PPARa activation influences plasma one-carbon metabolites and B-vitamin status in rats

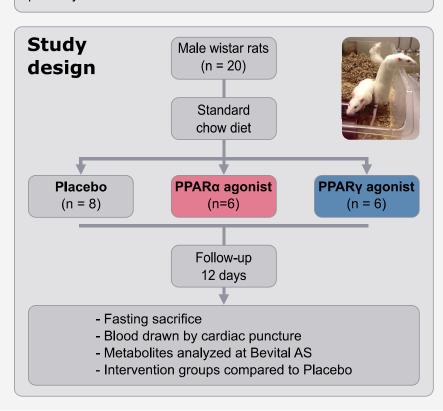
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Background

Activation of peroxisome proliferator-activated receptors (PPAR) with a pan-PPAR agonist increased plasma one-carbon and B-vitamin metabolites, including dimethylglycine (DMG), nicotinamide (NAM) and methylmalonic acid (MMA)¹.

This study aims to investigate the effect of specific PPARa and PPARy agonists on metabolites of the choline oxidation pathway and B-vitamin status.



Effect of PPARa and PPARy activation

Metabolite concentrations are given as geometric mean (multiplicative SD). The bars indicate standardized mean difference (SMD) vs Placebo, red represents PPARa, and blue represents PPARy. Groups were compared with ANOVA, and intervention groups compared to Placebo.

	Placebo (n = 8)	PPAR α (n = 6)	PPARγ (n = 6)	SMD vs Placebo (■α, ■γ)	p (■ α, ■ γ)	p (ANOVA)
Choline, µmol/L	10.7 (1.10)	10.0 (1.15)	9.07 (1.15)		0.33 0.03	0.07
Betaine, µmol/L	103 (1.25)	167 (1.08)	92.0 (1.23)		<0.001 0.34	<0.001
DMG, µmol/L	12.5 (1.26)	29.6 (1.32)	10.0 (1.61)		<0.001 0.32	<0.001
Glycine, µmo l /L	422 (1.17)	873 (1.20)	484 (1.18)		<0.001 0.14	<0.001
Serine, µmol/L	290 (1.13)	415 (1.20)	356 (1.09)		0.003 0.003	<0.001
Riboflavin, nmol/L	62.3 (1.19)	51.0 (1.26)	54.0 (1.18)	=5	0.11 0.14	0.15
FMN, nmol/L	33.1 (1.23)	20.1 (1.23)	33.3 (1.12)	<u>-</u>	0.001 0.93	<0.001
NA, nmo l /L	71.4 (1.21)	83.1 (1.24)	68.6 (1.17)		0.20 0.68	0.20
NAM, nmol/L	1535 (1.28)	8942 (1.35)	1432 (1.34)		<0,001 0.65	<0.001
PA, nmo l /L	64.8 (1.25)	62.0 (1.20)	74.2 (1.19)	-1	0.69 0.22	0.28
PL, nmol/L	298 (1.14)	499 (1.14)	274 (1.25)		<0.001 0.44	<0.001
PLP, nmol/L	507 (1.13)	712 (1.24)	511 (1.22)		0.010 0.93	0.004
mTHF, nmol/L	140 (1.32)	119 (1.59)	135 (1.20)	-	0.47 0.77	0.64
Cobalamin, pmol/L	2104 (1.08)	1784 (1.12)	1974 (1.06)	 _	0.013 0.11	0.008
MMA, µmol/L	0.46 (1.22)	0.96 (1.36)	0.42 (1.22)		0.001 0.41	<0.001
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Abbreviations: DMG, dimethylglycine; FMN, flavin mononucleotide; MMA, methylmalonic acid; mTHF, 5'-methyltetrahydrofolate; NA, nicotinic acid; NAM, nicotinamide; PA, pyridoxic acid; PL, pyridoxal; PLP, pyridoxal-5'-phosphate: PPAR, peroxisome proliferator-activated receptor and SMD, standardized mean difference.

PPARα activation increases plasma levels of one-carbon metabolites and B-vitamins, Conclusion including DMG, NAM and MMA. This confirms previous findings, suggesting a role of PPARα in the regulation of one-carbon metabolism and B-vitamin status.

Literature

1. Lysne V, Strand E, Svingen GF, Bjorndal B, Pedersen ER, Midttun O, et al. Peroxisome Proliferator-Activated Receptor Activation is Associated with Altered Plasma One-Carbon Metabolites and B-Vitamin Status in Rats, Nutrients, 2016;8(1),

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