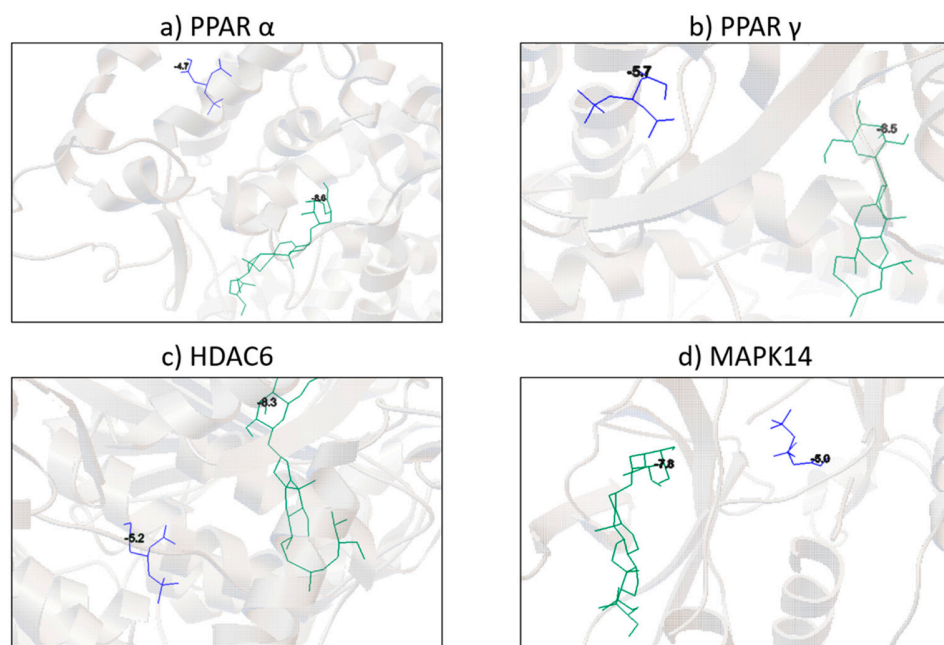


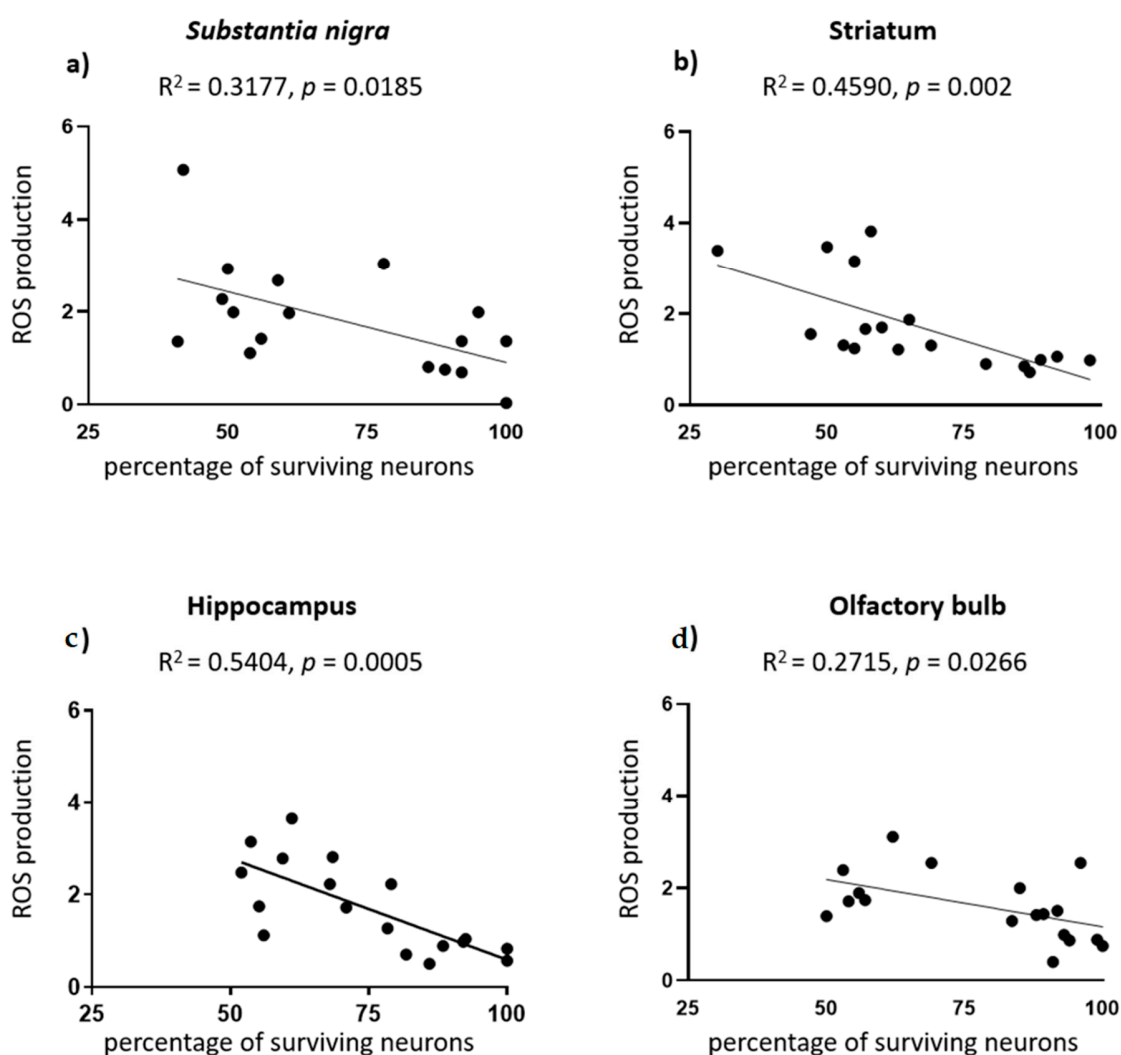
**Figure S1.** Molecular docking 3D representations between ligands (BSSG and positive controls) and (a) PPAR $\alpha$ , (b) PPAR $\gamma$ , (c) HDAC6 and (d) MAPK14. BSSG is represented in green, whereas positive controls are represented in red (testosterone) and blue (progesterone). These 3D representations were obtained from AutoDock tools.



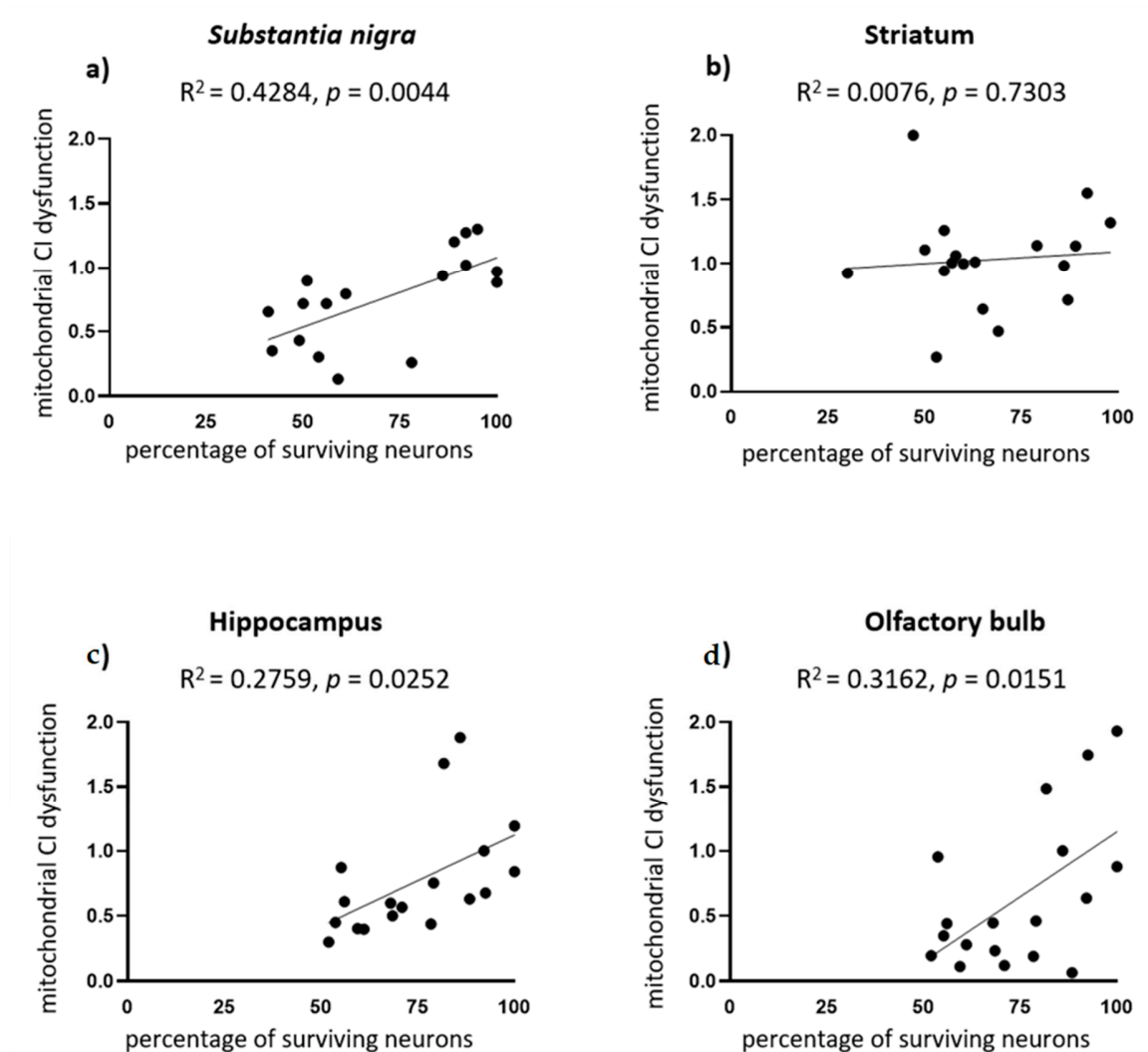
**Figure S2.** Molecular docking 3D representations between ligands (BSSG and negative control) and (a) PPAR $\alpha$ , (b) PPAR $\gamma$ , (c) HDAC6 and (d) MAPK14. BSSG is represented in green, whereas the negative control (propanaminium) is in blue. These 3D representations were obtained from AutoDock tools.

**Table S1.** Comparative results of molecular docking between BSSG and negative (-) and positive (+) controls.

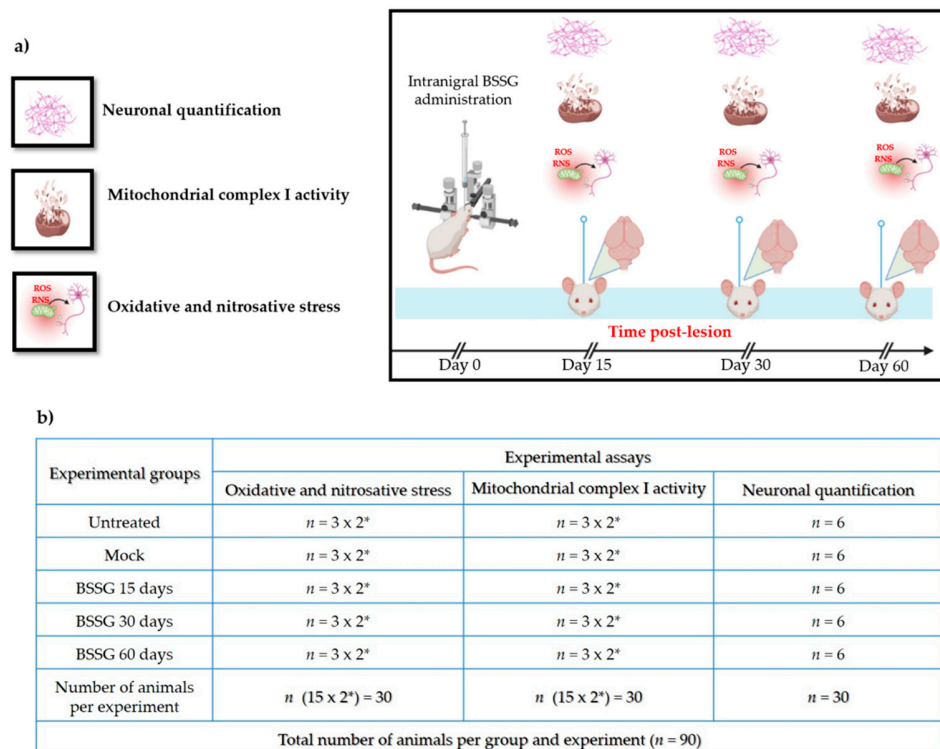
Compound	$\Delta G$ (kcal/mol)			
	PPAR $\alpha$	PPAR $\gamma$	HDAC6	MAPK14
Propanaminium (-)	-4.7	-5.7	-5.2	-5.0
Testosterone (+)	-8.0	-8.1	-7.9	-7.6
Progesterone (+)	-8.8	-8.0	-8.2	-7.9
BSSG	-8.6	-8.5	-8.3	-7.8



**Figure S3.** Correlation analysis of radical oxygen species (ROS) with the percentage of survival neurons in *substantia nigra* (a), striatum (b), hippocampus (c), and olfactory bulb (d). Pearson's correlation coefficient and linear regression appear on the top of every graph.  $p < 0.05$  was considered a statistically significant difference.



**Figure S4.** Correlation analysis of mitochondrial complex I (CI) dysfunction with the percentage of survival neurons in *substantia nigra* (a), striatum (b), hippocampus (c), and olfactory bulb (d). Pearson's correlation coefficient and linear regression appear on the top of every graph.  $p < 0.05$  was considered a statistically significant difference.



**Figure S5.** Experimental design. (a) Representative illustration of experimental assays evaluated through a temporal line. (b) The table shows the number of animals used by subgroups and experimental assays. \* Since  $n = 6$  animals per GROUP were used in the biochemical assays, these were performed in two independent experiments ( $n = 3$  animals per group and experiment). The Figure was created using Biorender.com.