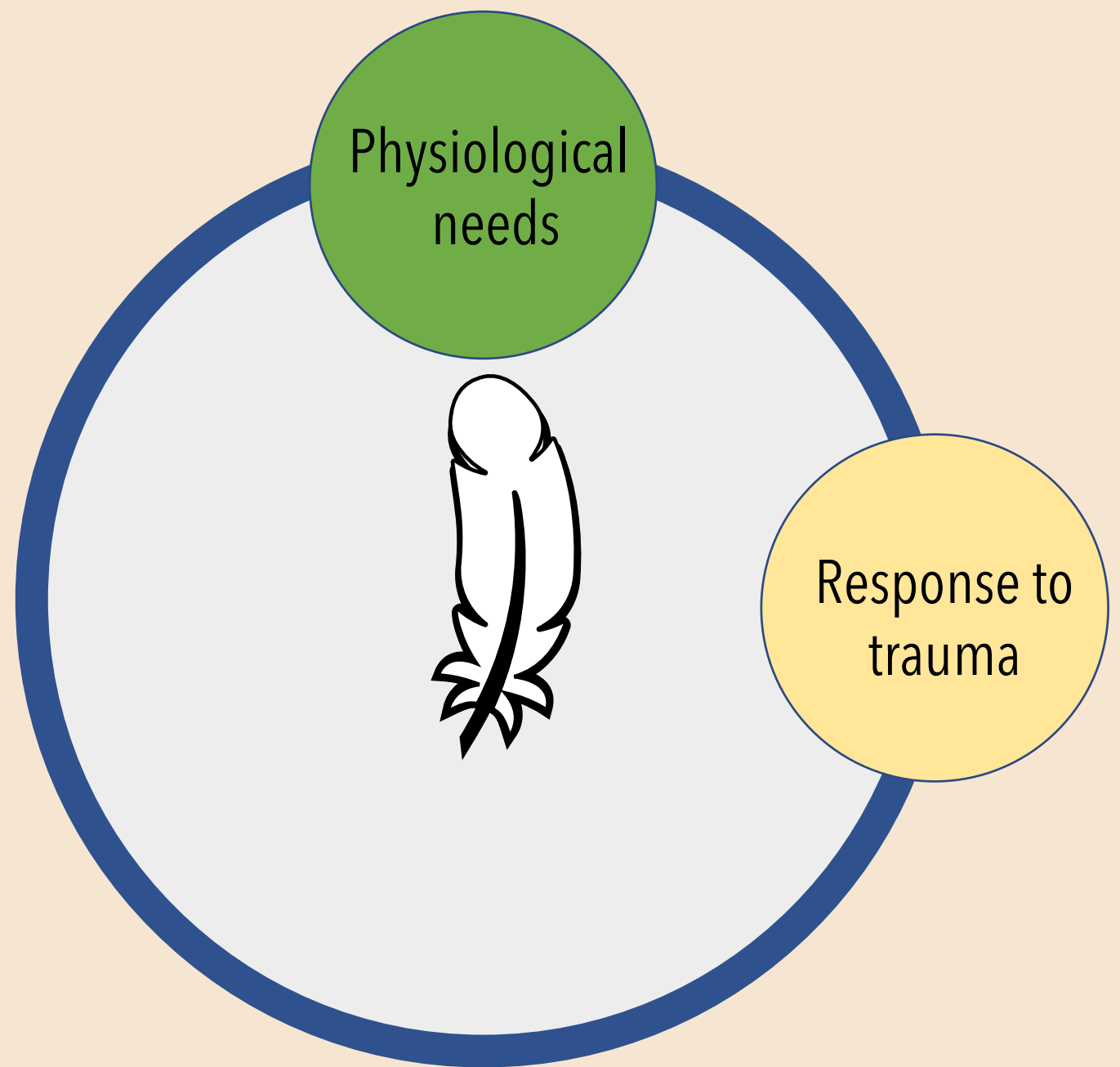
- ✓ NON invasive biological sample
- ✓ Suitable for genetic analysis
- ✓ Many epithelial cells
- ✓ Presence of blood in the calamus



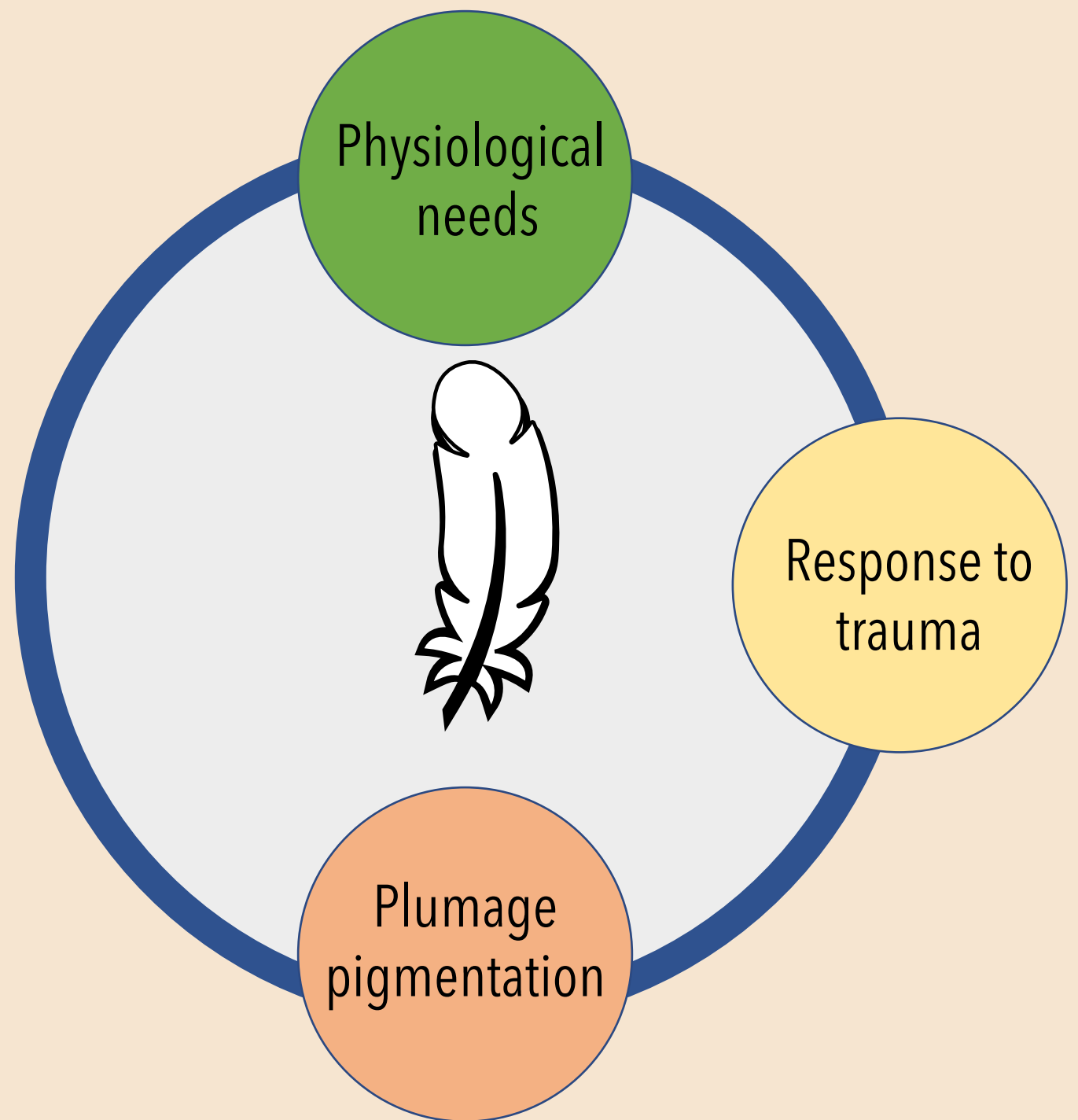
Gene expression in feathers



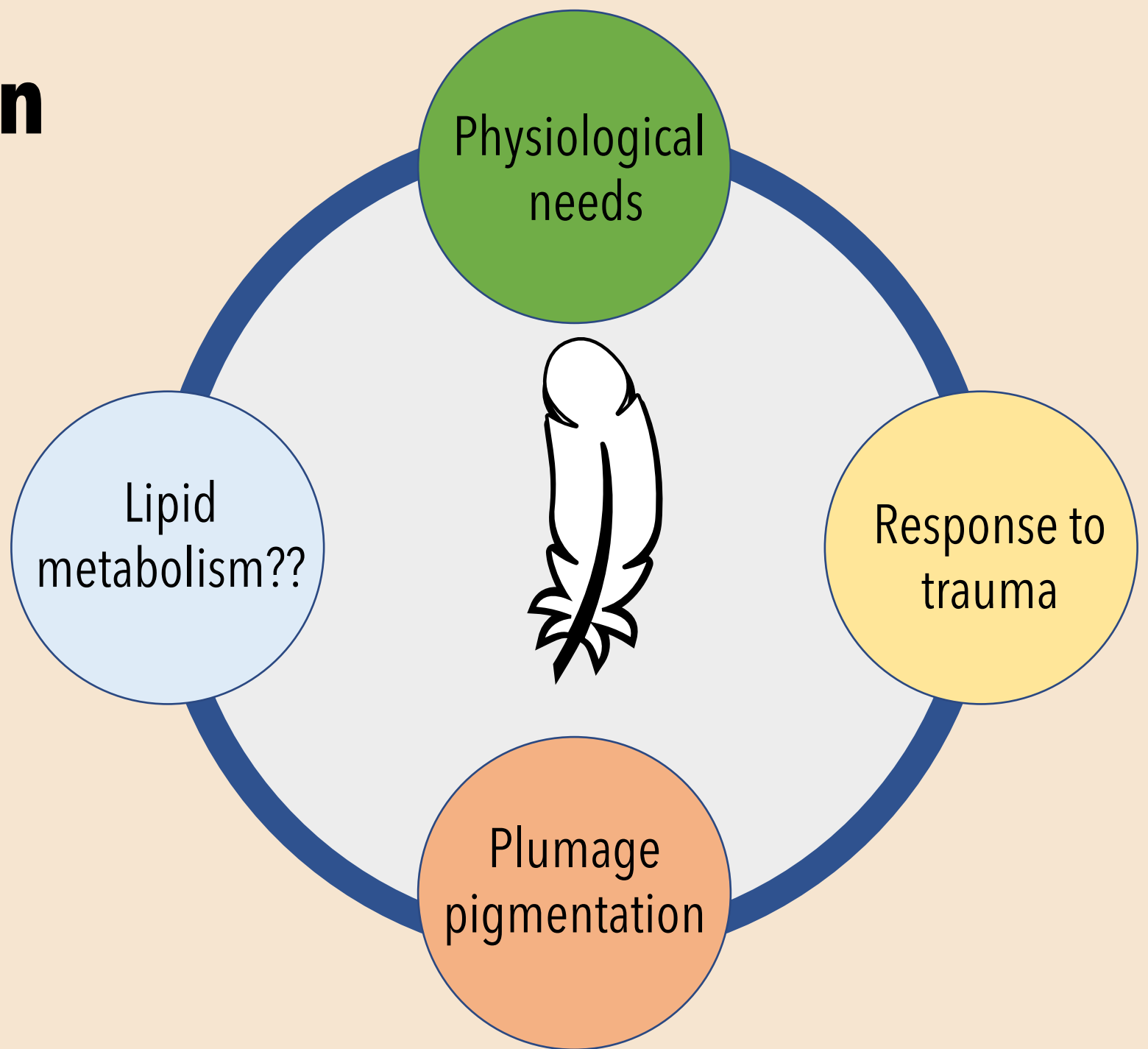
Gene expression in feathers



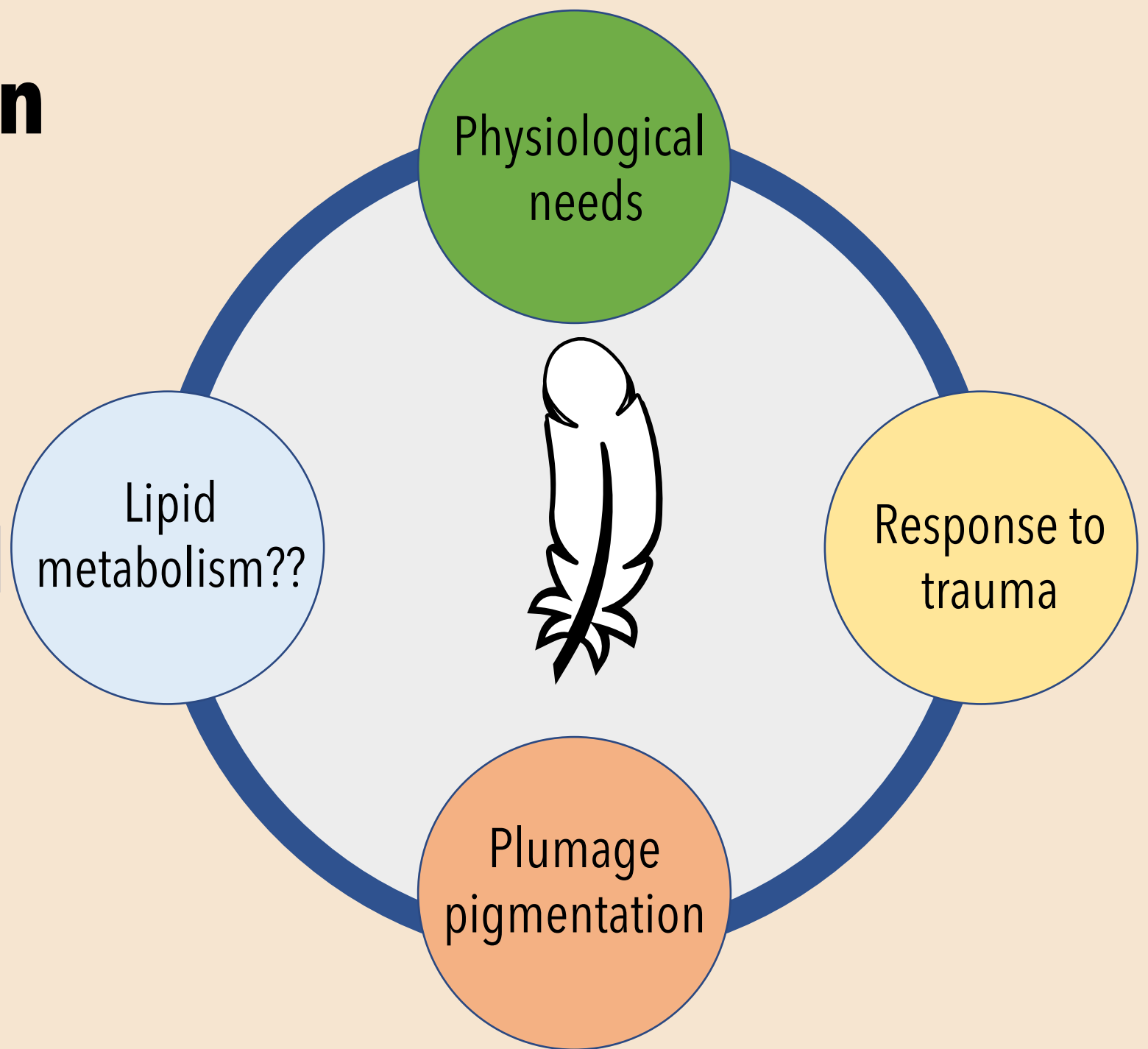
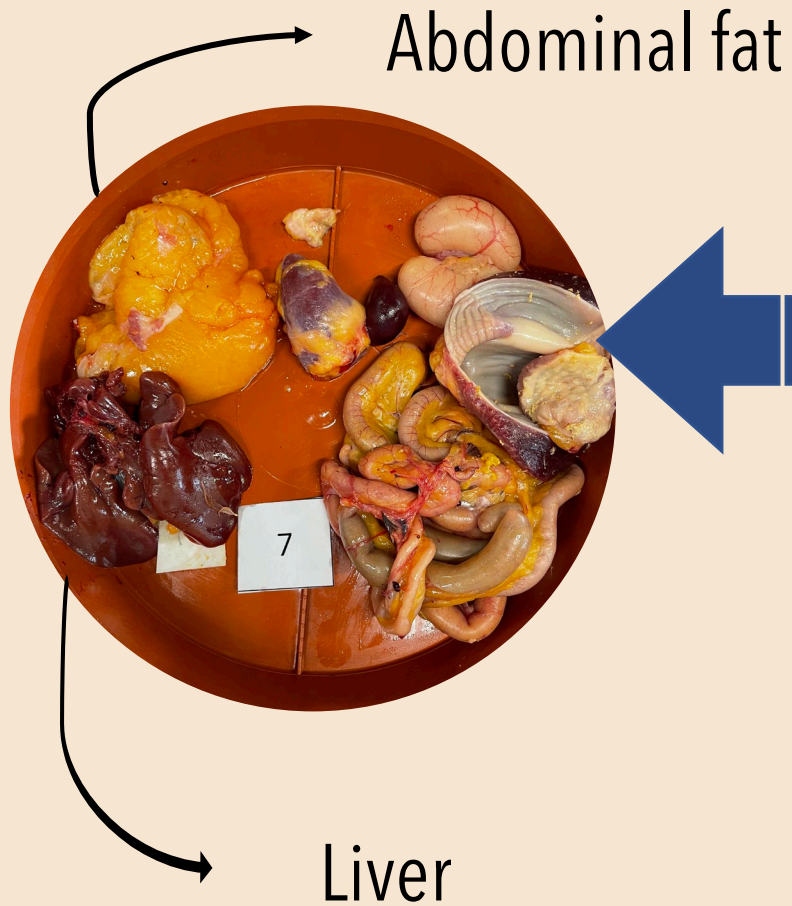
Gene expression in feathers



Gene expression in feathers

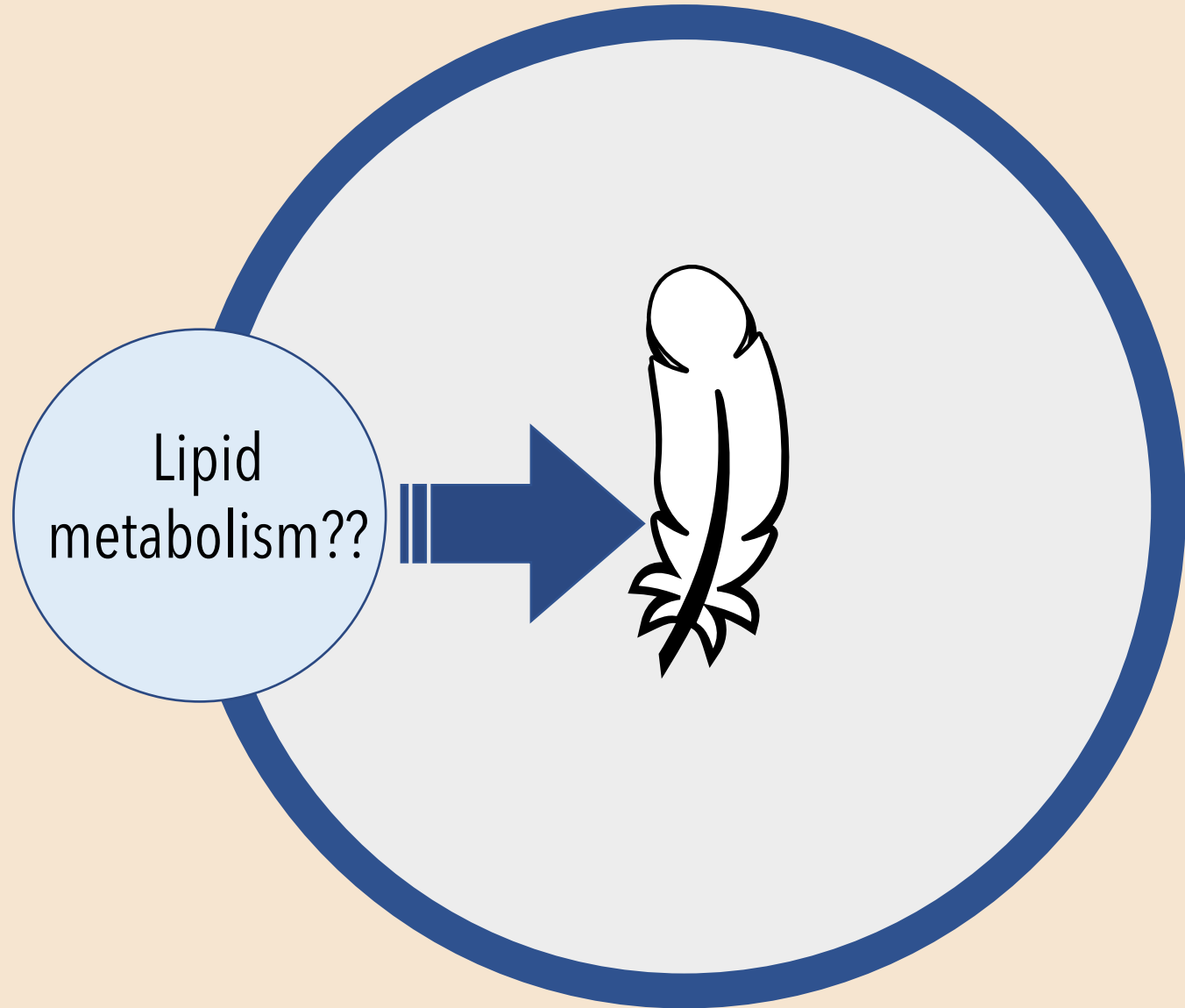


Gene expression in feathers



AIM

Feasibility of using
feathers to study
marker genes linked
to lipid metabolism



Animals and Treatment



Bionda Piemontese

- Slow growing chicken breed
- Local Piemontese breed
- Dual purpose



Animals and Treatment



15 males and 15 females/diet

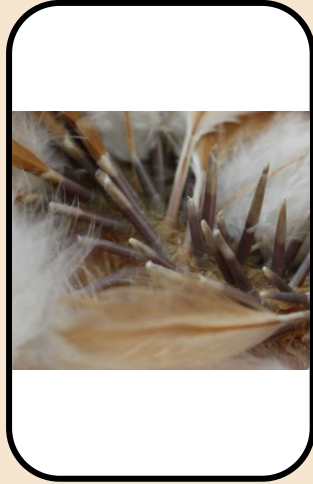
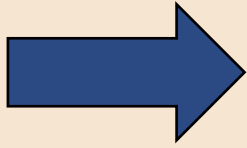
Diet composition	LL diet	HL diet
Mais	70 g	62,5 g
Nucleus	30 g	30 g
Palm kernel	-	6 g
Soybean	-	1.5 g
Ether Extract (EE)	3.63 %	9.33 %
Crude Protein (CP)	17.47 %	17.47%

LL: Low Lipidic content diet
HL: High Lipidic content diet

Materials and Methods



Animals

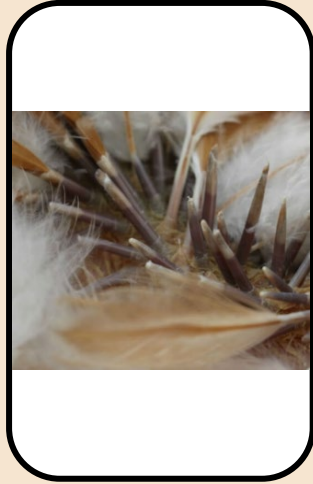
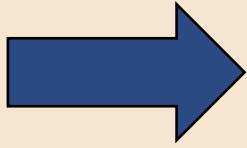


Feathers
collection

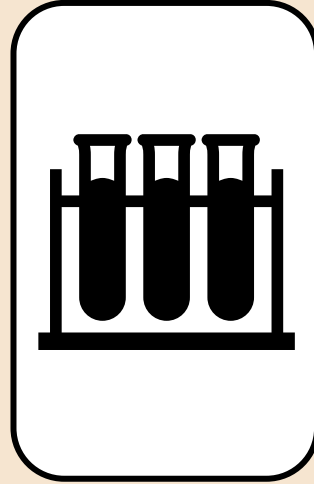
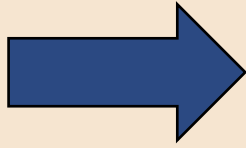
Materials and Methods



Animals



Feathers
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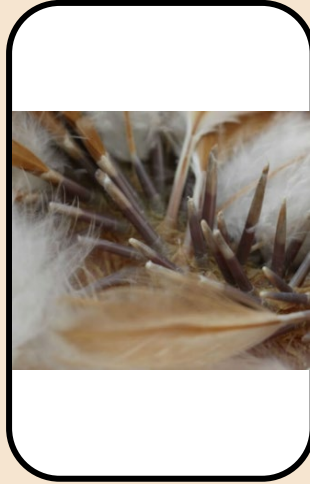
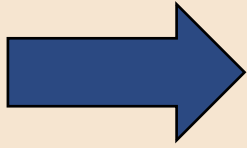


RNA
extraction

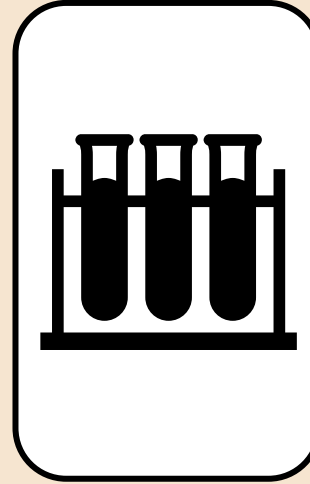
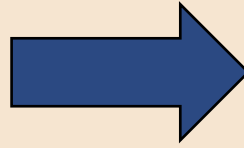
Materials and Methods



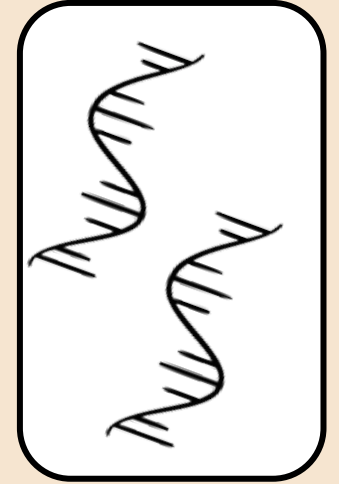
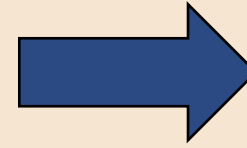
Animals



Feathers
collection



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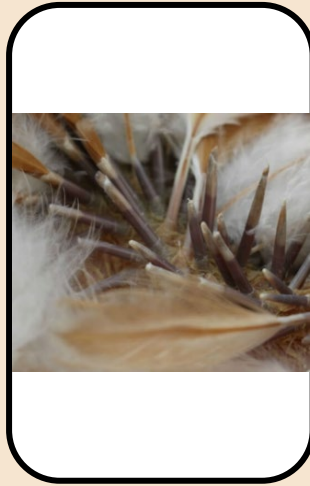
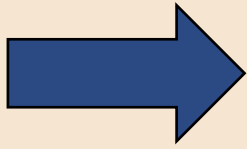


12 Pools
3 replicate/sex/diet

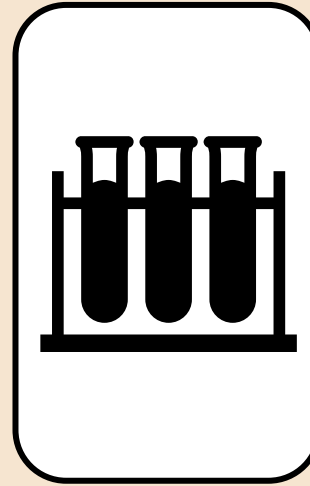
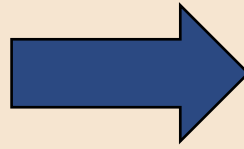
Materials and Methods



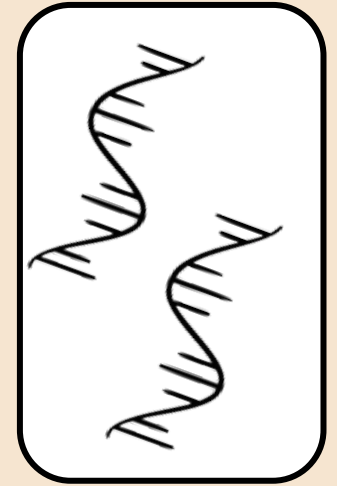
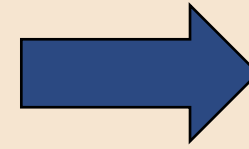
Animals



Feathers
collection

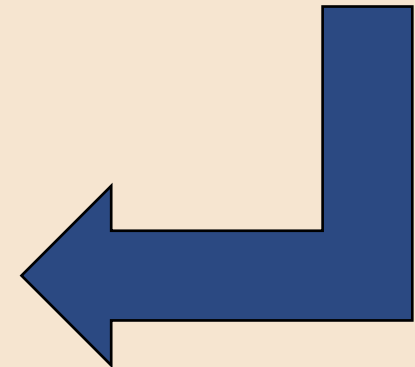


RNA
extraction



12 Pools
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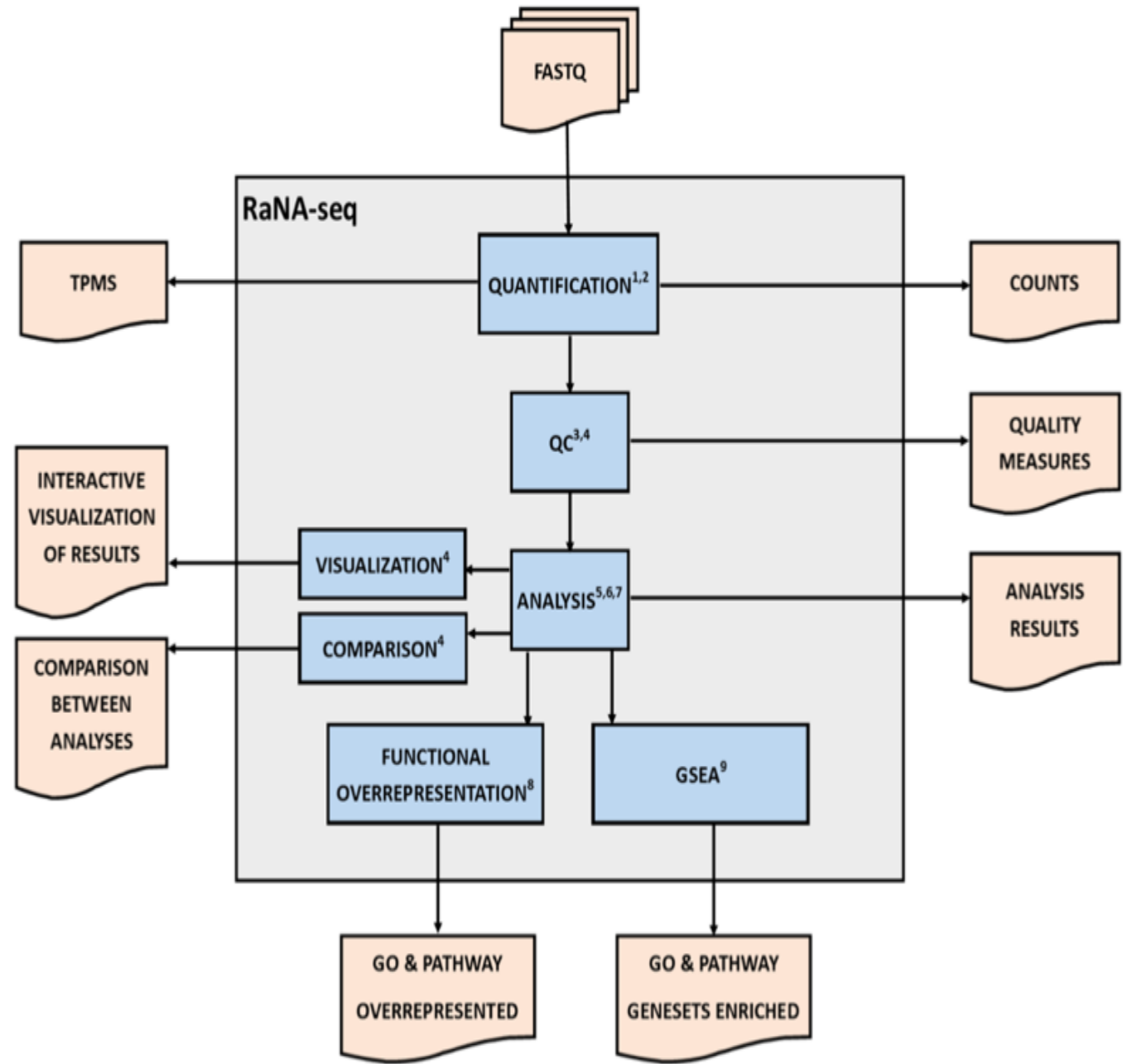
RNA profiling



Software analysis

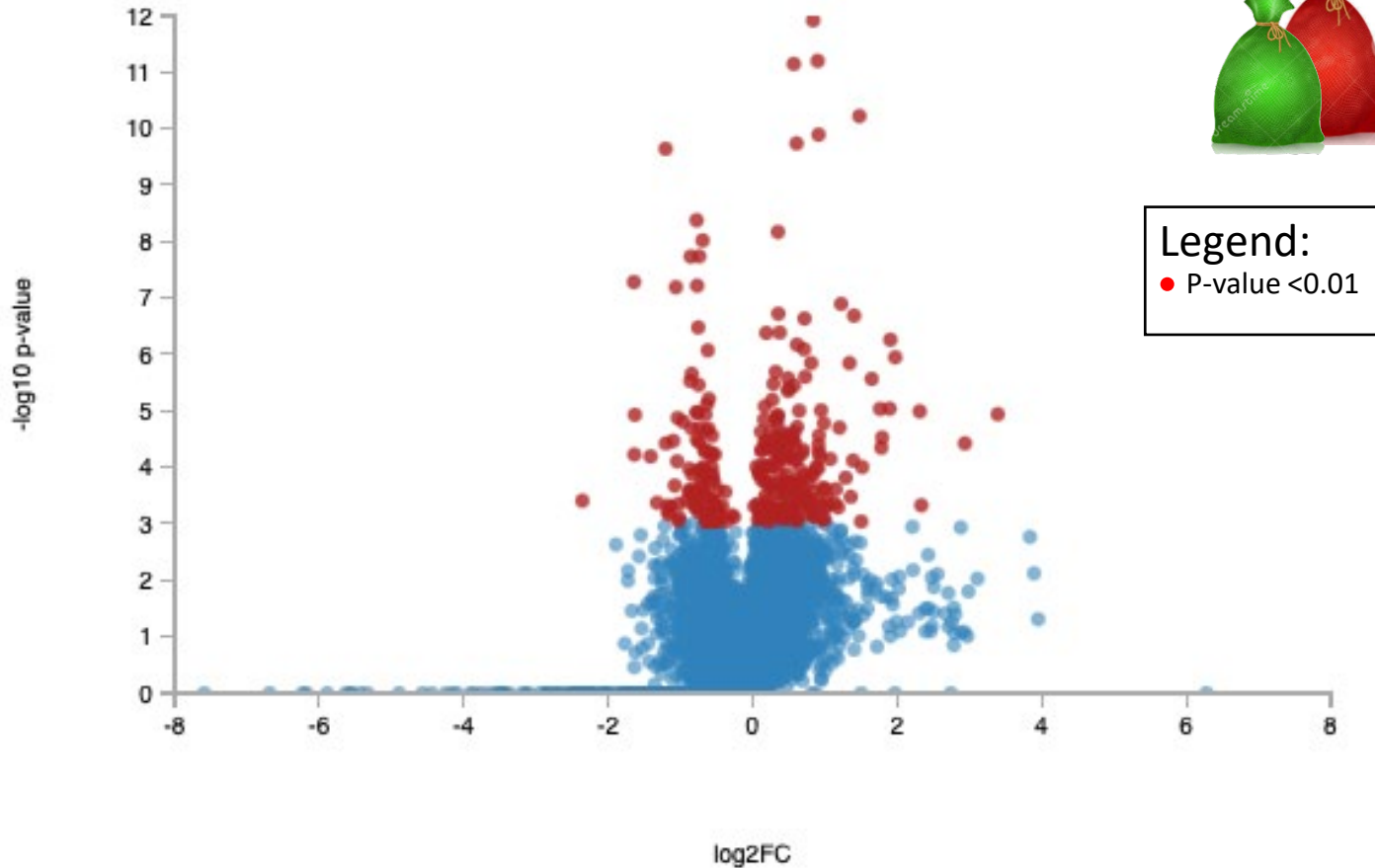


RaNA-seq



Results

HL vs LL regardless of sex



17.360 tot

316 significant

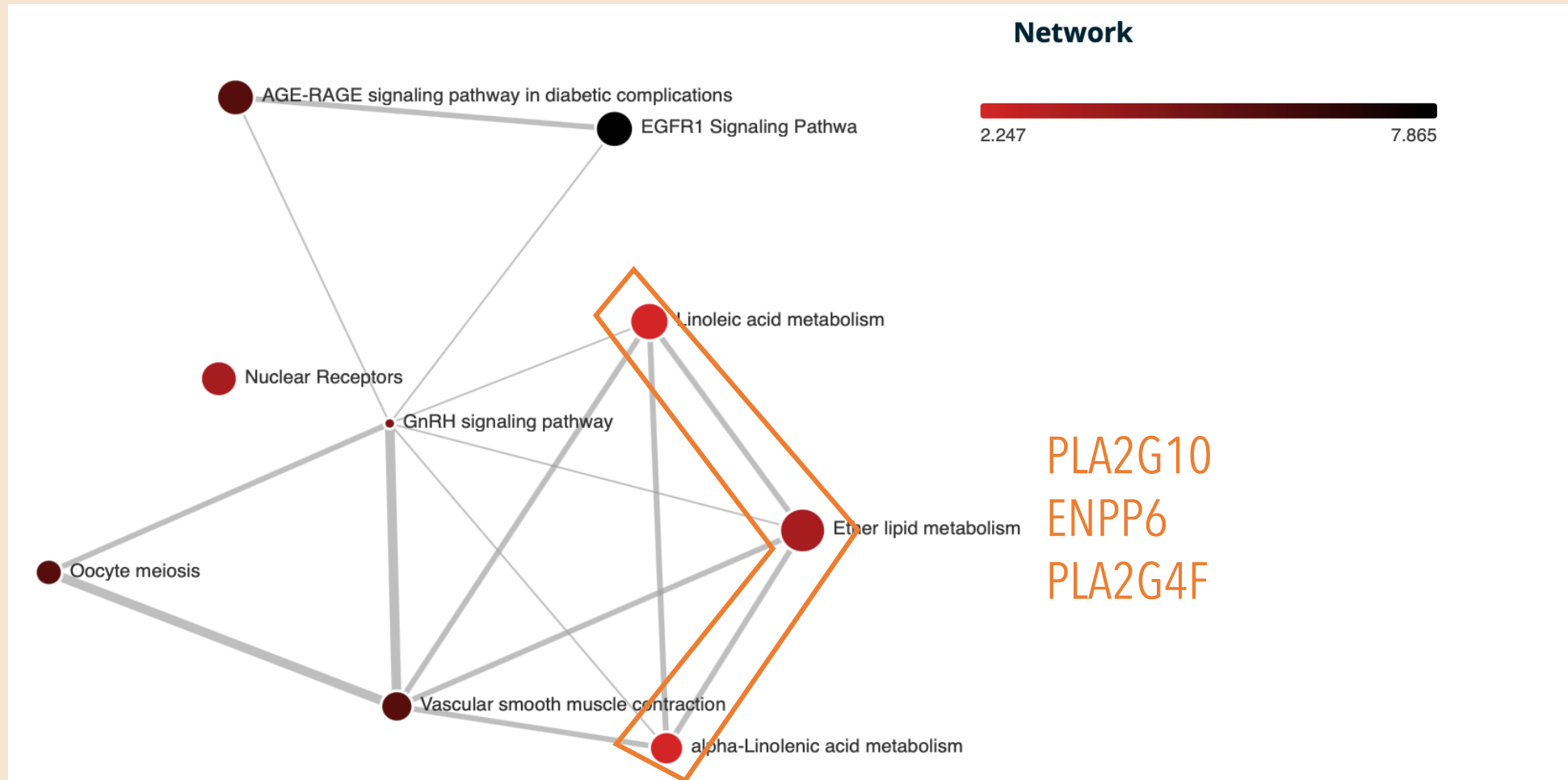
263 known

163 upregulated in HL

100 downregulated in HL

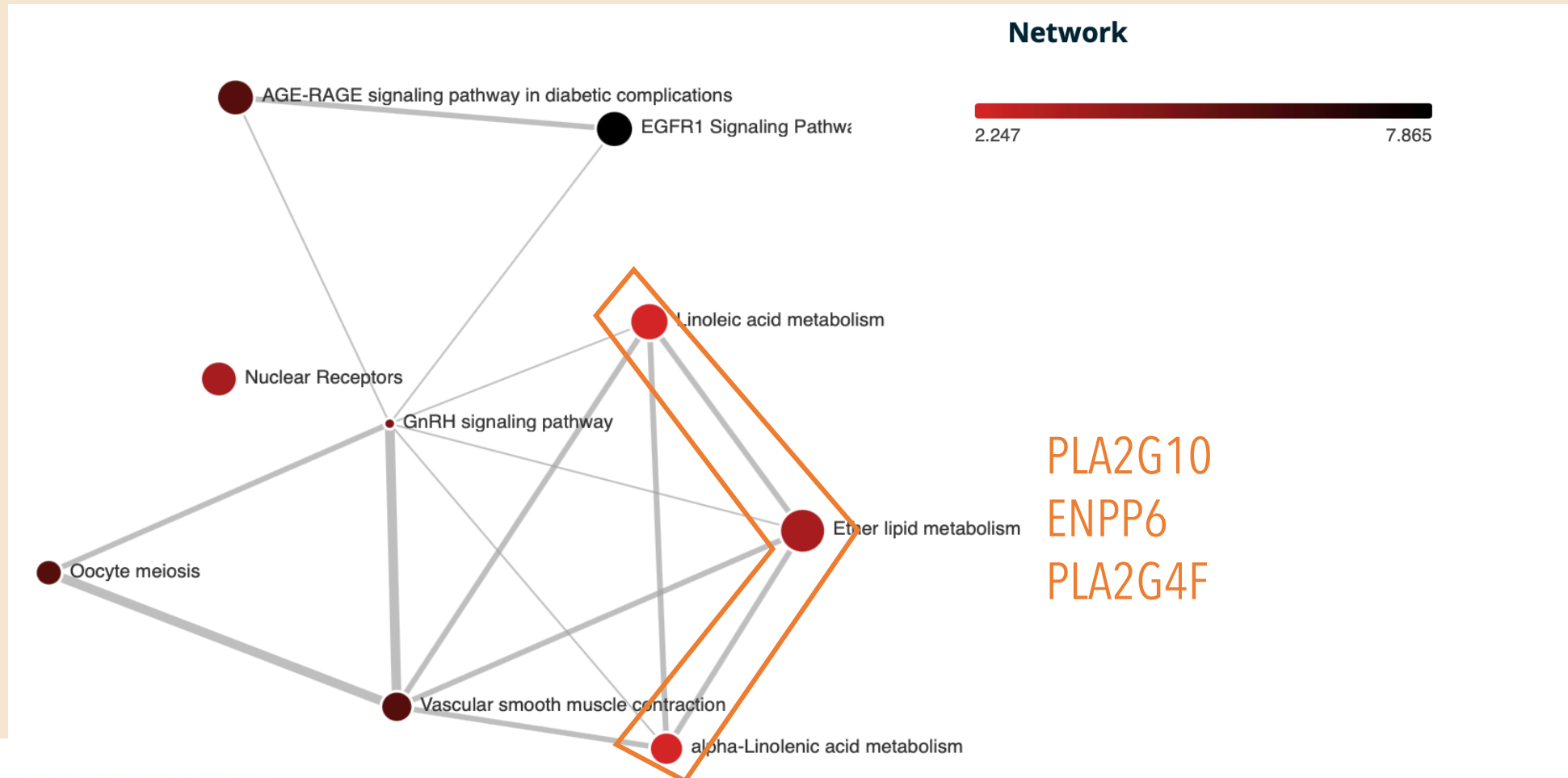
Results

HL vs LL regardless of sex



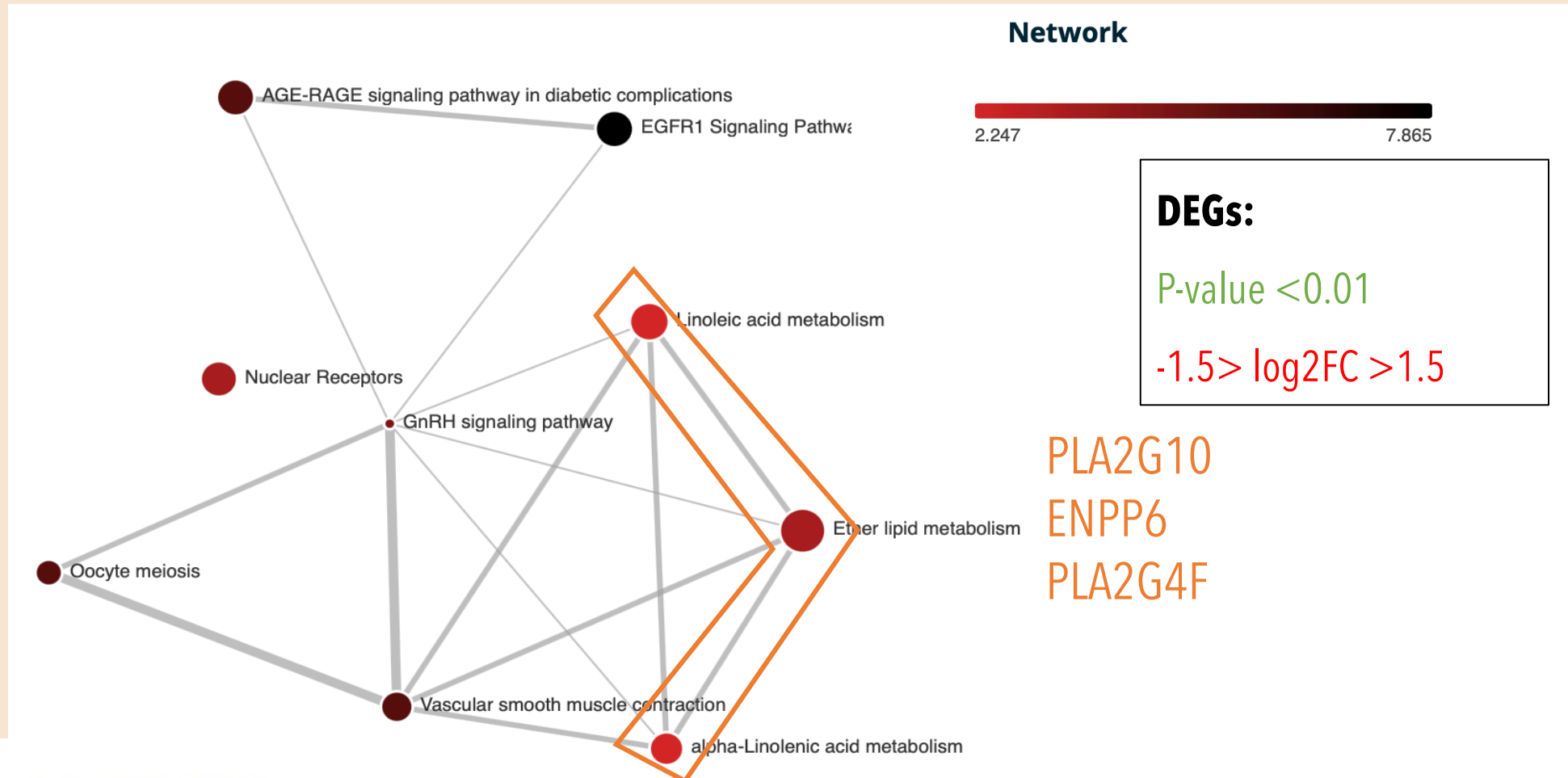
Results

HL vs LL regardless of sex



Results

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Results

HL vs LL

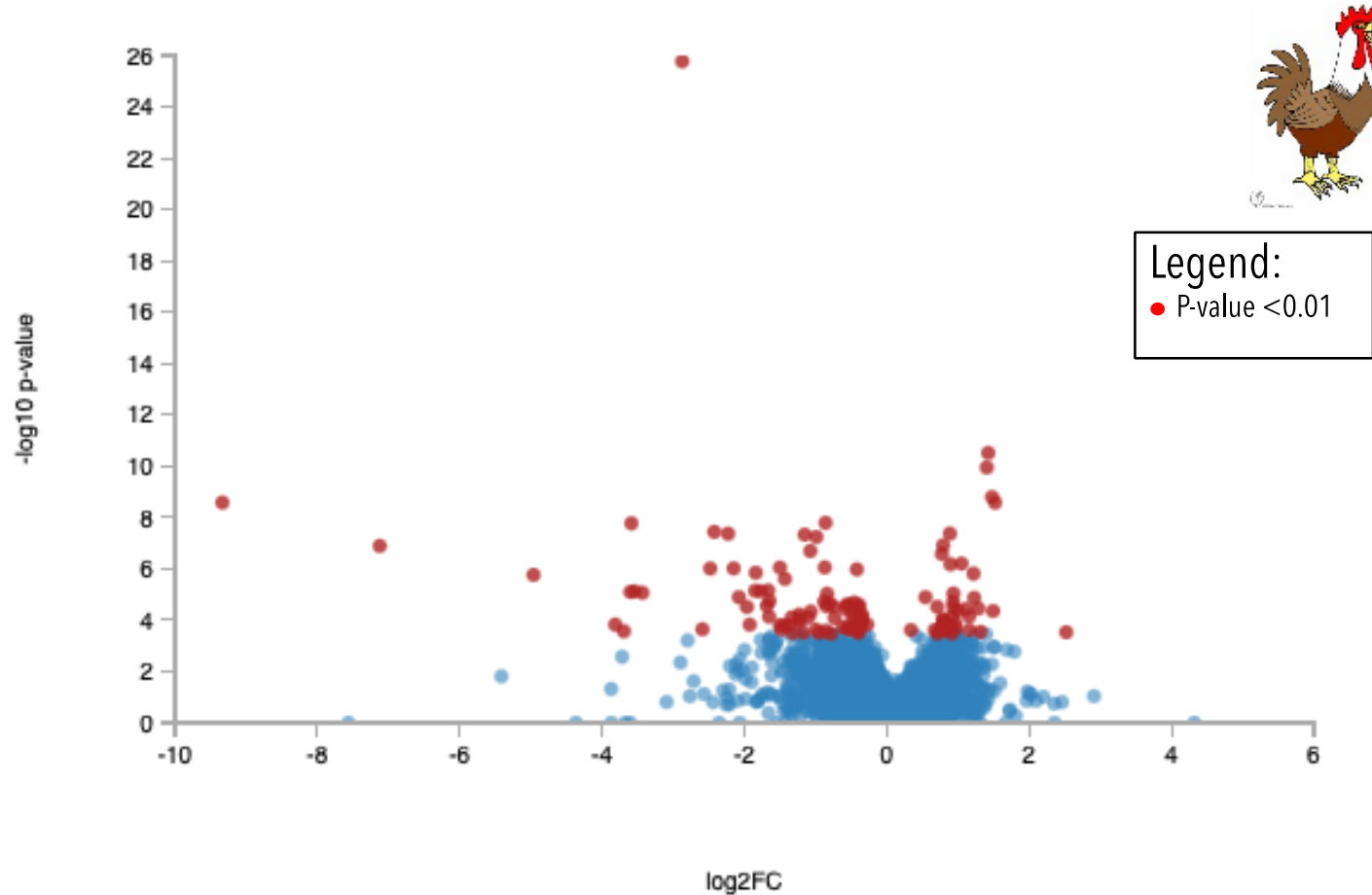
17.011 tot

118 significant

76 known

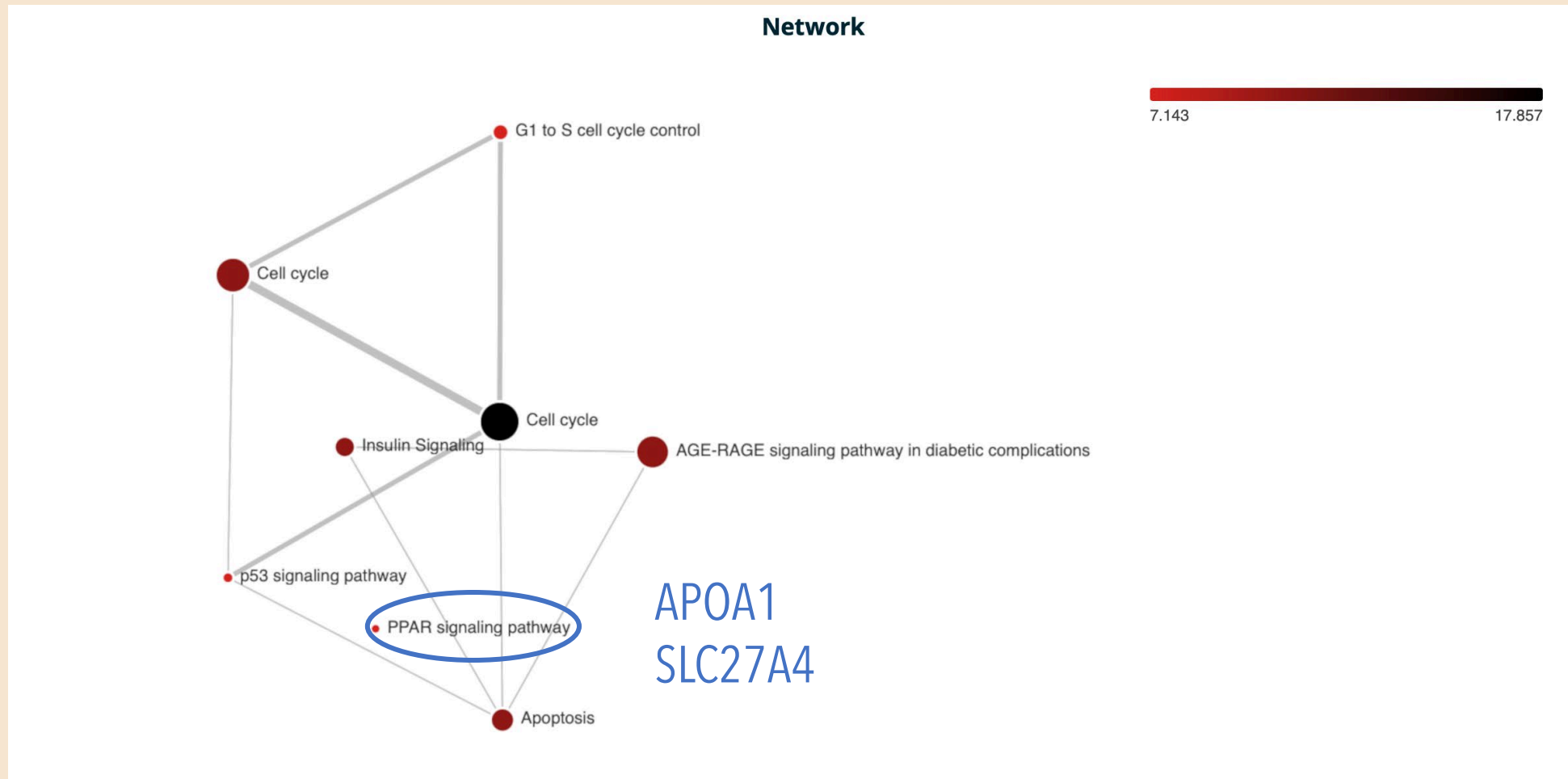
38 upregulated in HL

38 downregulated in HL



Results

HL vs LL

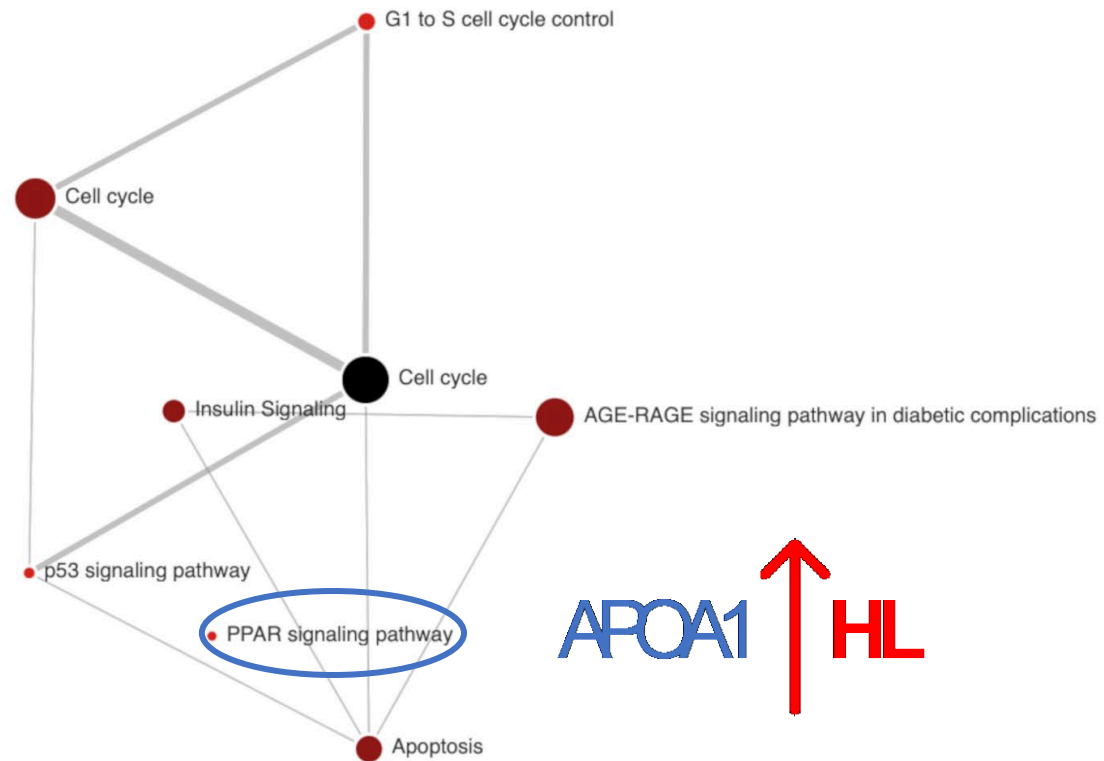


Results

HL vs LL



Network



7.143

17.857

DEGs:

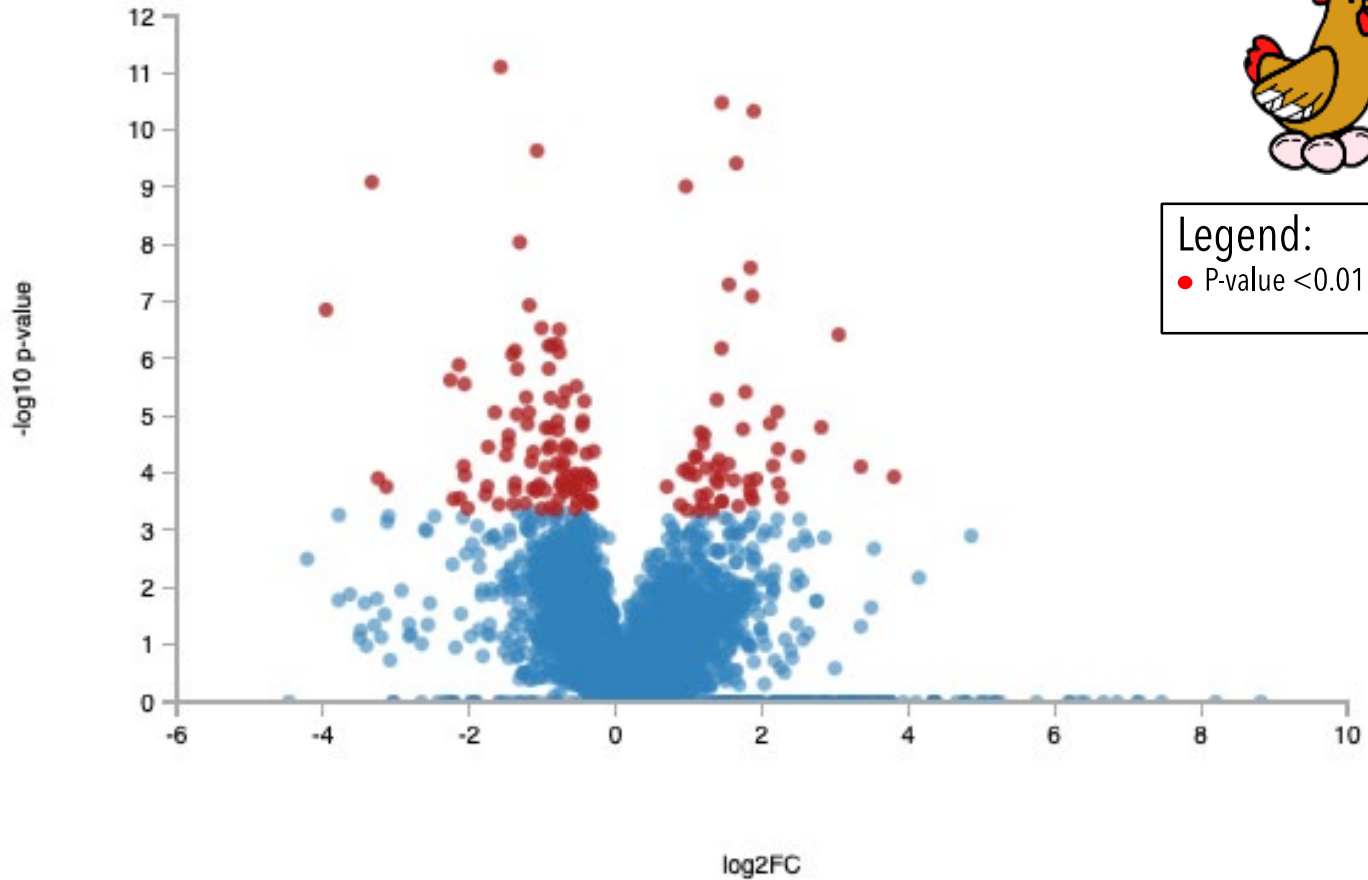
P-value < 0.01

$-1.5 > \log_2 FC > 1.5$

APOA1 ↑ HL

Results

HL vs LL



17.047 tot

153 significant

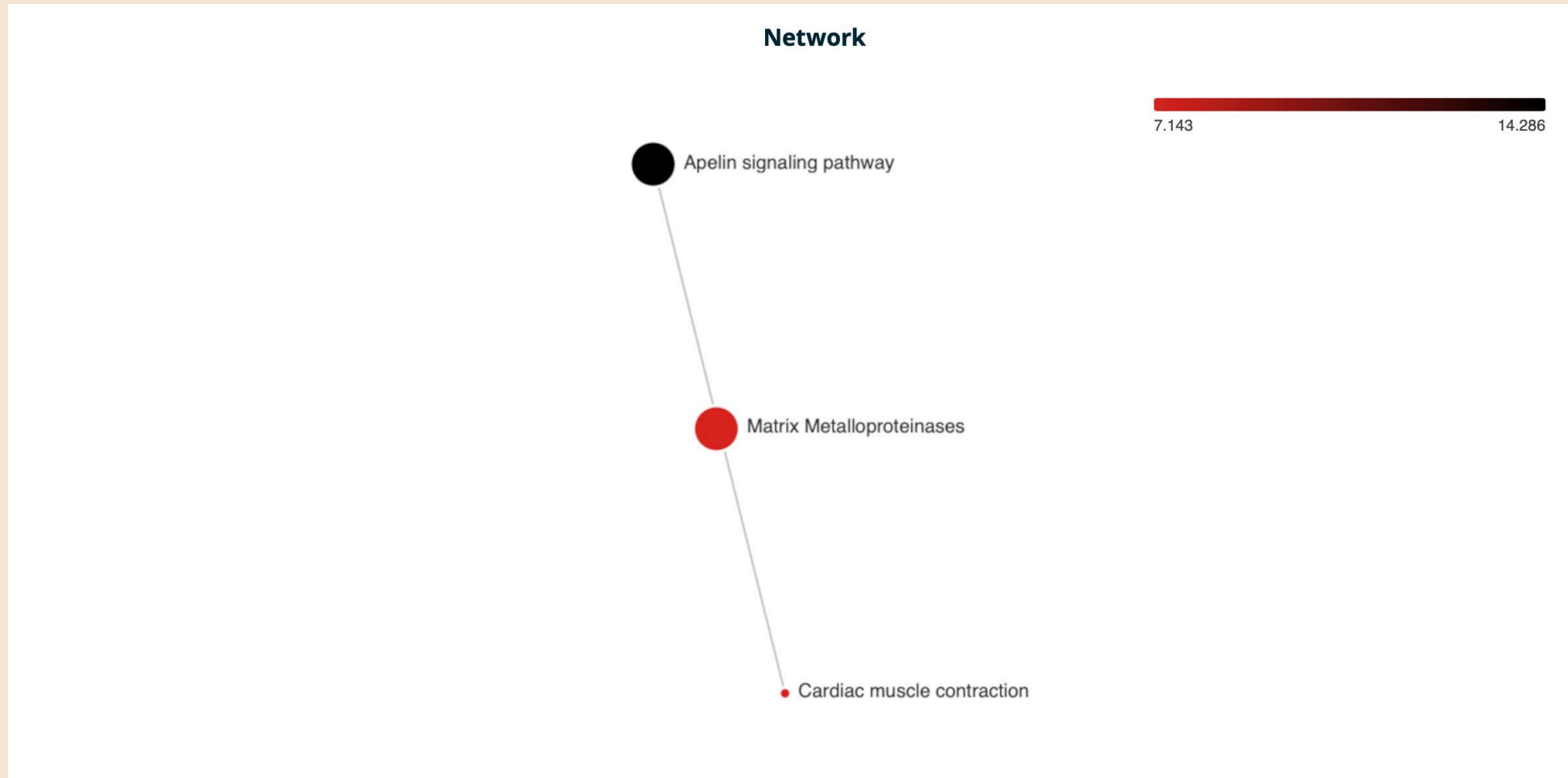
105 known

68 upregulated in HL

37 downregulated in HL

Results

HL vs LL



Conclusions

- **Gene expression in feathers:**
growth control, morphogenesis and differentiation
- **Genes linked to lipid metabolism in feathers:**
NEU2, NUDT19, PLBD1, CYP26B1, AOA1, GLA,
PLA2G10, ENPP6, PLA2G4F, APOA1 and SLC27A4
- **APOA1** upregulated in rooster fed the HL diet



THANKS FOR THE ATTENTION!!!



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