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Abbreviations: 2-OG, 2-oxoglutarate; CHP, cumene hydroperoxide; Glu, glutamate; GDH, glutamate dehydrogenase; GPx-1, glutathione peroxidase 1; GPx-4, glutathione peroxidase 4; GR, glutathione reductase; GSH, reduced glutathione; GSSG, oxidized glutathione; GST, GSH-S-transferase; GSH-T, GSH transport; GSSG-T, GSSG transport; HepM, AS-30D hepatoma mitochondria; IC, *threo*-DL-isocitrate; IDH-2, isocitrate dehydrogenase 2; ME, malic enzyme; Mal, Malate; ROS, reactive oxygen species; RHM, rat heart mitochondria; RLM, rat liver mitochondria; *t*-BHP, *tert*-butylhydroperoxide; TH, nicotinamide nucleotide transhydrogenase; TrxR, thioredoxin reductase.

Key Words: isocitrate dehydrogenase-2, glutathione peroxidase-4, reactive oxygen species, metabolic control, oxidative stress, kinetic modeling