Table 1. Cytoprotective Actions of Taurine

Antioxidation
Anti-inflammation by neutralization of hypochlorous to produce taurine chloramine
Diminishes superoxide by conjugating with uridine of $tRNA^{Leu(UUR)}$ in mitochondria
Generates ATP by encoding mitochondrial ND6 protein
Prevents mitochondrial membrane permeability and apoptosis
Benefits mitochondrial disease, MELAS by providing substrate for taurine conjugation
Energy Metabolism
Activates complex I and NADH sensitive enzymes by reducing NADH/NAD+ ratio during glycolysis
Restores fatty acid oxidation by increasing PPARalpha levels
Conjugates bile acids to facilitate lipid absorption by intestines
Gene Expression
Changes transcription profile of metabolism-related genes
Modulates genes to induce longevity
Changes transcription factors
Modulates protein phosphorylation and cell signaling
Endoplasmic Reticulum (ER) Stress
Attenuates ER stress by improving protein folding
Ameliorates stroke brain injury by inhibiting ER stress
Protects neurons in stroke and Alzheimer's disease
Neuromodulation
Protects CNS by agonizing GABAA , glycine and NMDA receptors
Decreases seizures by binding with GABAA receptor
Protects against seizures by elevating glutamic acid decarboxylase
Quality Control
Protects cardiomyocytes by activating ubiquitin-proteasome system and autophagy
Attenuates toxin-mediated autophagy
Ca^{2+} Homeostasis
Protects heart and brain during MI and stroke by diminishing Ca^{2+} overload
Taurine loss during ischemia-reperfusion protects heart by reducing hypoxia-induced Ca^{2+} overload
Taurine depletion leads to cardiomyopathy due to reduced activity of SR $^{Ca2+}$ATPase
Protects brain neurons during epilepsy by inducing Ca^{2+} binding proteins
Protects neurons against glutamate excitotoxicity by reducing glutamate-induced elevation of $[Ca^{2+}]$
Osmoregulation
Serves as an organic osmolyte

Adapted from Schaffer, S., & Kim, H. W. (2018, May 1). Effects and mechanisms of taurine as a therapeutic agent. Biomolecules and Therapeutics. Korean Society of Applied Pharmacology. https://doi.org/10.4062/biomolther.2017.251