

Additional Table 4 Effects of physical exercise on the levels of metabolites

Exerkine	Study	Research subject	Tissue	Exercise paradigm	Regulatory effect
Metabolites of the KYN pathway	Liu et al., 2013	Depression model mice	Prefrontal cortex	Swimming training	IDO ↓
	Schlittler et al., 2016	Male subjects	Muscle/plasma	Endurance exercise	Muscle KAT ↑ Plasma KYNA ↑
	Lee et al., 2017	C57BL/6 mice	Serum	Long-term voluntary aerobic exercise	KYNA/3HK ↑
	Souza et al., 2017	Mice with Aβ1-42 intracerebroventricular injection	Prefrontal cortex/hippocampus	Swimming training	↓ IDO induced by Aβ1-42
	Allison et al., 2019	Healthy older men over 65 yr	Skeletal muscle	12-wk progressive exercise program	Muscle KAT1-4 ↑
	Joisten et al., 2020	Healthy male adults	Serum	Acute endurance/resistance exercise	KYNA, KYNA/KYN, and KAT4 ↑
	Pal et al., 2021	Pancreatic cancer patients	Serum	Supervised resistance training	IDO ↓
Lactate	Aveseh et al., 2014	Diabetes model rats induced by streptozotocin	Cortex/hippocampus	Endurance training	Cortex and hippocampus: MCT1 ↑ Cortex: MCT2 ↑
	Takimoto and Hamada, 2014	Sprague-Dawley rats	Brain	Treadmill exercise	Lactate and MCT1/2/4 ↑
	Matsui et al., 2015	Wistar rats	Brain	Vigorous swimming	↑
	Tsuchiya et al., 2015	Healthy males	Blood	Resistance and/or endurance exercise	↑
	Cabral-Santos et al., 2016	Physically active male subjects	Serum	High intensity interval exercise	↑
	Dethlefsen et al., 2016	Breast cancer survivors	Serum	Acute exercise training	↑
	Heger et al., 2016	Healthy participants	Serum	Long-distance cycling	↑
	Shima et al., 2017	Type 2 diabetes mellitus rats (OLETF)	Hippocampus	Moderate exercise	MCT2 ↑
	Abedpoor et al., 2018	Branched chain amino acid administrated mice	Plasma	Treadmill exercise	↑
	Nagy et al., 2018	Young healthy male volunteers	Serum	A single bout of exercise (2-mile run)	↑
	Rodriguez et al., 2018	Obese male subjects	Blood	Acute high intensity interval exercise/continuous moderate exercise	↑ (Acute high intensity interval exercise > continuous moderate exercise)
	Combes et al., 2019	Healthy young adults	Blood	30 min of continuous exercise/60 min of intermittent exercise	↑
Kasai et al., 2019	Male college track and field sprinters	Blood	Repeated-sprint exercise in hypoxia	↑	
Kujach et al., 2019	Young males	Blood	Sprint interval exercise	↑	

3HK: 3-Hydroxykynurenine; Aβ: beta-amyloid peptide; IDO: indoleamine-2,3-dioxygenase; KAT: kynurenine aminotransferase; KYN: kynurenine; KYNA: kynurenic acid; MCT: monocarboxylate transporter; OLETF: Otsuka Long-Evans Tokushima fatty.

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