

Metabolomics analysis reveals altered metabolites in lean compared with obese adolescents and additional metabolic shifts associated with hyperinsulinaemia and insulin resistance in obese adolescents: a cross-sectional study

Elisabeth Müllner, Hanna E. Röhnisch, Claudia von Brömssen, Ali A. Moazzami*

*Corresponding author: Ali.Moazzami@slu.se; Department of Molecular Sciences, Swedish University of Agricultural Sciences, Uppsala, Sweden

Online Resource 4: *P*-values for effects of insulin, obesity glucose and their interactions with time after adjustment for gender and puberty

Metabolite	Insulin	Obesity	Glucose	Time	Insulin*Time	Obesity*Time	Glucose*Time	Gender	Puberty
Valine	0.0015 ¹	0.5502	0.2368	<.0001	0.3631	0.0210	0.8300	0.1177	0.0195
Leucine	0.0002	0.7357	0.3805	<.0001	0.2132	0.1275	0.9130	0.0130	0.0010
Isoleucine	0.0032	0.2215	0.2563	<.0001	0.2909	0.6480	0.7374	0.0525	0.0316
Tyrosine	0.0028	0.1574	0.5104	<.0001	0.1637	0.1830	0.9337	0.5167	0.4844
Serine	0.0456	0.8738	0.3579	<.0001	0.5487	0.1200	0.8721	0.5176	0.2306
Glycine	0.4246	0.1772	0.7091	<.0001	0.8921	0.2526	0.6305	0.1147	0.0898
Myo-Inositol	0.1235	0.9255	0.5642	<.0001	0.7610	0.0071	0.4728	0.1787	0.5929
Dimethylsulfone	0.0256	0.3632	0.5219	0.9367	0.5324	0.0689	0.7551	0.0441	0.1071
O-Acetylcarnitine	0.2678	0.0005	0.8302	<.0001	0.6085	0.0026	0.7970	0.1377	0.0403
Glutamate	0.8437	0.0343	0.3337	0.1887	0.0718	0.2267	0.1890	0.0969	0.7029
Alanine	0.1225	0.0577	0.6223	0.0374	0.8120	0.0315	0.8491	0.5056	0.3584
Pyruvate	0.7379	0.1299	0.2348	<.0001	0.7892	0.0551	0.6792	0.7142	0.5830
Acetate	0.8484	0.0049	0.7905	<.0001	0.7920	0.1381	0.4177	0.3841	0.1574
Lysine	0.0287	0.4657	0.6902	<.0001	0.5439	0.1228	0.8984	0.2556	0.0007
Phenylalanine	0.0319	0.1719	0.0918	<.0001	0.0814	0.2121	0.2762	0.9288	0.0003
2-Oxoisocaproate	0.0283	0.5543	0.6091	<.0001	0.3865	0.0951	0.4849	0.1138	0.0053

¹ linear mixed model (PROC MIXED) with time, insulin response (NI vs HI), obesity (lean vs obese), glucose responses (NGT vs IGT) and their interaction (time × insulin, time × obesity and time × glucose) as fixed factors and adjusted for gender and puberty.