Effect of dietary PL on growth and metabolism of lipids in Atlantic halibut juveniles

DIVERSIFY

Designed by Karl Andree, IRTA

D11.5

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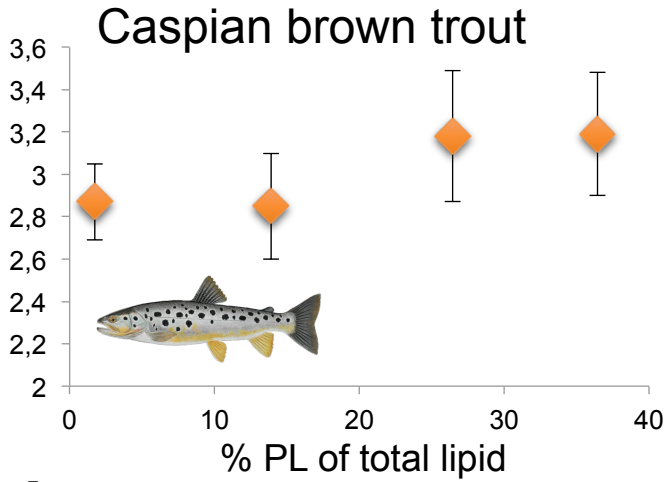
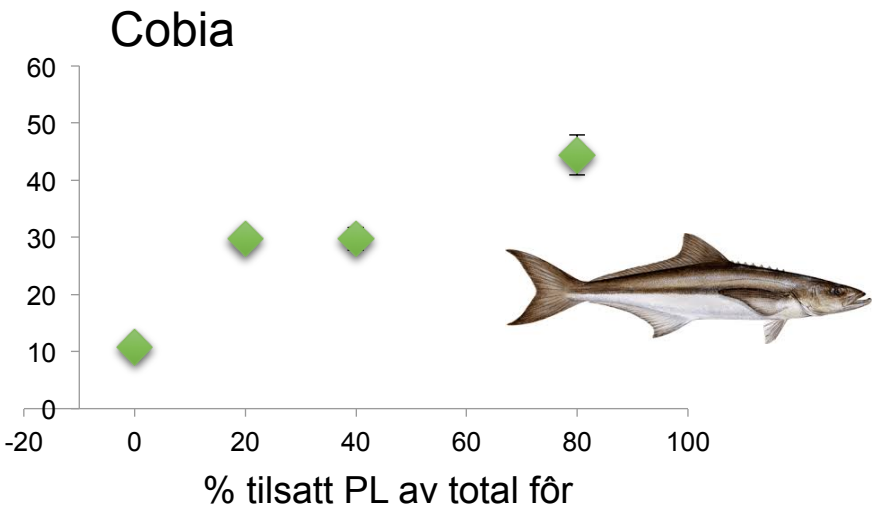
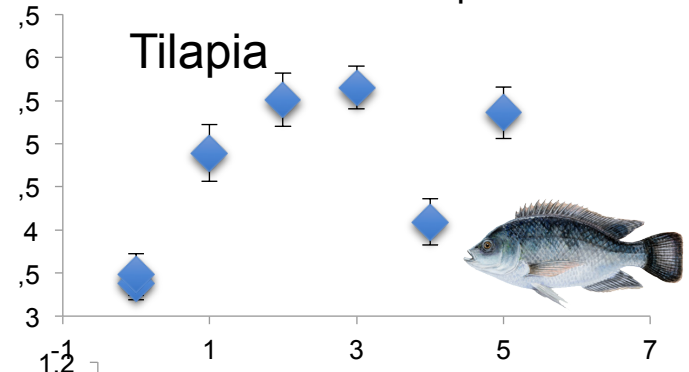
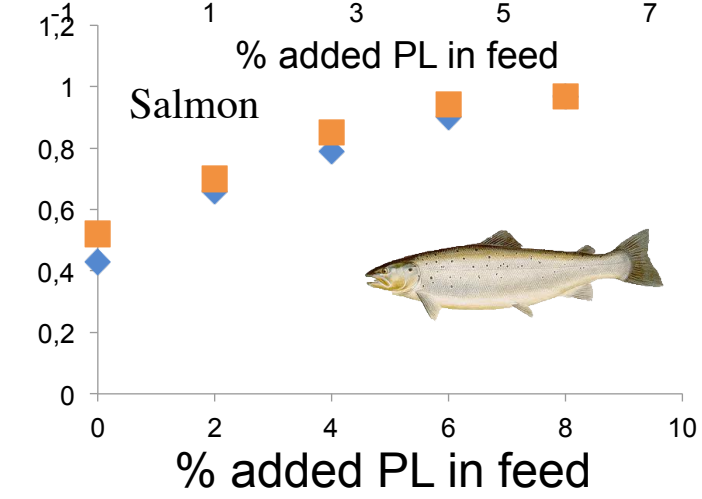
INSTITUTE OF MARINE RESEARCH

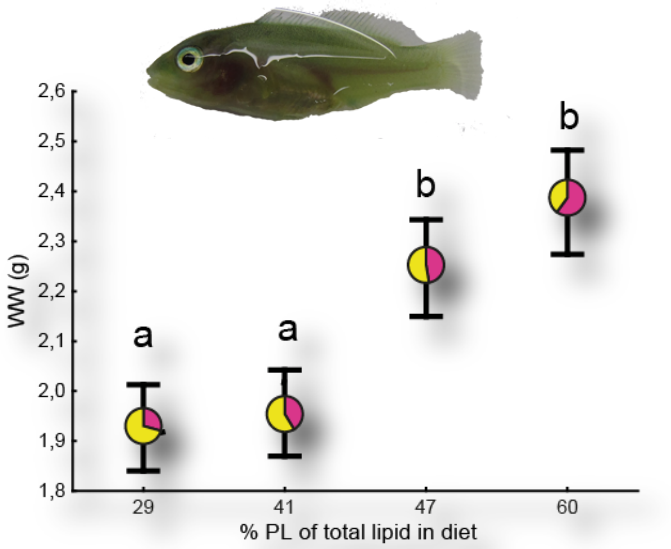
Effect of dietary PL on growth



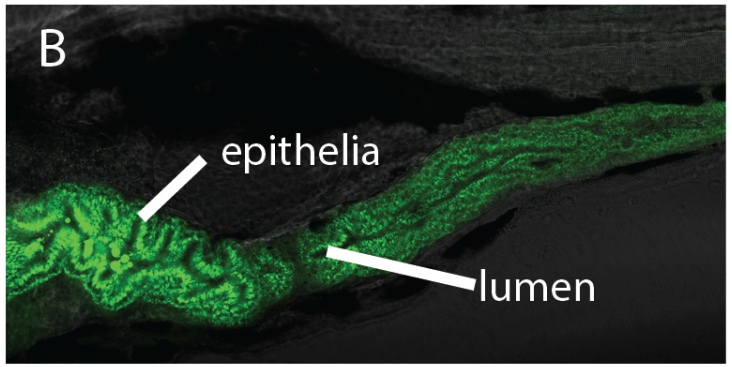


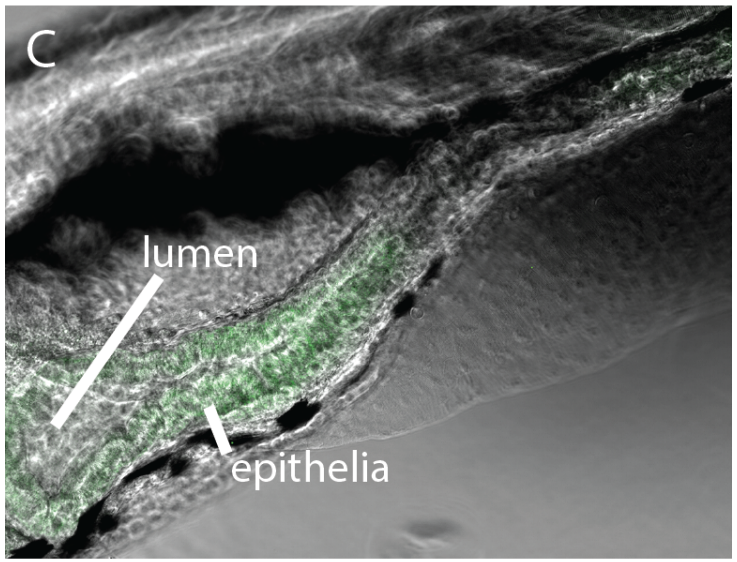


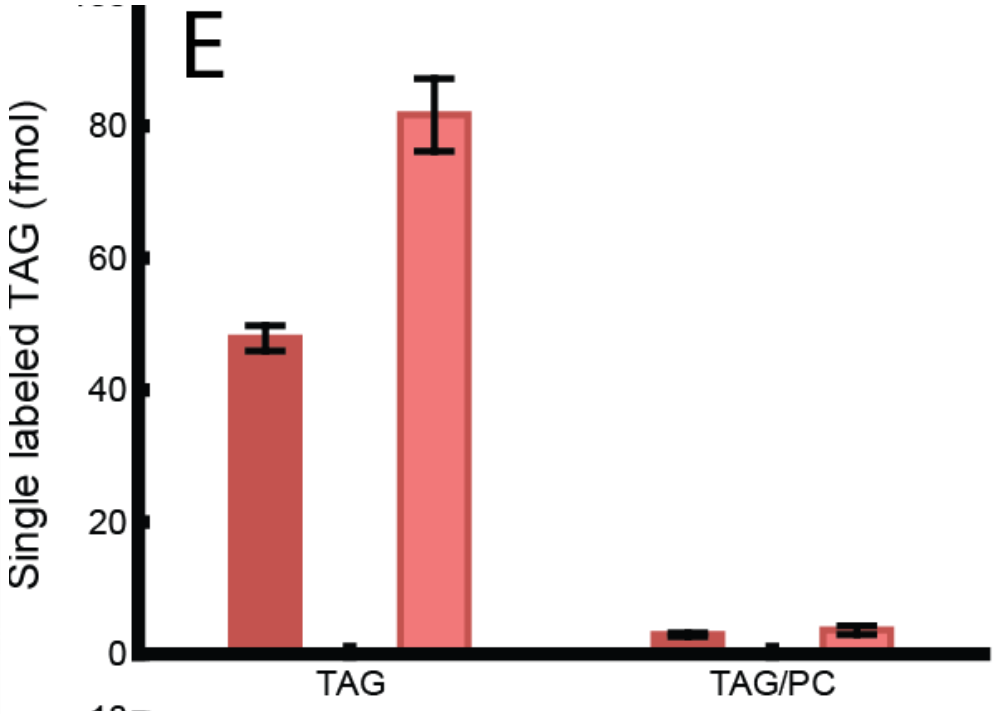




Dietary PL – role in TAG transport







Sæle et al., submitted

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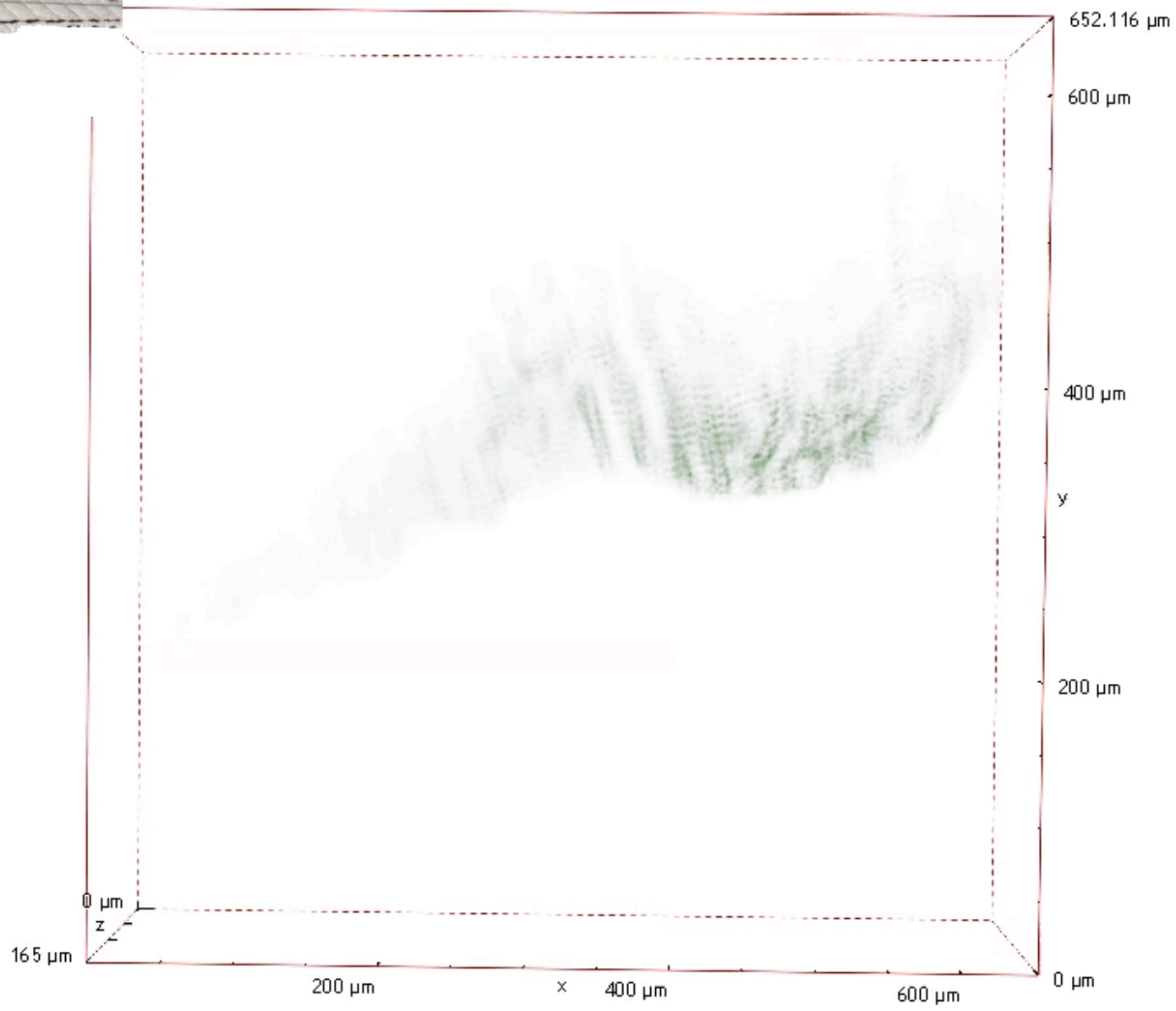
Dietary PL present



No dietary PL

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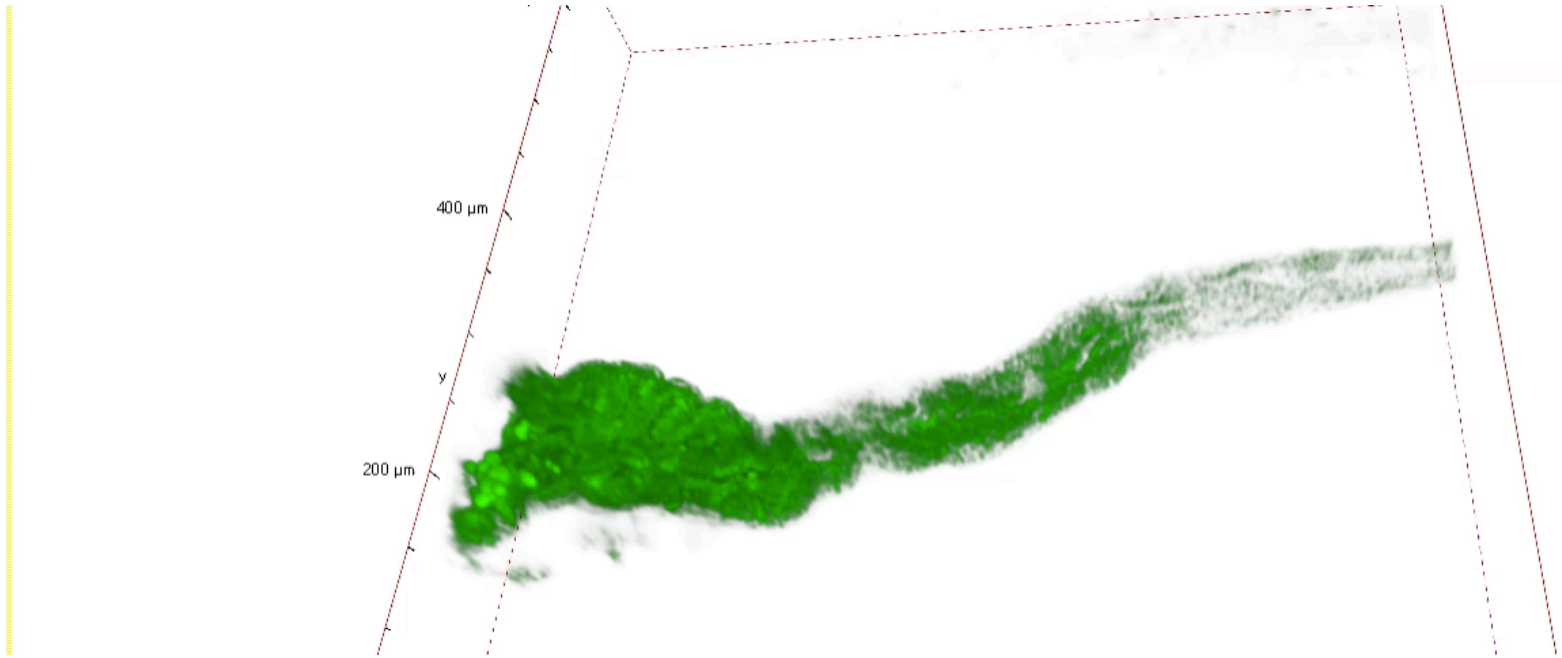


Diet design

Diet	Low PL		Medium		High PL
Water	-3,36	-3,36	-3,36	-3,36	-3,36
Soyaoil	**6,00**	**4,50**	**3,00**	**1,50**	**0,00**
Soya lecitin	**0**	**1,50**	**3,00**	**4,50**	**6,00**
krill meal	2,50	2,50	2,50	2,50	2,50
Wheat	15,37	15,37	15,37	15,37	15,37
FM North-Atlantic 12C	74,63	74,63	74,63	74,63	74,63
cpsp 90 ntc 12149	2,50	2,50	2,50	2,50	2,50
Fishoil North-Atlantic	**2,06**	**2,06**	**2,06**	**2,06**	**2,06**
vitamin premix	0,10	0,10	0,10	0,10	0,10
Yttrium premix	0,10	0,10	0,10	0,10	0,10
Mineral premix	0,10	0,10	0,10	0,10	0,10
[VOLUME]	100,00	100,00	100,00	100,00	100,00
DRY_MAT	93,00	93,00	93,00	93,00	93,00
V MOIST	7,00	7,00	7,00	7,00	7,00
C PROT	57,00	57,00	57,00	57,00	57,00
C FAT	18,00	18,00	18,00	18,00	18,00
ASH	10,56	10,56	10,56	10,56	10,56
STARCH	8,76	8,76	8,76	8,76	8,76

Diet analysis

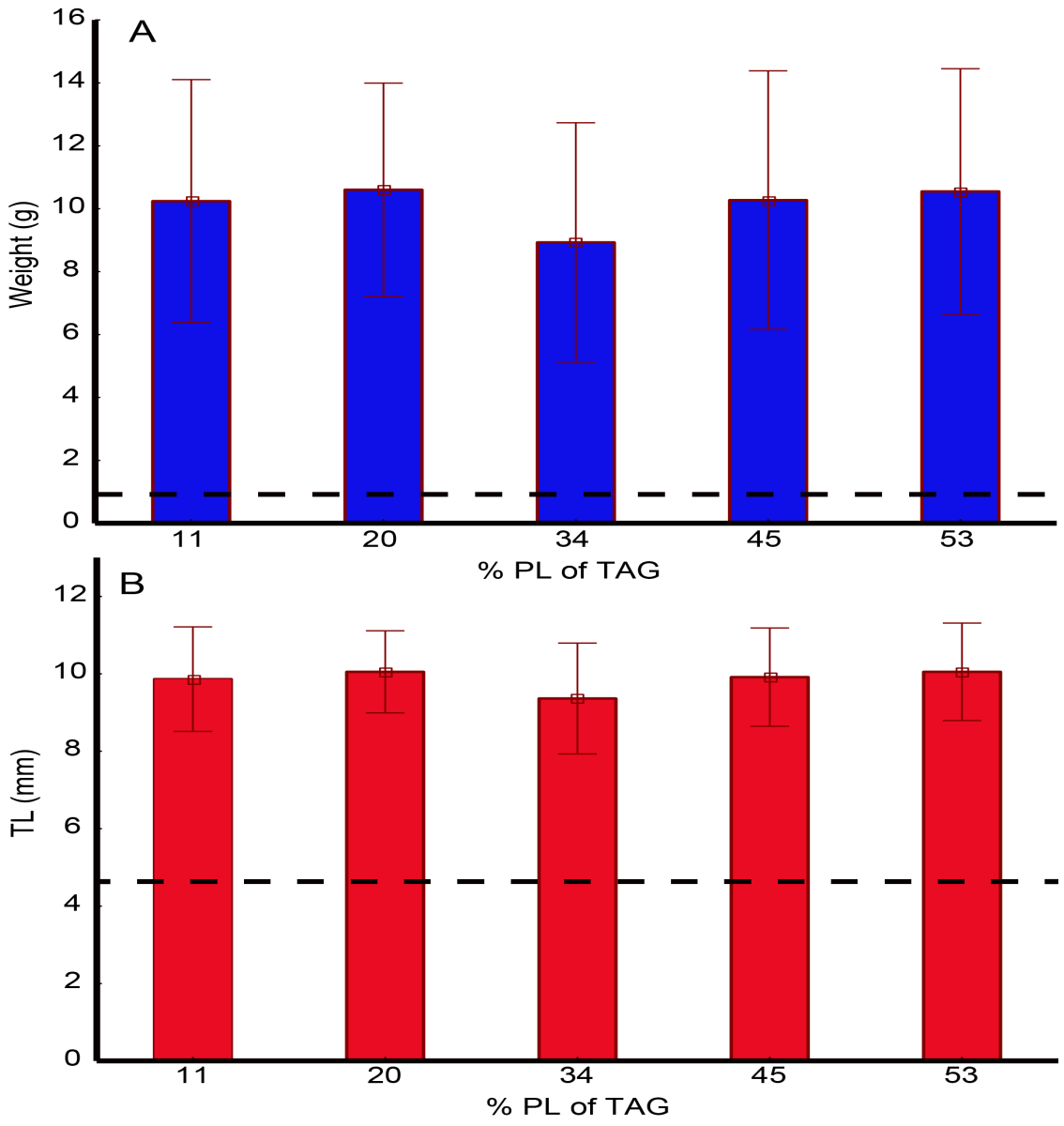
Lipid class (mg/g) analysis (HPTLC) of diets 1 to 5

Feed	Low		Medium		High
LysoPC	4,1	6,3	8,4	10,5	9,7
Sphingomyelin	1,4	1,5	1,7	1,9	2
Phosphatidylcholine	**8,1**	**13,3**	**19**	**23,9**	**29,1**
Phosphatidylserine	**1,2**	**3,2**	**7,6**	**9,8**	**11,6**
Phosphatidylinositol	**0**	**2,3**	**5,6**	**7,1**	**8,3**
Cardiolipin	0,1	0,2	0,4	0,4	0,5
Phosphatidylethanolamine	2	5,2	9,4	11,5	13,1
Diacylglycerol	1	1,3	1,7	1,5	1,3
Cholesterol	6,9	7,9	7,8	7,6	7,9
Free fatty acid	10,5	13	15,2	15,2	16,5
Triacylglycerol	**149**	**161**	**152**	**144**	**139**
Cholesteryl ester	nd	nd	nd	nd	nd
Sum Phospholipids	**17**	**32**	**52**	**65**	**74**
Sum Neutral lipids	**167**	**183**	**177**	**169**	**164**
Sum Lipids	**184**	**215**	**229**	**234**	**238**

9%	15%	23%	28%	31%

Weight (g)

Total length (mm)



Sampling

GLOBAL LIPIDOMICS

THE TRUEMASS™ COMPLEX LIPID PANEL

Methods

- Identify more than 1,500 molecular species of lipids
- Absolute quantitation of lipid class & molecular species concentrations
- Complete fatty acid composition of each lipid class
- Pathway mapping and discovery tools for easy interpretation

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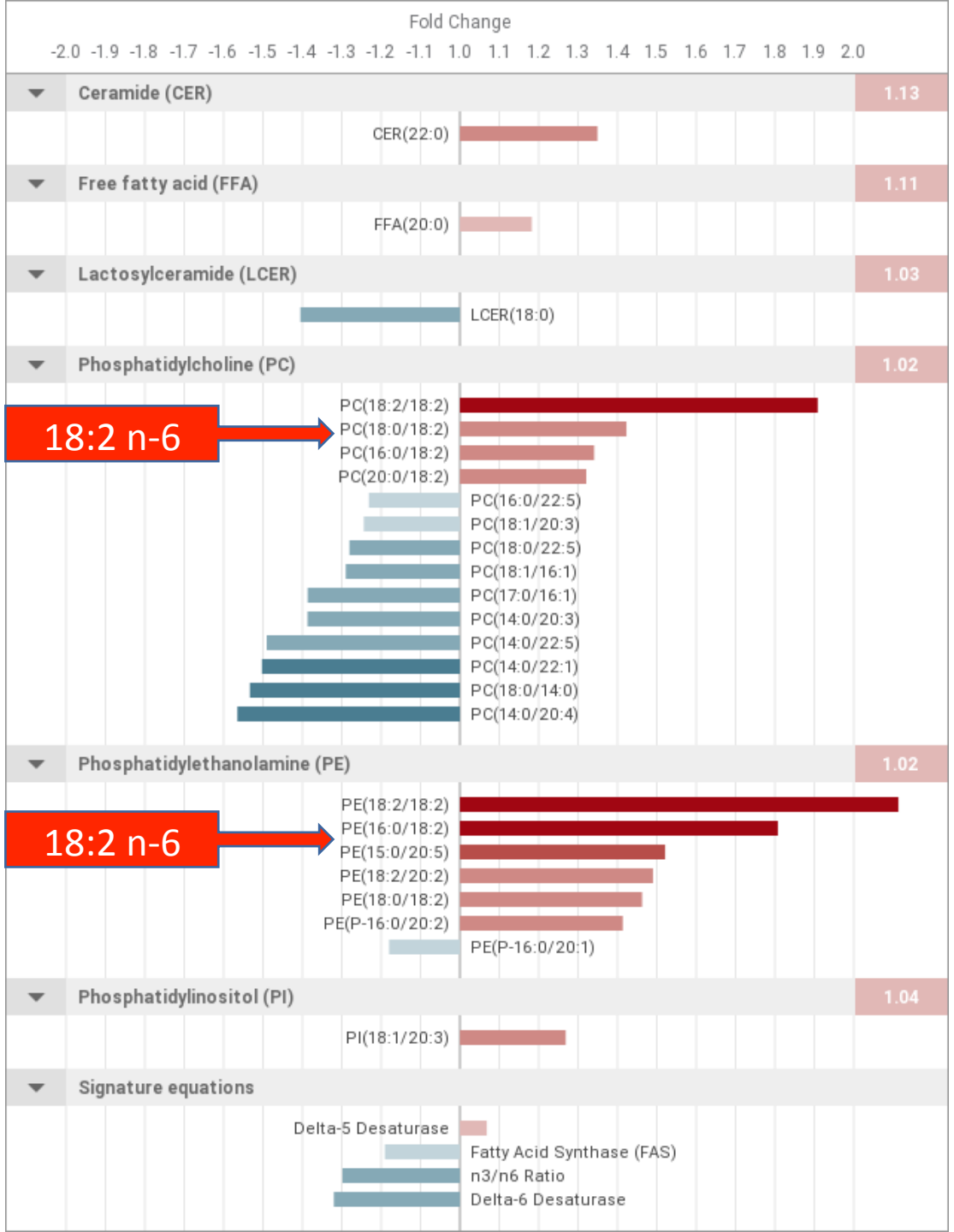
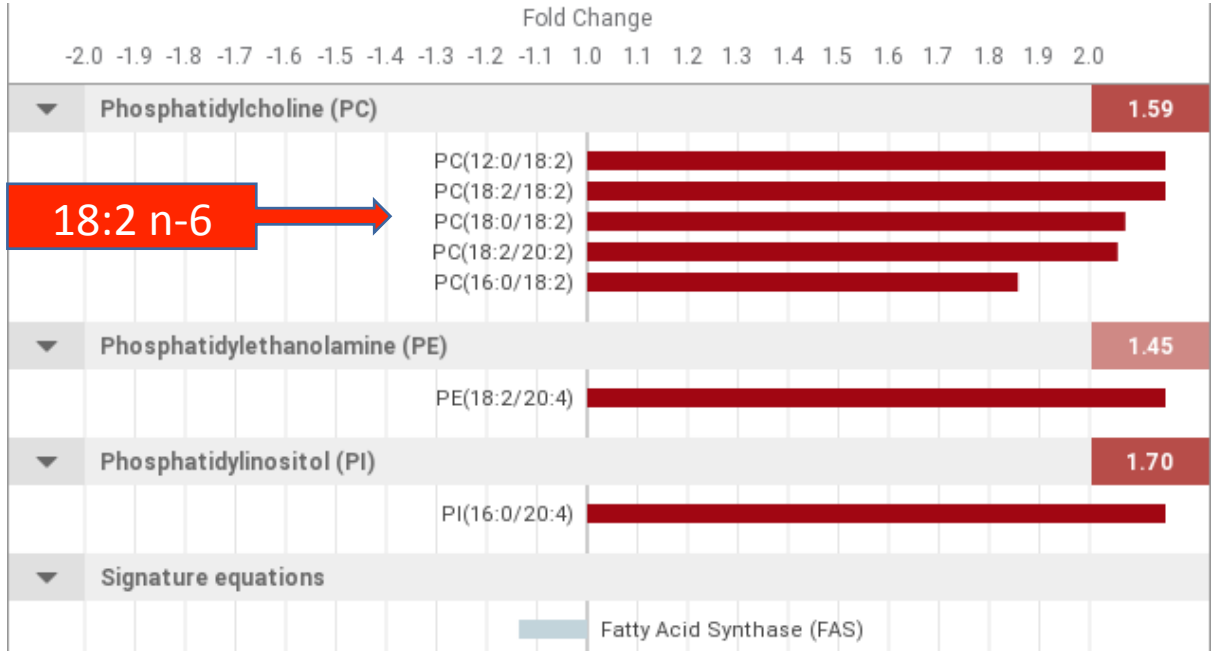
Intestine, high vs low PC 1h postprandial

Metabolites measured	1,066
Significant at P < 0.05	2.3%



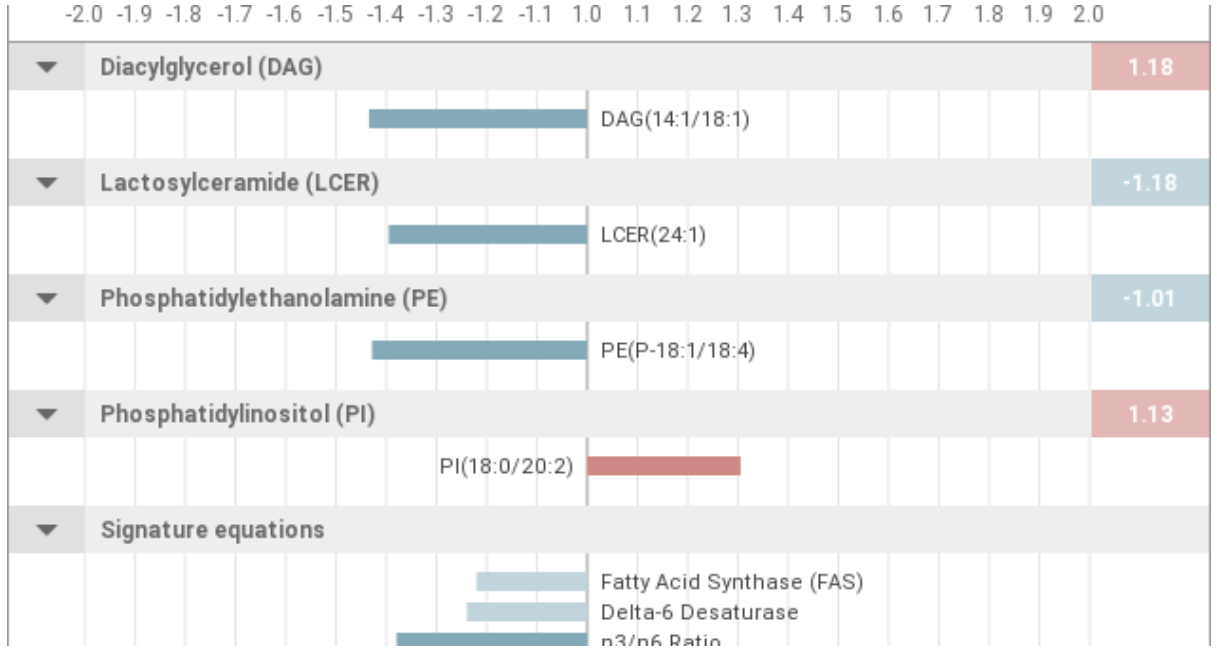
Intestine, high vs low PC 4h postprandial

Metabolites measured	1066
Significant at P < 0.05	0.7%



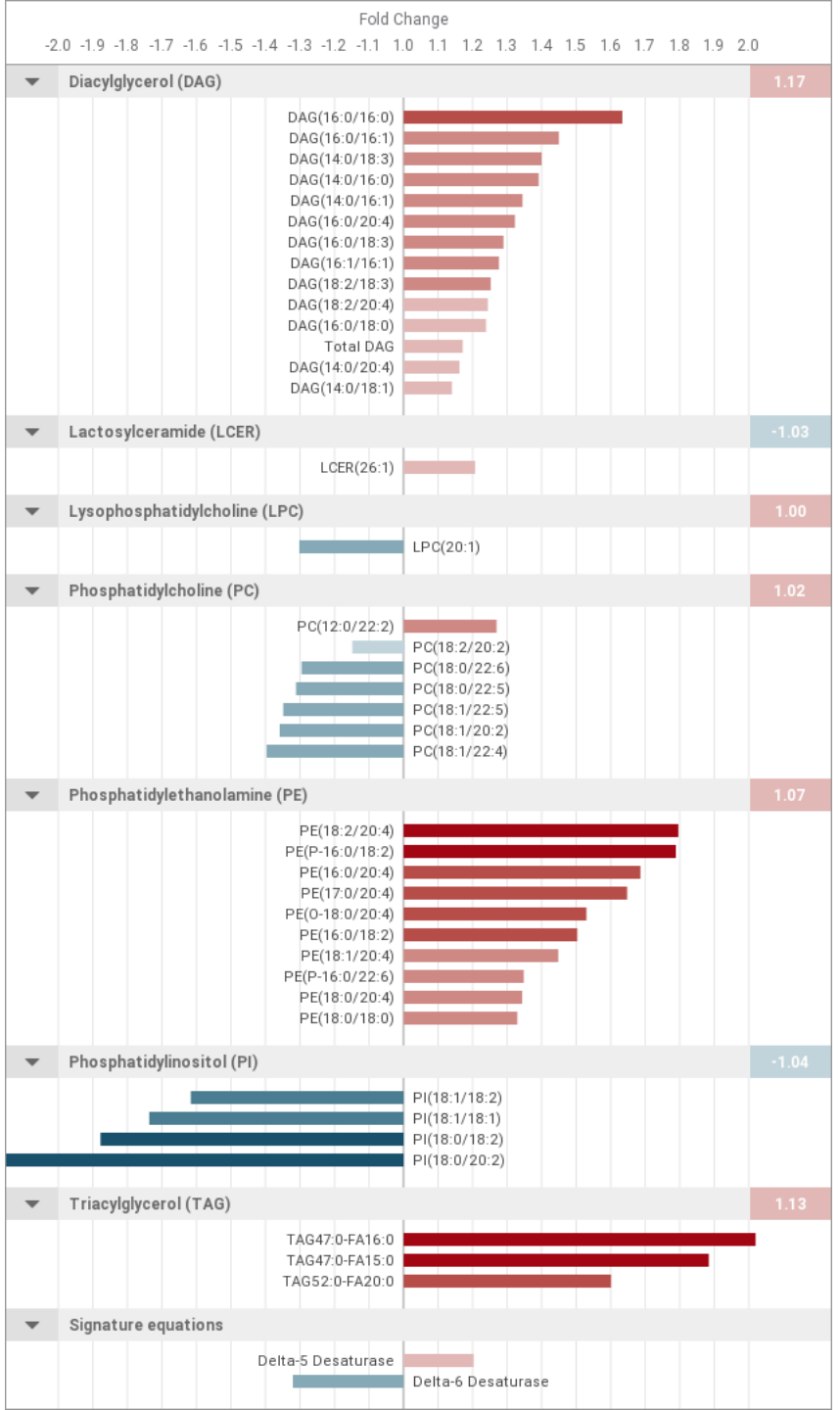
Intestine, high vs low PC 24h postprandial

Metabolites measured	1066
Significant at P < 0.05	0.4%



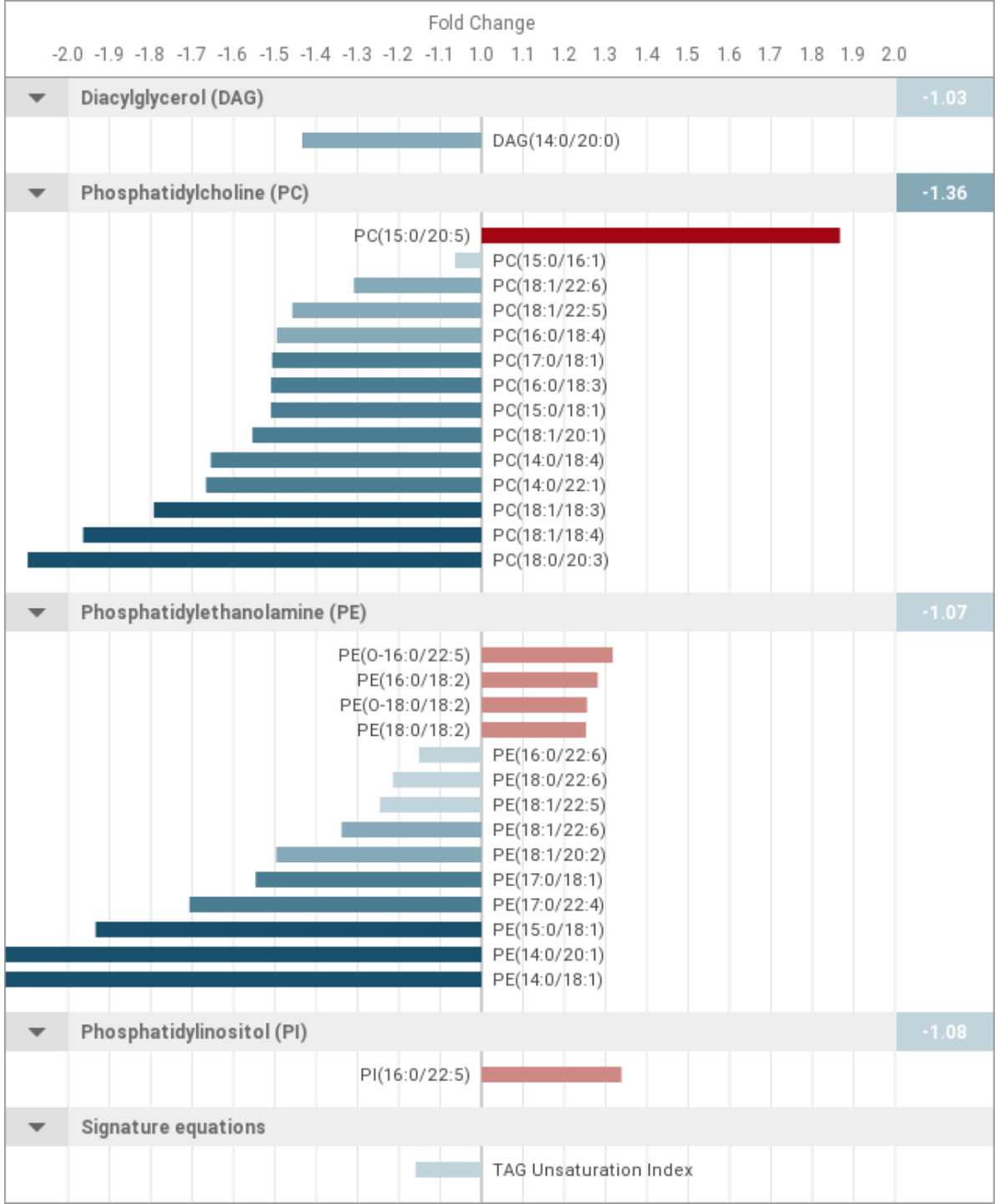
Liver, high vs low PC 24h postprandial

Metabolites measured	1010
Significant at P < 0.05	4%

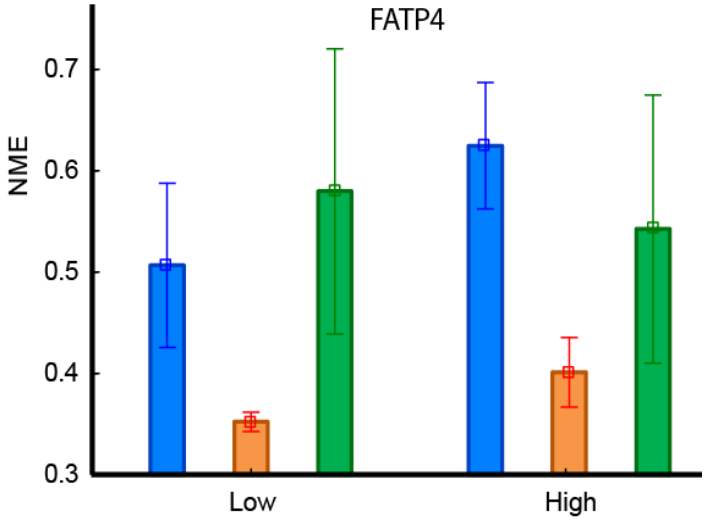


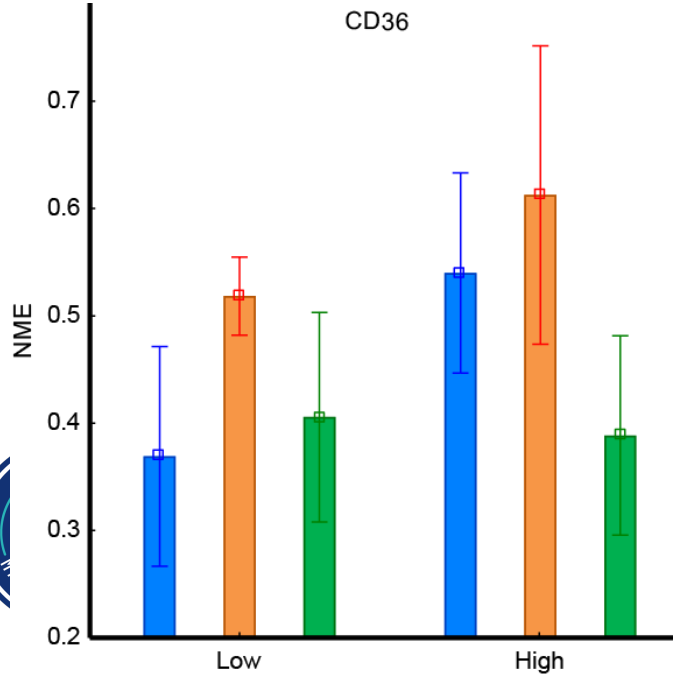
Muscle, high vs low PC 24h postprandial

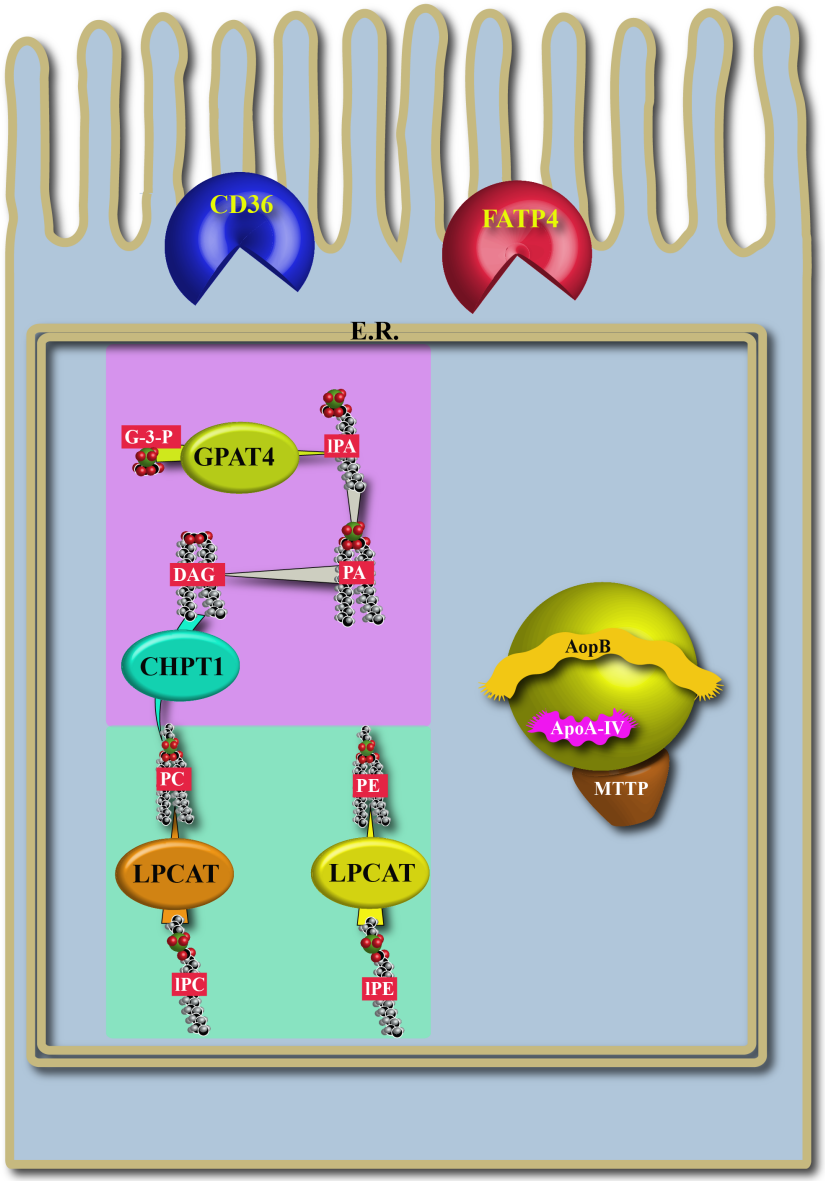
Metabolites measured	1042
Significant at P < 0.05	2.9%

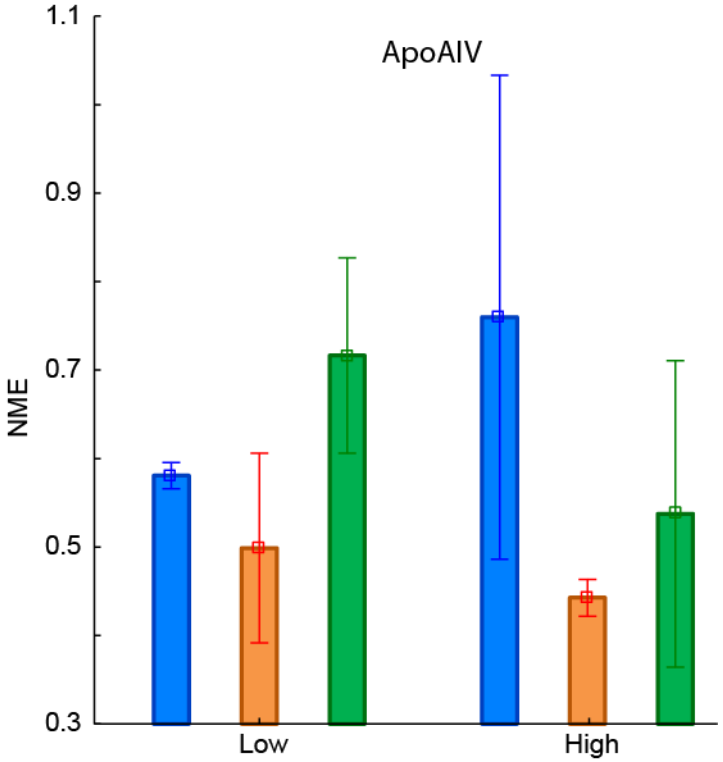


Genetic regulation of lipid metabolism intestine









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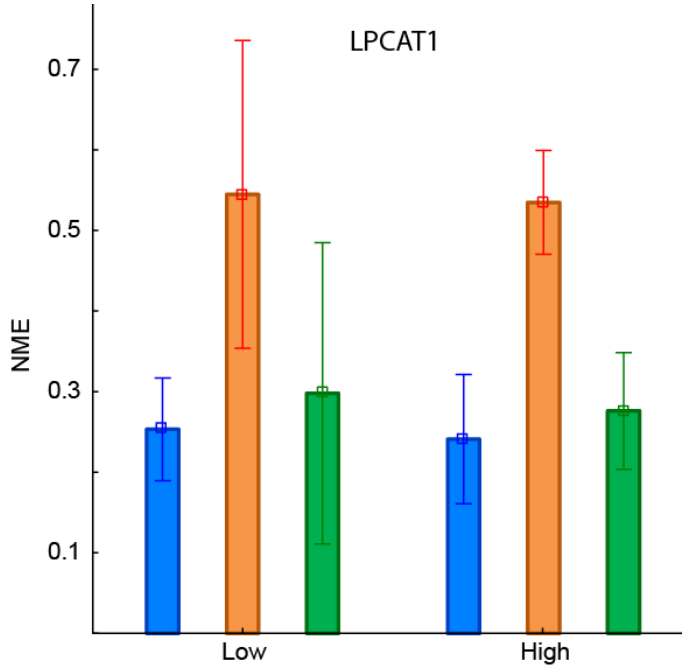
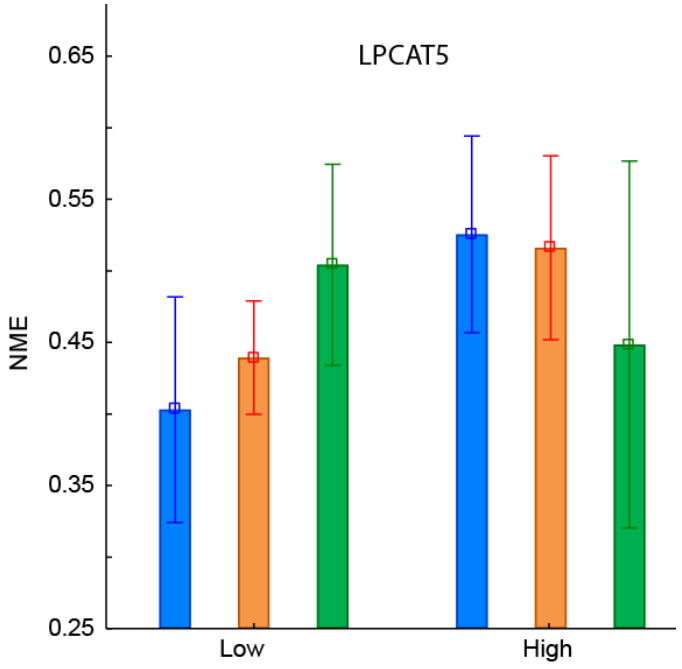
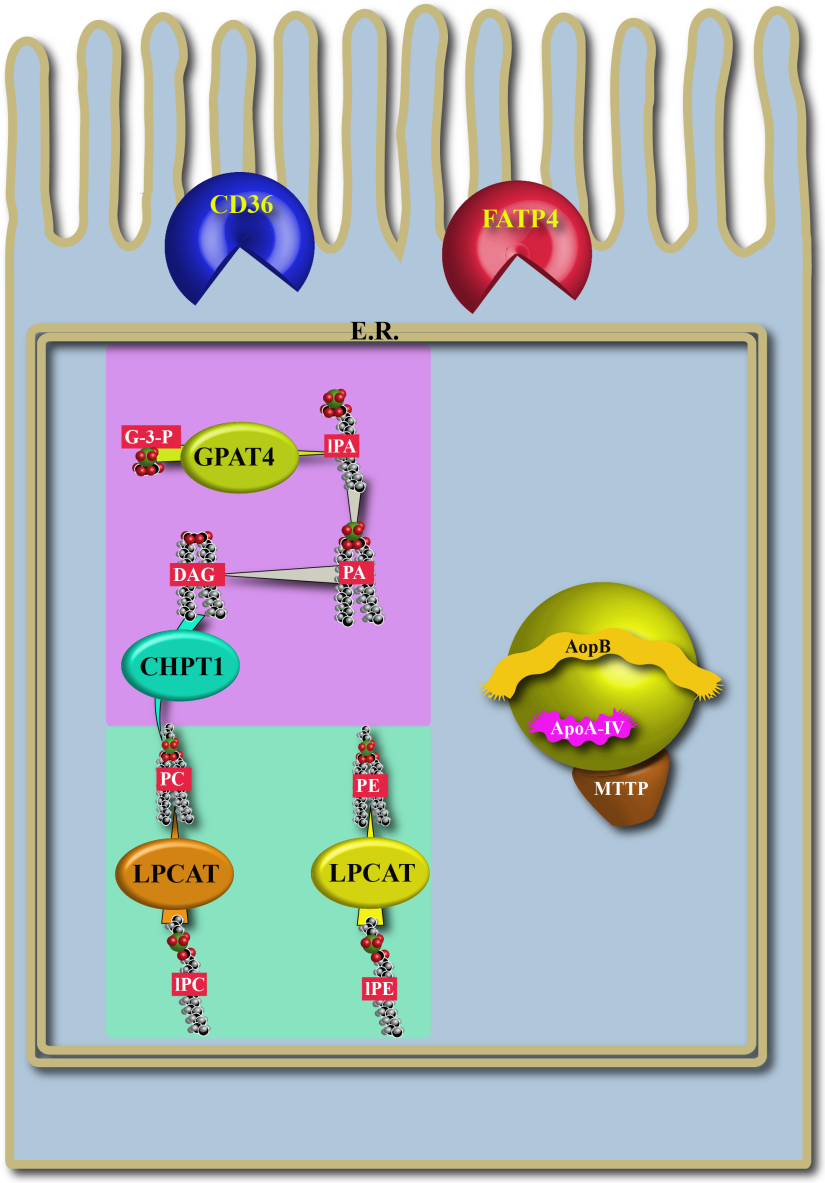
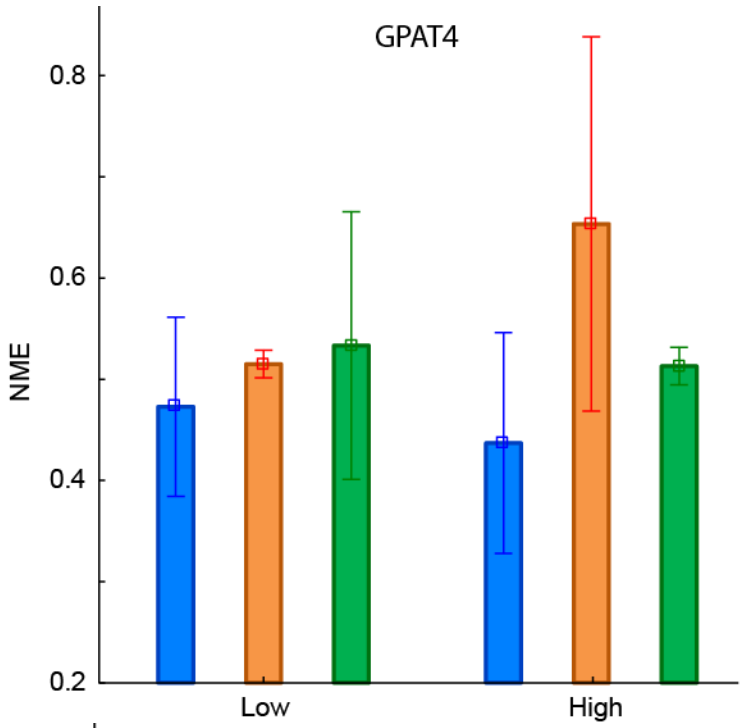
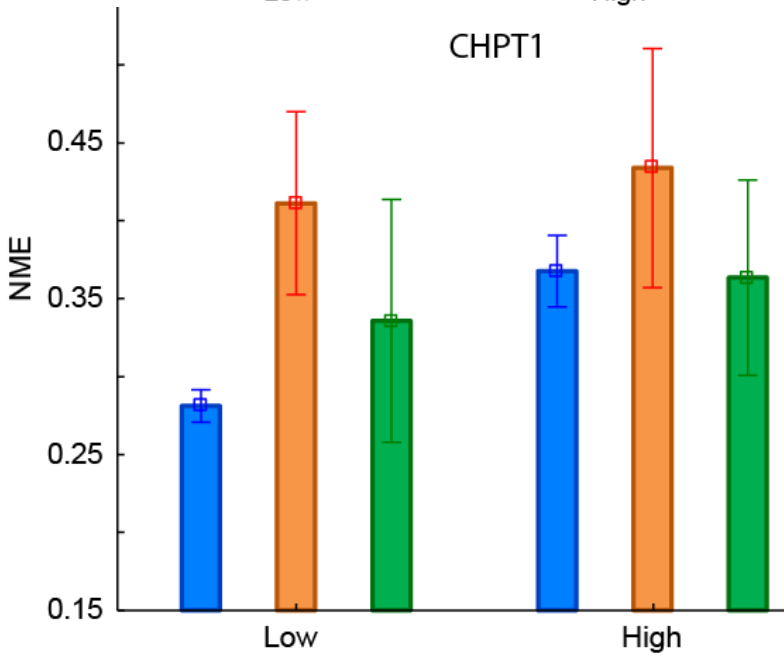




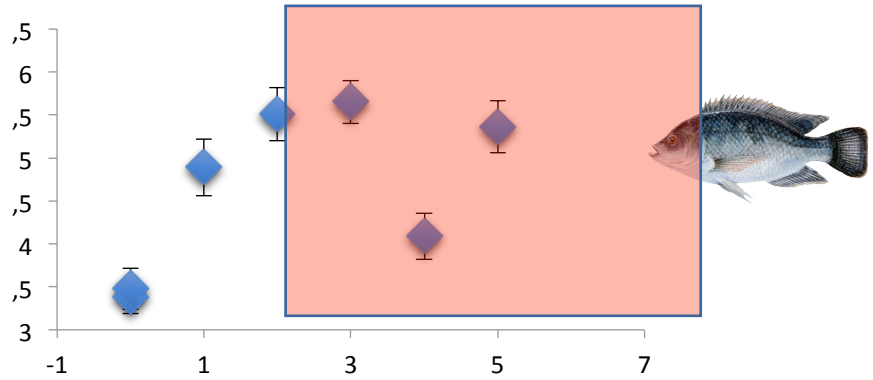




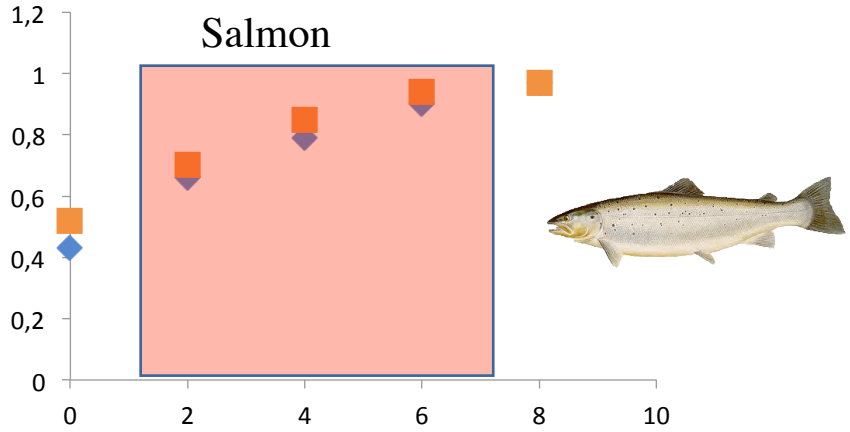


Effect of dietary PL on growth

Tilapia

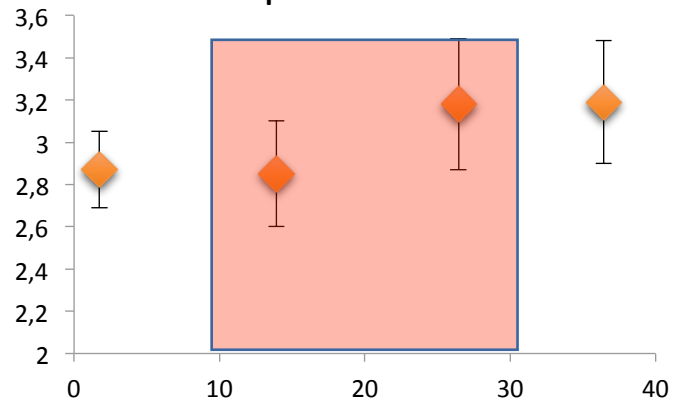


Salmon

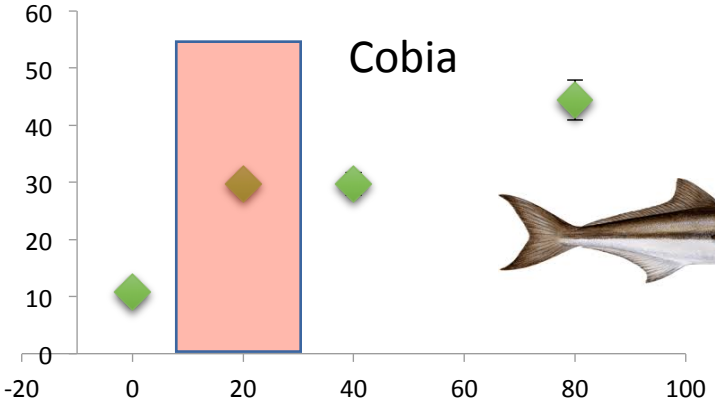


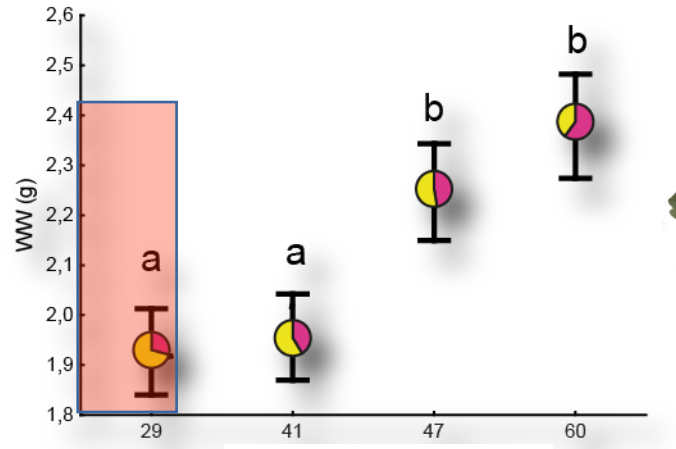
% added PL in feed

Caspian brown trout



Cobia





% PL of total lipid

Dietary total lipid: 18.4 to 23.8 % did not affect growth

Dietary PL: 9 to 31 % of total lipid did not affect growth

Dietary fatty acid profile conserved in intestinal epithelium in PL 4h postprandial
Not in TAG

Liver: DAG enriched in high PL group -

Muscle: PC and PE species with DHA lower in high PL group