

Supplementary Table S1: Keywords (top 10) within clusters related to the papers (top 5)

Cluster Labels	Keyword Time-cited	Keyword (top 10)	Title	First Author	Citations (top 5)	DOI
	430	metabolomics	Quantitative Serum Nuclear Magnetic Resonance Metabolomics in Cardiovascular Epidemiology and	Soininen, Pasi	227	10.1111/j.2047-6310.2012.00087.x
			Circulating branched-chain amino acid concentrations are associated with obesity and future insulin resistance in children and adolescents	McCormack, S E	209	10.1111/j.2047-6310.2012.00087.x
			Serum metabolomics reveals gamma-glutamyl dipeptides as biomarkers for discrimination among different forms of liver disease	Soga, Tomoyoshi	145	10.1016/j.jhep.2011.01.031
			A diabetes-predictive amino acid score and future cardiovascular disease	Magnusson, Martin	139	10.1093/eurheartj/ehs424
			Combined Proteomic and Metabolomic Profiling of Serum Reveals Association of the Complement System with Obesity and Identifies Novel Markers of Body Fat Mass Changes	Oberbach, Andreas	135	10.1021/pr2005555
	148	biomarker	Proposed minimum reporting standards for data analysis in metabolomics	Goodacre, Royston	247	10.1007/s11306-007-0081-3
			The dynamic range of the human metabolome revealed by challenges	Krug, Susanne	189	10.1096/fj.11-198093
			Serum metabolomics reveals gamma-glutamyl dipeptides as biomarkers for discrimination among different forms of liver disease	Soga, Tomoyoshi	145	10.1016/j.jhep.2011.01.031
			Potential metabolite markers of schizophrenia	Yang, J	122	10.1038/mp.2011.131
			A Novel Serum Metabolomics-Based Diagnostic Approach to Pancreatic Cancer	Kobayashi, Takashi	108	10.1158/1055-9965.EPI-12-1033
			A Novel Serum Metabolomics-Based Diagnostic Approach for Colorectal	Nishiumi, Shin	154	10.1371/journal.pone.0040459
			Long-term Leisure-time Physical Activity and Serum Metabolome	Kujala, Urho M	109	10.1161/CIRCULATIONAHA.112.105551

#0 colorectal cancer	83	plasma	Metabolomic profiling of dietary-induced insulin resistance in the high fat-fed C57BL/6J mouse	Shearer, J	94	10.1111/j.1463-1326.2007.00837.x
			Metabolomics in Epidemiology: Sources of Variability in Metabolite Measurements and Implications	Sampson, Joshua N	83	10.1158/1055-9965.EPI-12-1109
			Metabolic and hormonal responses to isoenergetic high-intensity interval exercise and continuous moderate-intensity exercise	Peake, Jonathan M	70	10.1152/ajpendo.00276.2014
	76	mass spectrometry	The dynamic range of the human metabolome revealed by challenges	Krug, Susanne	189	10.1096/fj.11-198093
			A Novel Serum Metabolomics-Based Diagnostic Approach for Colorectal	Nishiumi, Shin	154	10.1371/journal.pone.0040459
			Metabolomic NMR Fingerprinting to Identify and Predict Survival of Patients with Metastatic Colorectal Cancer	Bertini, Ivano	113	10.1158/0008-5472.CAN-11-1543
			A Novel Serum Metabolomics-Based Diagnostic Approach to Pancreatic Cancer	Kobayashi, Takashi	108	10.1158/1055-9965.EPI-12-1033
			A multivariate screening strategy for investigating metabolic effects of strenuous physical exercise in human serum	Pohjanen, Elin	85	10.1021/pr070007g
	74	identification	Proposed minimum reporting standards for data analysis in metabolomics	Goodacre, Royston	247	10.1007/s11306-007-0081-3
			A Novel Serum Metabolomics-Based Diagnostic Approach to Pancreatic Cancer	Kobayashi, Takashi	108	10.1158/1055-9965.EPI-12-1033
			Human metabolic correlates of body mass index	Moore, Steven C	87	10.1007/s11306-013-0574-1
			Virtual Quantification of Metabolites by Capillary Electrophoresis-Electrospray Ionization-Mass Spectrometry: Predicting Ionization Efficiency Without Chemical Standards	Chalcraft, Kenneth R	85	10.1021/ac802272u
			Medium Chain Acylcarnitines Dominate the Metabolite Pattern in Humans under Moderate Intensity Exercise and Support Lipid Oxidation	Lehmann, Rainer	81	10.1371/journal.pone.0011519

68	metabonomics	Investigations of the effects of gender, diurnal variation, and age in human urinary metabolomic profiles	Slupsky, Carolyn M	283	10.1021/ac0708588
		Analysis of metabolomic data using support vector machines	Mahadevan, Sankar	216	10.1021/ac800954c
		Identification and Validation of Urinary Metabolite Biomarkers for Major Depressive Disorder	Zheng, Peng	126	10.1074/mcp.M112.021816
		Distinct Urinary Metabolic Profile of Human Colorectal Cancer	Cheng, Yu	124	10.1021/pr201001a
		International NMR-Based Environmental Metabolomics Intercomparison Exercise	Viant, Mark R	112	10.1021/es802198z
55	serum	Metabolomics as a Tool for Discovery of Biomarkers of Autism Spectrum Disorder in the Blood Plasma of Children	West, Paul R	93	10.1371/journal.pone.0112445
		High-throughput H-1 NMR-based metabolic analysis of human serum and urine for large-scale epidemiological studies: validation study	Barton, Richard H	89	10.1093/ije/dym284
		Metabolomic Profiling of Serum from Human Pancreatic Cancer Patients Using H-1 NMR Spectroscopy and Principal Component Analysis	OuYang, Dong	68	10.1007/s12010-011-9240-0
		Metabolomics provide new insights on lung cancer staging and discrimination from chronic obstructive pulmonary disease	Deja, Stanislaw	59	10.1016/j.jpba.2014.08.020
		Comparing metabolite profiles of habitual diet in serum and urine	Playdon, Mary C	59	10.3945/ajcn.116.135301
		Tissue imaging and serum lipidomic profiling for screening potential biomarkers of thyroid tumors by matrix-assisted laser desorption/ionization-Fourier transform ion cyclotron resonance mass spectrometry	Guo, Shuai	38	10.1007/s00216-014-7846-0

	45	acid	Metabolomics insights into early type 2 diabetes pathogenesis and detection in individuals with normal fasting glucose	Merino, Jordi	31	10.1007/s00125-018-4599-x
			Bananas as an Energy Source during Exercise: A Metabolomics Approach	Nieman, David C	30	10.1371/journal.pone.0037479
			Effects of exposure to water disinfection by-products in a swimming pool: A metabolome-wide association study	van Veldhoven, Karin	27	10.1016/j.envint.2017.11.017
			Response of Gut Microbiota to Metabolite Changes Induced by Endurance Exercise	Zhao, Xia	26	10.3389/fmicb.2018.00765
	41	profile	A diabetes-predictive amino acid score and future cardiovascular disease	Magnusson, Martin	139	10.1093/eurheartj/ehs424
			Long-term Leisure-time Physical Activity and Serum Metabolome	Kujala, Urho M	109	10.1161/CIRCULATIONAHA.112.105551
			Multivariate Modeling and Prediction of Breast Cancer Prognostic Factors Using MR Metabolomics	Giskeodegard, Guro F	100	10.1021/pr9008783
			Integrating Omic Technologies into Aquatic Ecological Risk Assessment and Environmental Monitoring: Hurdles, Achievements, and Future Outlook	Van Aggelen, Graham	99	10.1289/ehp.0900985
			Metabolomics as a Tool for Discovery of Biomarkers of Autism Spectrum Disorder in the Blood Plasma of Children	West, Paul R	93	10.1371/journal.pone.0112445
	78	physical activity	Metabolic Signatures of Adiposity in Young Adults: Mendelian Randomization Analysis and Effects of Weight Change	Wurtz, Peter	135	10.1371/journal.pmed.1001765
			Human metabolic correlates of body mass index	Moore, Steven C	87	10.1007/s11306-013-0574-1
			Clinical and Metabolic Characterization of Lean Caucasian Subjects With Non-alcoholic Fatty Liver	Feldman, Alexandra	73	10.1038/ajg.2016.318
			Metabolite patterns predicting sex and age in participants of the Karlsruhe Metabolomics and Nutrition (KarMeN) study	Rist, Manuela J	54	10.1371/journal.pone.0183228

		Linking diet, physical activity, cardiorespiratory fitness and obesity to serum metabolite networks: findings from a population-based study	Floegel, A	52	10.1038/ijo.2014.39
66	obesity	Combined Proteomic and Metabolomic Profiling of Serum Reveals Association of the Complement System with Obesity and Identifies Novel Markers of Body Fat Mass Changes	Oberbach, Andreas	135	10.1021/pr2005555
		Metabolic Signatures of Adiposity in Young Adults: Mendelian Randomization Analysis and Effects of Weight Change	Wurtz, Peter	135	10.1371/journal.pmed.1001765
		Long-term Leisure-time Physical Activity and Serum Metabolome	Kujala, Urho M	109	10.1161/CIRCULATIONAHA.112.105551
		Human metabolic correlates of body mass index	Moore, Steven C	87	10.1007/s11306-013-0574-1
		Clinical and Metabolic Characterization of Lean Caucasian Subjects With Non-alcoholic Fatty Liver	Feldman, Alexandra	73	10.1038/ajg.2016.318
64	insulin resistance	Quantitative Serum Nuclear Magnetic Resonance Metabolomics in Cardiovascular Epidemiology and	Soininen, Pasi	227	10.1161/CIRCGENETICS.114.000216
		Circulating branched-chain amino acid concentrations are associated with obesity and future insulin resistance in children and adolescents	McCormack, S E	209	10.1111/j.2047-6310.2012.00087.x
		A diabetes-predictive amino acid score and future cardiovascular disease	Magnusson, Martin	139	10.1093/eurheartj/ehs424
		Human metabolic correlates of body mass index	Moore, Steven C	87	10.1007/s11306-013-0574-1
		Clinical and Metabolic Characterization of Lean Caucasian Subjects With Non-alcoholic Fatty Liver	Feldman, Alexandra	73	10.1038/ajg.2016.318
		A diabetes-predictive amino acid score and future cardiovascular disease	Magnusson, Martin	139	10.1093/eurheartj/ehs424
		Human metabolic correlates of body mass index	Moore, Steven C	87	10.1007/s11306-013-0574-1

#1 obesity	60	risk	Metabolomics in Epidemiology: Sources of Variability in Metabolite Measurements and Implications	Sampson, Joshua N	83	10.1158/1055-9965.EPI-12-1109
			Metabolic biomarker signature to differentiate pancreatic ductal adenocarcinoma from chronic pancreatitis	Mayerle, Julia	53	10.1136/gutjnl-2016-312432
			Linking diet, physical activity, cardiorespiratory fitness and obesity to serum metabolite networks: findings from a population-based study	Floegel, A	52	10.1038/ijo.2014.39
	50	disease	Harmonizing lipidomics: NIST interlaboratory comparison exercise for lipidomics using SRM 1950-Metabolites in Frozen Human Plasma	Bowden, John A	120	10.1194/jlr.M079012
			Energy Metabolic Reprogramming in the Hypertrophied and Early Stage Failing Heart A Multisystems Approach	Lai, Ling	109	10.1161/CIRCHEARTFAILURE.114.001469
			Clinical and Metabolic Characterization of Lean Caucasian Subjects With Non-alcoholic Fatty Liver	Feldman, Alexandra	73	10.1038/ajg.2016.318
			Prognostic Implications of Long-Chain Acylcarnitines in Heart Failure and Reversibility With Mechanical Circulatory Support	Ahmad, Tariq	57	10.1016/j.jacc.2015.10.079
			Urinary metabolic profiles in early pregnancy are associated with preterm birth and fetal growth restriction in the Rhea mother-child cohort study	Maitre, Lea	45	10.1186/1741-7015-12-110
	43	amino acid	Quantitative Serum Nuclear Magnetic Resonance Metabolomics in Cardiovascular Epidemiology and	Soininen, Pasi	227	10.1161/CIRCGENETICS.114.000216
			A diabetes-predictive amino acid score and future cardiovascular disease	Magnusson, Martin	139	10.1093/eurheartj/ehs424
			Potential metabolite markers of schizophrenia	Yang, J	122	10.1038/mp.2011.131
			Long-term Leisure-time Physical Activity and Serum Metabolome	Kujala, Urho M	109	10.1161/CIRCULATIONAHA.112.105551

		Metabolomics as a Tool for Discovery of Biomarkers of Autism Spectrum Disorder in the Blood Plasma of Children	West, Paul R	93	10.1371/journal.pone.0112445
31	diet	Comparing metabolite profiles of habitual diet in serum and urine	Playdon, Mary C	59	10.3945/ajcn.116.135301
		Linking diet, physical activity, cardiorespiratory fitness and obesity to serum metabolite networks: findings from a population-based study	Floegel, A	52	10.1038/ijo.2014.39
		Influence of weight reduction on blood levels of C-reactive protein, tumor necrosis factor-alpha, interleukin-6, and oxylipins in obese subjects	Moeller, Katharina	24	10.1016/j.plefa.2015.12.001
		The impact of free or standardized lifestyle and urine sampling protocol on metabolome recognition accuracy	Wallner-Liebmann, Sandra	22	10.1007/s12263-014-0441-3
		Specific appetite, energetic and metabolomics responses to fat overfeeding in resistant-to-bodyweight-gain constitutional thinness	Germain, N	18	10.1038/nutd.2014.17
29	health	Combined Application of NMR- and GC-MS-Based Metabonomics Yields a Superior Urinary Biomarker Panel for Bipolar Disorder	Chen, Jian-jun	48	10.1038/srep05855
		Associations Between Metabolomic Compounds and Incident Heart Failure Among African Americans: The ARIC	Zheng, Yan	40	10.1093/aje/kwt004
		Novel Multimetabolite Prediction of Walnut Consumption by a Urinary Biomarker Model in a Free-Living Population: the PREDIMED Study	Garcia-Aloy, Mar	35	10.1021/pr500425r
		Effects of a Flavonoid-Rich Juice on Inflammation, Oxidative Stress, and Immunity in Elite Swimmers: A Metabolomics-Based Approach	Knab, Amy M	32	10.1123/ijsnem.23.2.150
		Objectively measured physical activity and plasma metabolomics in the Shanghai Physical Activity Study	Xiao, Qian	28	10.1093/ije/dyw033

	28	inflammation	Sex hormone-binding globulin associations with circulating lipids and metabolites and the risk for type 2 diabetes: observational and causal effect estimates	Wang, Qin	51	10.1093/ije/dyv093
			Breath metabolomic profiling by nuclear magnetic resonance spectroscopy in asthma	Ibrahim, B	41	10.1111/all.12211
			Purine metabolism is dysregulated in patients with major depressive disorder	Ali-Sisto, Toni	38	10.1016/j.psyneuen.2016.04.017
			Metabolomics-Based Analysis of Banana and Pear Ingestion on Exercise Performance and Recovery	Nieman, David C	31	10.1021/acs.jproteome.5b00909
			Molecular alterations in skeletal muscle in rheumatoid arthritis are related to disease activity, physical inactivity, and disability	Huffman, Kim M	28	10.1186/s13075-016-1215-7
	27	association	Meta-analysis of fecal metagenomes reveals global microbial signatures that are specific for colorectal cancer	Wirbel, Jakob	93	10.1038/s41591-019-0406-6
			Circulating Branched-Chain Amino Acids and Incident Cardiovascular Disease in a Prospective Cohort of US Women	Tobias, Deirdre K	33	10.1161/CIRCGEN.118.002157
			The ColoCare Study: A Paradigm of Transdisciplinary Science in Colorectal Cancer Outcomes	Ulrich, Cornelia M	15	10.1158/1055-9965.EPI-18-0773
			Phthalate exposure and childhood overweight and obesity: Urinary metabolomic evidence	Xia, Bin	14	10.1016/j.envint.2018.09.001
			LC-MS-based serum fingerprinting reveals significant dysregulation of phospholipids in chronic heart failure	Marcinkiewicz-Siemion, M	5	10.1016/j.jpba.2018.03.027
			Metabolomics as a Tool for Discovery of Biomarkers of Autism Spectrum Disorder in the Blood Plasma of Children	West, Paul R	93	10.1371/journal.pone.0112445

	41	performance	Influence of a Polyphenol-Enriched Protein Powder on Exercise-Induced Inflammation and Oxidative Stress in Athletes: A Randomized Trial Using a Metabolomics Approach	Nieman, David C	54	10.1371/journal.pone.0072215
			Metabolic biomarker signature to differentiate pancreatic ductal adenocarcinoma from chronic pancreatitis	Mayerle, Julia	53	10.1136/gutjnl-2016-312432
			Study of Induction Chemotherapy Efficacy in Oral Squamous Cell Carcinoma Using Pseudotargeted Metabolomics	Ye, Guozhu	53	10.1021/pr4011298
			The Muscle Metabolome Differs between Healthy and Frail Older Adults	Fazelzadeh, Parastoo	33	10.1021/acs.jproteome.5b00840
	33	oxidative stress	Metabolomics approach to assessing plasma 13-and 9-hydroxy-octadecadienoic acid and linoleic acid metabolite responses to 75-km cycling	Nieman, David C	38	10.1152/ajpregu.00092.2014
			Physical fitness level is reflected by alterations in the human plasma metabolome	Chorell, Elin	35	10.1039/c2mb05428k
			Bananas as an Energy Source during Exercise: A Metabolomics Approach	Nieman, David C	30	10.1371/journal.pone.0037479
			Targeted Metabolomics Connects Thioredoxin-interacting Protein (TXNIP) to Mitochondrial Fuel Selection and Regulation of Specific Oxidoreductase Enzymes in Skeletal Muscle	DeBalsi, Karen L	29	10.1074/jbc.M113.511535
			A pilot study comparing the metabolic profiles of elite-level athletes from different sporting disciplines	Al-Khelaifi, Fatima	27	10.1186/s40798-017-0114-z
			Prognostic Implications of Long-Chain Acylcarnitines in Heart Failure and Reversibility With Mechanical Circulatory Support	Ahmad, Tariq	57	10.1016/j.jacc.2015.10.079
			A pilot study comparing the metabolic profiles of elite-level athletes from different sporting disciplines	Al-Khelaifi, Fatima	27	10.1186/s40798-017-0114-z

	23	muscle	The Intersection of Aging Biology and the Pathobiology of Lung Diseases: A Joint NHLBI/NIA Workshop	Budinger, G R Scott	22	10.1093/gerona/glx090
			The ACTN3 R577X Polymorphism Is Associated with Cardiometabolic Fitness in Healthy Young Adults	Deschamps, Chelsea L	21	10.1371/journal.pone.0130644
			Understanding the response to endurance exercise using a systems biology approach: combining blood metabolomics, transcriptomics and miRNomics in horses	Mach, Nuria	17	10.1186/s12864-017-3571-3
	22	metabolome	The maternal-age-associated risk of congenital heart disease is modifiable	Schulkey, Claire E	39	10.1038/nature14361
			Effects of exposure to water disinfection by-products in a swimming pool: A metabolome-wide association study	van Veldhoven, Karin	27	10.1016/j.envint.2017.11.017
			Characterisation of the faecal metabolome and microbiome of Thoroughbred racehorses	Proudman, C J	25	10.1111/evj.12324
			Effects of sleep restriction on the human plasma metabolome	Bell, Lauren N	23	10.1016/j.physbeh.2013.08.007
			Predictive diagnosis of major depression using NMR-based metabolomics and least-squares support vector machine	Zheng, Hong	18	10.1016/j.cca.2016.11.039
	21	model	Dominant components of the Thoroughbred metabolome characterised by H-1-nuclear magnetic resonance spectroscopy: A metabolite atlas of common biofluids	Escalona, E E	21	10.1111/evj.12333
			Understanding the response to endurance exercise using a systems biology approach: combining blood metabolomics, transcriptomics and miRNomics in horses	Mach, Nuria	17	10.1186/s12864-017-3571-3
			PLS-Based and Regularization-Based Methods for the Selection of Relevant Variables in Non-targeted Metabolomics Data	Bujak, Renata	17	10.3389/fmolb.2016.00035 PG

#2 oxidative stress			Biomarkers in amyotrophic lateral sclerosis: combining metabolomic and clinical parameters to define disease	Blasco, H	12	10.1111/ene.12851
			Artificial Neural Network for Probabilistic Feature Recognition in Liquid Chromatography Coupled to High-Resolution Mass Spectrometry	Woldegebr iel, Michael	12	10.1021/acs.analchem.6b03678
	21	response	Integrating Omic Technologies into Aquatic Ecological Risk Assessment and Environmental Monitoring: Hurdles, Achievements, and Future Outlook	Van Aggelen, Graham	99	10.1289/ehp.0900985
			H-1 NMR-Based Metabonomic Investigation of the Effect of Two Different Exercise Sessions on the Metabolic Fingerprint of Human Urine	Pechlivanis , Alexandros	80	10.1021/pr100684t
			H-1 NMR Study on the Short- and Long-Term Impact of Two Training Programs of Sprint Running on the Metabolic Fingerprint of Human Serum	Pechlivanis , Alexandros	47	10.1021/pr300846x
			Effects of a Flavonoid-Rich Juice on Inflammation, Oxidative Stress, and Immunity in Elite Swimmers: A Metabolomics-Based Approach	Knab, Amy M	32	10.1123/ijsnem.23.2.150
			Identification of serum analytes and metabolites associated with aerobic capacity	Lustgarten, Michael S	24	10.1007/s00421-012-2555-x
	15	physical exercise	Long-term Leisure-time Physical Activity and Serum Metabolome	Kujala, Urho M	109	10.1161/CIRCULATIONAHA.112.105551
			H-1 NMR-Based Metabonomic Investigation of the Effect of Two Different Exercise Sessions on the Metabolic Fingerprint of Human Urine	Pechlivanis , Alexandros	80	10.1021/pr100684t
			H-1 NMR-based metabolomics approach for exploring urinary metabolome modifications after acute and chronic physical exercise	Enea, C	64	10.1007/s00216-009-3289-4 PG 10

		H-1 NMR Study on the Short- and Long-Term Impact of Two Training Programs of Sprint Running on the Metabolic Fingerprint of Human Serum	Pechlivanis , Alexandros	47	10.1021/pr300846x
		Metabolomics investigation of exercise-modulated changes in metabolism in rat liver after exhaustive and endurance exercises	Huang, Chi-Chang	44	10.1007/s00421-009-1247-7
14	systems biology	Metabolomics Workbench: An international repository for metabolomics data and metadata, metabolite standards, protocols, tutorials and training, and analysis tools	Sud, Manish	175	10.1093/nar/gkv1042
		International NMR-Based Environmental Metabolomics Intercomparison Exercise	Viant, Mark R	112	10.1021/es802198z
		Nuclear magnetic resonance-based metabolomics predicts exercise-induced ischemia in patients with suspected coronary artery disease	Barba, Ignasi	56	10.1002/mrm.21632
		Evaluation of regression models in metabolic physiology: predicting fluxes from isotopic data without knowledge of the pathway	Antoniewicz, Maciek R	33	10.1007/s11306-006-0018-2
		Whole Blood Transcriptomics and Urinary Metabolomics to Define Adaptive Biochemical Pathways of High-Intensity Exercise in 50-60 Year Old Masters Athletes	Mukherjee, Kamalika	25	10.1371/journal.pone.0092031
13	stress	Identification and Validation of Urinary Metabolite Biomarkers for Major Depressive Disorder	Zheng, Peng	126	10.1074/mcp.M112.021816
		A pilot study comparing the metabolic profiles of elite-level athletes from different sporting disciplines	Al-Khelaifi, Fatima	27	10.1186/s40798-017-0114-z
		Identification of serum analytes and metabolites associated with aerobic capacity	Lustgarten, Michael S	24	10.1007/s00421-012-2555-x

			Metabolic time-course response after resistance exercise: A metabolomics approach	Berton, Ricardo	22	10.1080/02640414.2016.1218035
			Understanding the response to endurance exercise using a systems biology approach: combining blood metabolomics, transcriptomics and miRNomics in horses	Mach, Nuria	17	10.1186/s12864-017-3571-3
	9	liver	Effects of Intra- and Post-Operative Ischemia on the Metabolic Profile of Clinical Liver Tissue Specimens Monitored by NMR	Cacciatore, Stefano	22	10.1021/pr400702d
			Serum Metabolomics Analysis Reveals a Distinct Metabolic Profile of Patients with Primary Biliary Cholangitis	Hao, Juan	13	10.1038/s41598-017-00944-9
			Exercise-Induced Alterations in Skeletal Muscle, Heart, Liver, and Serum Metabolome Identified by Non-Targeted Metabolomics Analysis	Starnes, Joseph W	11	10.3390/metabo7030040
			AICAR stimulation metabolome widely mimics electrical contraction in isolated rat epitrochlearis muscle	Miyamoto, Licht	10	10.1152/ajpcell.00162.2013
			Serum metabolomics reveals the mechanistic role of functional foods and exercise for obesity management in rats	Ammar, Naglaa M	6	10.1016/j.jpba.2017.05.001
	21	protein	Serum metabolomics reveals gamma-glutamyl dipeptides as biomarkers for discrimination among different forms of liver disease	Soga, Tomoyoshi	145	10.1016/j.jhep.2011.01.031
			Comparative metabolomics of estrogen receptor positive and estrogen receptor negative breast cancer: alterations in glutamine and beta-alanine metabolism	Budczies, Jan	81	10.1016/j.jprot.2013.10.002
			Linking diet, physical activity, cardiorespiratory fitness and obesity to serum metabolite networks: findings from a population-based study	Floegel, A	52	10.1038/ijo.2014.39

13		Metabolomic profiles as reliable biomarkers of dietary composition	Esko, Tonu	39	10.3945/ajcn.116.144428
		Diagnosis of major depressive disorder based on changes in multiple plasma neurotransmitters: a targeted metabolomics study	Pan, Jun-Xi	31	10.1038/s41398-018-0183-x
	supplementation	Metabolomics-Based Analysis of Banana and Pear Ingestion on Exercise Performance and Recovery	Nieman, David C	31	10.1021/acs.jproteome.5b00909
		Personalized Metabolomics for Predicting Glucose Tolerance Changes in Sedentary Women After High-Intensity Interval Training	Kuehnbaum, Naomi L	27	10.1038/srep06166
		Sportomics: Building a new concept in metabolic studies and exercise science	Bassini, Adriana	22	10.1016/j.bbrc.2013.12.137
		Metabolomics studies on db/db diabetic mice in skeletal muscle reveal effective clearance of overloaded intermediates by exercise	Xiang, Li	14	10.1016/j.aca.2017.11.082
		Metabolomics analysis of serum reveals the effect of Danggui Buxue Tang on fatigued mice induced by exhausting physical exercise	Miao, Xiaoyao	12	10.1016/j.jpba.2018.01.028
	nmr spectroscopy	Metabolomics provide new insights on lung cancer staging and discrimination from chronic obstructive pulmonary disease	Deja, Stanislaw	59	10.1016/j.jpba.2014.08.020
		Metabolomics study of esophageal adenocarcinoma	Zhang, Jian	47	0.1016/j.jtcvs.2010.08.025
		Metabolomics-Derived Prostate Cancer Biomarkers: Fact or Fiction?	Kumar, Deepak	37	10.1021/pr5011108
		Monitoring the Response of the Human Urinary Metabolome to Brief Maximal Exercise by a Combination of RP-UPLC-MS and H-1 NMR Spectroscopy	Pechlivanis, Alexandros	24	10.1021/acs.jproteome.5b00470

			Dominant components of the Thoroughbred metabolome characterised by H-1-nuclear magnetic resonance spectroscopy: A metabolite atlas of common biofluids	Escalona, E E	21	10.1111/evj.12333
	11	mortality	Metabolic Signatures of Adiposity in Young Adults: Mendelian Randomization Analysis and Effects of Weight Change	Wurtz, Peter	135	10.1371/journal.pmed.1001765
			Metabolomic Profiling of Serum from Human Pancreatic Cancer Patients Using H-1 NMR Spectroscopy and Principal Component Analysis	OuYang, Dong	68	10.1007/s12010-011-9240-0
			A family based tailored counselling to increase non-exercise physical activity in adults with a sedentary job and physical activity in their young children: design and methods of a year-long randomized controlled trial	Finni, Taija	19	10.1186/1471-2458-11-944
			Serum Metabolites Related to Cardiorespiratory Fitness, Physical Activity Energy Expenditure, Sedentary Time and Vigorous Activity	Wientzek, Angelika	10	10.1123/ijsnem.2013-0048
			A plasma metabolite panel as biomarkers for early primary breast cancer detection	Yuan, Baowen	9	10.1002/ijc.31996
	10	nutrition	Linking diet, physical activity, cardiorespiratory fitness and obesity to serum metabolite networks: findings from a population-based study	Floegel, A	52	10.1038/ijo.2014.39
			Personalized nutrition and obesity	Qi, Lu	16	10.3109/07853890.2014.891802
			Near-infrared spectroscopy and partial least squares-class modeling (PLS-CM) for metabolomics fingerprinting discrimination of intervention breakfasts ingested by obese individuals	Alvarez-Sanchez, Beatriz	8	10.1002/cem.2526
			Metabolomics profiling of xenobiotics in elite athletes: relevance to supplement consumption	Al-Khelaifi, Fatima	7	10.1186/s12970-018-0254-7

<p>hypertension</p>			Micronutrient Research, Programs, and Policy: From Meta-analyses to Metabolomics	Allen, Lindsay H	6	10.3945/an.113.005421
	10	m	Large-Scale Prediction of Collision Cross-Section Values for Metabolites in Ion Mobility-Mass Spectrometry	Zhou, Zhiwei	70	10.1021/acs.analchem.6b03091
			Metabolomics Data Normalization with EigenMS	Karpievitch, Yuliya V	43	10.1371/journal.pone.0116221
			Sample preparation and orthogonal chromatography for broad polarity range plasma metabolomics: Application to human subjects with neurodegenerative dementia	Armirotti, Andrea	24	10.1016/j.ab.2014.03.019
			Training in metabolomics research. II. Processing and statistical analysis of metabolomics data, metabolite identification, pathway analysis, applications of metabolomics and its future	Barnes, Stephen	21	0.1002/jms.3780
			Analysis of serum phospholipid profiles by liquid chromatography-tandem mass spectrometry in high resolution mode for evaluation of atherosclerotic patients	Calderon-Santiago, M	15	10.1016/j.chroma.2014.10.052
	8	pathway	Metabolomics Workbench: An international repository for metabolomics data and metadata, metabolite standards, protocols, tutorials and training, and analysis tools	Sud, Manish	175	10.1093/nar/gkv1042
			Diagnosis of major depressive disorder based on changes in multiple plasma neurotransmitters: a targeted metabolomics study	Pan, Jun-Xi	31	10.1038/s41398-018-0183-x
			Response of Gut Microbiota to Metabolite Changes Induced by Endurance Exercise	Zhao, Xia	26	10.3389/fmicb.2018.00765

		Training in metabolomics research. II. Processing and statistical analysis of metabolomics data, metabolite identification, pathway analysis, applications of metabolomics and its future	Barnes, Stephen	21	10.1002/jms.3780
		Metabolomics analysis of serum reveals the effect of Danggui Buxue Tang on fatigued mice induced by exhausting physical exercise	Miao, Xiaoyao	12	10.1016/j.jpba.2018.01.028
8	survival	The ColoCare Study: A Paradigm of Transdisciplinary Science in Colorectal Cancer Outcomes	Ulrich, Cornelia M	15	10.1158/1055-9965.EPI-18-0773
		Associations of branched-chain amino acids with parameters of energy balance and survival in colorectal cancer patients: results from the ColoCare study	Delphan, Mahmoud	9	10.1007/s11306-017-1314-8
		Identification of metabolites in plasma for predicting survival in glioblastoma	Shen, Jie	6	10.1002/mc.22815
		LC-MS-based serum fingerprinting reveals significant dysregulation of phospholipids in chronic heart failure	Marcinkiewicz-Siemion, M	5	10.1016/j.jpba.2018.03.027
		A distinct glycerophospholipid metabolism signature of acute graft versus host disease with predictive value	Liu, Yue	3	10.1172/jci.insight.129494
7	body mass index	Metabolic Signatures of Adiposity in Young Adults: Mendelian Randomization Analysis and Effects of Weight Change	Wurtz, Peter	135	10.1371/journal.pmed.1001765
		Associations of Body Mass and Fat Indexes With Cardiometabolic Traits	Bell, Joshua A	19	10.1016/j.jacc.2018.09.066
		Day-3 embryo metabolomics in the spent culture media is altered in obese women undergoing in vitro fertilization	Bellver, Jose	18	10.1016/j.fertnstert.2015.03.015
		Personalized nutrition and obesity	Qi, Lu	16	10.3109/07853890.2014.891802
		Associations of branched-chain amino acids with parameters of energy balance and survival in colorectal cancer patients: results from the ColoCare study	Delphan, Mahmoud	9	10.1007/s11306-017-1314-8

5	proteomics	Sportomics: Building a new concept in metabolic studies and exercise science	Bassini, Adriana	22	10.1016/j.bbrc.2013.12.137
		MASSyPup - an 'Out of the Box' solution for the analysis of mass spectrometry data	Winkler, Robert	15	10.1002/jms.3314
		Rational and design of an overfeeding protocol in constitutional thinness: Understanding the physiology, metabolism and genetic background of resistance to weight gain	Ling, Yiin	8	10.1016/j.ando.2016.06.001
		Bridging the Gaps: The Promise of Omics Studies in Pediatric Exercise Research	Radom-Aizik, Shlomit	4	10.1123/pes.2015-0270
		Childhood obesity: a systems medicine approach	Stone, William L	2	10.2741/4441
197	exercise	Investigations of the effects of gender, diurnal variation, and age in human urinary metabolomic profiles	Slupsky, Carolyn M	283	10.1021/ac0708588
		Circulating branched-chain amino acid concentrations are associated with obesity and future insulin resistance in children and adolescents	McCormack, S E	209	10.1111/j.2047-6310.2012.00087.x
		Long-term Leisure-time Physical Activity and Serum Metabolome	Kujala, Urho M	109	10.1161/CIRCULATIONAHA.112.105551
		Metabolomic profiling of dietary-induced insulin resistance in the high fat-fed C57BL/6J mouse	Shearer, J	94	10.1111/j.1463-1326.2007.00837.x
		A multivariate screening strategy for investigating metabolic effects of strenuous physical exercise in human serum	Pohjanen, Elin	85	10.1021/pr070007g
		Quantitative Serum Nuclear Magnetic Resonance Metabolomics in Cardiovascular Epidemiology and	Soininen, Pasi	227	10.1161/CIRCGENETICS.114.000216
		Targeted metabolomics for discrimination of systemic inflammatory disorders in critically ill patients	Schmerler, Diana	78	10.1194/jlr.P023309

	86	metabolism	Mass Spectrometry-Based Quantitative Metabolomics Revealed a Distinct Lipid Profile in Breast Cancer Patients	Qiu, Yunping	57	10.3390/ijms14048047
			Prognostic Implications of Long-Chain Acylcarnitines in Heart Failure and Reversibility With Mechanical Circulatory Support	Ahmad, Tariq	57	10.1016/j.jacc.2015.10.079
			Metabolomic Profiling Identifies Novel Circulating Biomarkers of Mitochondrial Dysfunction Differentially Elevated in Heart Failure With Preserved Versus Reduced Ejection Fraction: Evidence for Shared Metabolic Impairments in Clinical Heart Failure	Hunter, Wynn G	52	10.1161/JAHA.115.003190
	86	skeletal muscle	Energy Metabolic Reprogramming in the Hypertrophied and Early Stage Failing Heart A Multisystems Approach	Lai, Ling	109	10.1161/CIRCHEARTFAILURE.114.001469
			Medium Chain Acylcarnitines Dominate the Metabolite Pattern in Humans under Moderate Intensity Exercise and Support Lipid Oxidation	Lehmann, Rainer	81	10.1371/journal.pone.0011519
			Muscle-specific loss of Bmal1 leads to disrupted tissue glucose metabolism and systemic glucose homeostasis	Harfmann, Brianna D	70	10.1186/s13395-016-0082-x
			Metabolite signatures of exercise training in human skeletal muscle relate to mitochondrial remodelling and cardiometabolic fitness	Huffman, Kim M	53	10.1007/s00125-014-3343-4
			Six weeks of a polarized training-intensity distribution leads to greater physiological and performance adaptations than a threshold model in trained cyclists	Neal, Craig M	52	10.1152/japplphysiol.00652.2012
			Metabolic and hormonal responses to isoenergetic high-intensity interval exercise and continuous moderate-intensity exercise	Peake, Jonathan M	70	10.1152/ajpendo.00276.2014

#4 skeletal muscle	18	glucose	Impact of combined resistance and aerobic exercise training on branched-chain amino acid turnover, glycine metabolism and insulin sensitivity in overweight humans	Glynn, Erin L	50	10.1007/s00125-015-3705-6
			Serum metabolic profiles in overweight and obese women with and without metabolic syndrome	Wiklund, Petri K	42	10.1186/1758-5996-6-40
			Metabolomics Approach for Analyzing the Effects of Exercise in Subjects with Type 1 Diabetes Mellitus	Brugnara, Laura	41	10.1371/journal.pone.0040600
			A Protein-Leucine Supplement Increases Branched-Chain Amino Acid and Nitrogen Turnover But Not Performance	Nelson, Andre R	31	10.1249/MSS.0b013e3182290371
	15	validation	Identification of novel candidate plasma metabolite biomarkers for distinguishing serous ovarian carcinoma and benign serous ovarian tumors	Buas, Matthew F	29	10.1016/j.ygyno.2015.10.021
			The Cooperative Health Research in South Tyrol (CHRIS) study: rationale, objectives, and preliminary results	Pattaro, Cristian	22	10.1186/s12967-015-0704-9
			Metabolite signature for diagnosing major depressive disorder in peripheral blood mononuclear cells	Zheng, Peng	19	10.1016/j.jad.2016.02.008
			Global profiling of the muscle metabolome: method optimization, validation and application to determine exercise-induced metabolic effects	Alves, Rodrigo D A M	10	10.1007/s11306-014-0701-7
			Metabolic profiling identifies phospholipids as potential serum biomarkers for schizophrenia	Wang, Dongfang	10	10.1016/j.psychres.2018.12.008
			Energy Metabolic Reprogramming in the Hypertrophied and Early Stage Failing Heart A Multisystems Approach	Lai, Ling	109	10.1161/CIRCHEARTFAILURE.114.001469

	14	gene expression	Predictive Metabolomics Evaluation of Nutrition-Modulated Metabolic Stress Responses in Human Blood Serum During the Early Recovery Phase of Strenuous Physical Exercise	Chorell, Ellin	78	10.1021/pr900081q
			Molecular alterations in skeletal muscle in rheumatoid arthritis are related to disease activity, physical inactivity, and disability	Huffman, Kim M	28	10.1186/s13075-016-1215-7
			GC-MS based metabolomics identification of possible novel biomarkers for schizophrenia in peripheral blood mononuclear cells	Liu, Mei-Ling	28	10.1039/c4mb00157e
			Whole Blood Transcriptomics and Urinary Metabolomics to Define Adaptive Biochemical Pathways of High-Intensity Exercise in 50-60 Year Old Masters Athletes	Mukherjee, Kamalika	25	10.1371/journal.pone.0092031
	11	database	Large-Scale Prediction of Collision Cross-Section Values for Metabolites in Ion Mobility-Mass Spectrometry	Zhou, Zhiwei	70	10.1021/acs.analchem.6b03091
			Fast metabolite identification with Input Output Kernel Regression	Brouard, Celine	28	10.1093/bioinformatics/btw246
			Whole-body fat oxidation increases more by prior exercise than overnight fasting in elite endurance athletes	Hall, Ulrika Andersson	15	10.1139/apnm-2015-0452
			Development and Validation of a High-Throughput Mass Spectrometry Based Urine Metabolomic Test for the Detection of Colonic Adenomatous Polyps	Deng, Lu	13	10.3390/metabo7030032
			Liquid Chromatography-Mass Spectrometry-Based Metabolomics of Nonhuman Primates after 4 Gy Total Body Radiation Exposure: Global Effects and Targeted Panels	Pannkuk, Evan L	9	10.1021/acs.jproteome.9b00101
			Six weeks of a polarized training-intensity distribution leads to greater physiological and performance adaptations than a threshold model in trained cyclists	Neal, Craig M	52	10.1152/japplphysiol.00652.2012

	9	capacity	Metabolomics Approach for Analyzing the Effects of Exercise in Subjects with Type 1 Diabetes Mellitus	Brugnara, Laura	41	10.1371/journal.pone.0040600
			Effects of a Flavonoid-Rich Juice on Inflammation, Oxidative Stress, and Immunity in Elite Swimmers: A Metabolomics-Based Approach	Knab, Amy M	32	10.1123/ijsnem.23.2.150
			Plasma metabolic profile in COPD patients: effects of exercise and	Rodriguez, Diego A	21	10.1007/s11306-011-0336-x
			Reduced mitochondrial lipid oxidation leads to fat accumulation in myosteatosis	Gumucio, Jonathan P	15	10.1096/fj.201802457RR
	7	oxidation	Six weeks of a polarized training-intensity distribution leads to greater physiological and performance adaptations than a threshold model in trained cyclists	Neal, Craig M	52	10.1152/japplphysiol.00652.2012
			Type 2 diabetes alters metabolic and transcriptional signatures of glucose and amino acid metabolism during exercise and recovery	Hansen, Jakob S	43	10.1007/s00125-015-3584-x
			The relationship between aerobic fitness level and metabolic profiles in healthy adults	Morris, Ciara	35	10.1002/mnfr.201200629
			Metabolic modeling of muscle metabolism identifies key reactions linked to insulin resistance phenotypes	Nogiec, Christopher	18	10.1016/j.molmet.2014.12.012
			Metabolomics studies on db/db diabetic mice in skeletal muscle reveal effective clearance of overloaded intermediates by exercise	Xiang, Li	14	10.1016/j.aca.2017.11.082
	6	gene	Untargeted 1H-NMR metabolomics in CSF	Blasco, Helene	29	10.1212/WNL.0000000000000274
			Estrogen-Related Receptor- α Coordinates Transcriptional Programs Essential for Exercise Tolerance and Muscle Fitness	Perry, Marie-Claude	21	10.1210/me.2014-1281
			Metabolomics biomarkers to predict acamprosate treatment response in alcohol-dependent subjects	Hinton, David J	11	10.1038/s41598-017-02442-4

			A mutation in Ampd2 is associated with nephrotic syndrome and hypercholesterolemia in mice	Helmering, Joan	10	10.1186/1476-511X-13-167
			MetaComp: comprehensive analysis software for comparative meta-omics including comparative metagenomics	Zhai, Peng	8	10.1186/s12859-017-1849-8
	56	metabolite	Metabolic and hormonal responses to isoenergetic high-intensity interval exercise and continuous moderate-intensity exercise	Peake, Jonathan M	70	10.1152/ajpendo.00276.2014
			Identifying biomarkers of dietary patterns by using metabolomics	Playdon, Mary C	62	10.3945/ajcn.116.144501
			Comparing metabolite profiles of habitual diet in serum and urine	Playdon, Mary C	59	10.3945/ajcn.116.135301
			Influence of a Polyphenol-Enriched Protein Powder on Exercise-Induced Inflammation and Oxidative Stress in Athletes: A Randomized Trial Using a Metabolomics Approach	Nieman, David C	54	10.1371/journal.pone.0072215
			Metabolomics Study of Urine in Autism Spectrum Disorders Using a Multiplatform Analytical Methodology	Dieme, Binta	50	10.1021/acs.jproteome.5b00699
	18	rat	Monitoring the Response of the Human Urinary Metabolome to Brief Maximal Exercise by a Combination of RP-UPLC-MS and H-1 NMR Spectroscopy	Pechlivanis , Alexandros	24	10.1021/acs.jproteome.5b00470
			Effects of Acute Systematic Hypoxia on Human Urinary Metabolites Using LC-MS-Based Metabolomics	Lou, Bih-Show	19	10.1089/ham.2013.1130
			Beneficial effects of exercise on gut microbiota functionality and barrier integrity, and gut-liver crosstalk in an in vivo model of early obesity and non-alcoholic fatty liver disease	Carbajo-Pescador, Sara	16	10.1242/dmm.039206
			Molecular and metabolomic effects of voluntary running wheel activity on skeletal muscle in late middle-aged rats	Garvey, Sean M	15	10.14814/phy2.12319

		Metabolomics analysis of serum reveals the effect of Danggui Buxue Tang on fatigued mice induced by exhausting physical exercise	Miao, Xiaoyao	12	10.1016/j.jpba.2018.01.028
17	blood	Metabolic time-course response after resistance exercise: A metabolomics approach	Berton, Ricardo	22	10.1080/02640414.2016.1218035
		Individual Human Metabolic Phenotype Analyzed by H-1 NMR of Saliva Samples	Wallner-Liebniann, Sandra	18	10.1021/acs.jproteome.5b01060
		Human Genetic Variation, Sport and Exercise Medicine, and Achilles Tendinopathy: Role for Angiogenesis-Associated Genes	Rahim, Masouda	14	10.1089/omi.2016.0116
		Targeted Metabolomics Approach To Detect the Misuse of Steroidal Aromatase Inhibitors in Equine Sports by Biomarker Profiling	Chan, George Ho Man	11	10.1021/acs.analchem.5b03165
		A plasma metabolite panel as biomarkers for early primary breast cancer detection	Yuan, Baowen	9	10.1002/ijc.31996
17	prediction	Metabolomics insights into early type 2 diabetes pathogenesis and detection in individuals with normal fasting glucose	Merino, Jordi	31	10.1007/s00125-018-4599-x
		Fast metabolite identification with Input Output Kernel Regression	Brouard, Celine	28	10.1093/bioinformatics/btw246
		Maternal urinary metabolic signatures of fetal growth and associated clinical and environmental factors in the INMA study	Maitre, Lea	25	10.1186/s12916-016-0706-3
		Efficiency of genomic selection for tomato fruit quality	Duangjit, Janejira	23	10.1007/s11032-016-0453-3
		A Pharmacometabonomic Approach To Predicting Metabolic Phenotypes and Pharmacokinetic Parameters of Atorvastatin in Healthy Volunteers	Huang, Qing	21	10.1021/acs.jproteome.5b00440
		Investigation of Gender-Specific Exhaled Breath Volatome in Humans by GCxGC-TOF-MS	Das, Mrinal Kumar	39	10.1021/ac403541a

#5 aging	16	age	NMR-Based Metabolomic Profiling of Overweight Adolescents: An Elucidation of the Effects of Inter-/Intraindividual Differences, Gender, and Pubertal Development	Zheng, Hong	23	10.1155/2014/537157
			The Intersection of Aging Biology and the Pathobiology of Lung Diseases: A Joint NHLBI/NIA Workshop	Budinger, G R Scott	22	10.1093/gerona/glx090
			Phthalate exposure and childhood overweight and obesity: Urinary metabolomic evidence	Xia, Bin	14	10.1016/j.envint.2018.09.001
			Characterization of trotter horses urine metabolome by means of proton nuclear magnetic resonance spectroscopy	Zhu, Chenglin	11	10.1007/s11306-018-1403-3
	13	gut microbiota	Changes in intestinal microbiota composition and metabolism coincide with increased intestinal permeability in young adults under prolonged physiological stress	Karl, J Philip	77	10.1152/ajpgi.00066.2017
			Response of Gut Microbiota to Metabolite Changes Induced by Endurance Exercise	Zhao, Xia	26	10.3389/fmicb.2018.00765
			Urinary biomarker panel for diagnosing patients with depression and anxiety disorders	Chen, Jian-jun	23	10.1038/s41398-018-0245-0
			Effect of aerobic exercise and low carbohydrate diet on pre-diabetic non-alcoholic fatty liver disease in postmenopausal women and middle aged men - the role of gut microbiota composition: study protocol for the AELC randomized controlled trial	Liu, Wu Yi	19	10.1186/1471-2458-14-48
			Intestinal Metagenomes and Metabolomes in Healthy Young Males: Inactivity and Hypoxia Generated Negative Physiological Symptoms Precede Microbial Dysbiosis	Sket, Robert	11	10.3389/fphys.2018.00198

12	aging	The effects of graded levels of calorie restriction: IX. Global metabolomic screen reveals modulation of carnitines, sphingolipids and bile acids in the liver of C57BL/6 mice	Green, Cara L	21	10.1111/accel.12570
		Improved motor and cognitive performance with sodium nitrite supplementation is related to small metabolite signatures: a pilot trial in middle-aged and older adults	Justice, Jamie N	19	10.18632/aging.100842
		Molecular and metabolomic effects of voluntary running wheel activity on skeletal muscle in late middle-aged rats	Garvey, Sean M	15	10.14814/phy2.12319
		Impact of exercise on fecal and cecal metabolome over aging: a longitudinal study in rats	Deda, Olga	11	10.4155/bio-2016-0222
		Impact of Exercise and Aging on Rat Urine and Blood Metabolome. An LC-MS Based Metabolomics Longitudinal Study	Deda, Olga	7	10.3390/metabo7010010
8	carnitine	Metabolomics studies on db/db diabetic mice in skeletal muscle reveal effective clearance of overloaded intermediates by exercise	Xiang, Li	14	10.1016/j.aca.2017.11.082
		Circulating Metabolites Associated with Alcohol Intake in the European Prospective Investigation into Cancer and Nutrition Cohort	van Roekel, Eline H	6	10.3390/nu10050654
		LC-MS-based serum fingerprinting reveals significant dysregulation of phospholipids in chronic heart failure	Marcinkiewicz-Siemion, M	5	10.1016/j.jpba.2018.03.027
		Metabolomic Response to Acute Hypoxic Exercise and Recovery in Adult Males	Davison, Gareth	4	10.3389/fphys.2018.01682
		An NMR-Based Approach to Identify Urinary Metabolites Associated with Acute Physical Exercise and Cardiorespiratory Fitness in Healthy Humans-Results of the KarMeN Study	Kistner, Sina	0	10.3390/metabo10050212

	7	lipidomics	Modulation of the lipidomic profile due to a lipid challenge and fitness level: a postprandial study	Morris, Ciara	7	10.1186/s12944-015-0062-x
			Comparative determination of fatty acid composition of low-molecular components of blood plasma by three mass spectrometry techniques: the 'old-new' exercise in lipidomics	Milman, B L	2	10.1134/S1061934815140099
			Physical activity and lipidomics in a population at high risk of type 2 diabetes mellitus	Henson, Joseph	1	10.1080/02640414.2020.1744836
			Plasma Metabolomics Profiles are Associated with the Amount and Source of Protein Intake: A Metabolomics Approach within the PREDIMED Study	Hernandez-Alonso, Pablo	0	10.1002/mnfr.202000178
			Comprehensive Metabolomic and Lipidomic Analysis Reveals Metabolic Changes After Mindfulness Training	Chen, Wei	0	10.1007/s12671-020-01359-w
	6	targeted metabolomics	Harmonizing lipidomics: NIST	Bowden,	120	10.1194/jlr.M079012
			Food Targeting: Geographical Origin Determination of Hazelnuts (Corylus avellana) by LC-QqQ-MS/MS-Based Targeted Metabolomics Application	Klockmann, Sven	24	10.1021/acs.jafc.6b05007
			Identification of metabolic pathway disturbances using multimodal metabolomics in autistic disorders in a Middle Eastern population	Bitar, Tania	18	10.1016/j.jpba.2018.01.007
			Impact of Exercise and Aging on Rat Urine and Blood Metabolome. An LC-MS Based Metabolomics Longitudinal Study	Deda, Olga	7	10.3390/metabo7010010
			Circulating Metabolites Associated with Alcohol Intake in the European Prospective Investigation into Cancer and Nutrition Cohort	van Roekel, Eline H	6	10.3390/nu10050654