

SUPPLEMENT

Buneeva O.A., Kapitsa I.G., Zgoda V.G., Medvedev A.E. (2023) Neuroprotective effects of isatin and afobazole in rats with rotenone-induced Parkinsonism are accompanied by increased brain levels of Triton X-100 soluble alpha-synuclein. Biomeditsinskaya Khimiya, 69(5), 290-299.

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Table 1S. Rat brain proteins which relative content differs from that of control animals (upon the influence of rotenone and neuroprotectors isatin and afobazole). Uniprot accession numbers of mitochondrial proteins are given in bold.

№	Uniprot accession number	Uniprot gene number	Uniprot protein name	Functions	Rotenone		Rotenone+ isatin		Isatin		Rotenone+ afobazole		Afobazole	
					- Log (P-value)	Difference from control*	- Log (P-value)	Difference from control*	- Log (P-value)	Difference from control*	- Log (P-value)	Difference from control*	- Log (P-value)	Difference from control*
1	D3ZQG6	<i>Trim2</i>	Tripartite motif-containing protein 2	6	2.7	0.9	2.7	0.6	2.4	0.5	2.9	0.7	2.6	0.7
2	O08839	<i>Bin1</i>	Myc box-dependent-interacting protein 1	2	3.5	0.6	3.4	0.8	5.1	1.3	3.1	1.0	3.8	1.2
3	O88767	<i>Park7</i>	Parkinson disease protein 7 homolog	4	2.6	1.5	2.2	1.6	2.4	1.8	2.3	1.7	2.4	1.8
4	S5RZM8	COX2	Cytochrome c oxidase subunit 2	1	1.8	1.3	1.8	1.6	2.0	2.0	1.7	1.7	1.5	1.6
5	P04797	<i>Gapdh</i>	Glyceraldehyde-3-phosphate dehydrogenase	1	2.4	0.7	3.8	2.0	3.6	1.9	3.8	2.0	3.7	2.1
6	P07895	<i>Sod2</i>	Superoxide dismutase [Mn], mitochondrial	4	3.6	-1.6	2.5	-1.2	2.0	-0.8	2.9	-1.5	2.9	-1.4
7	P07943	<i>Akr1b1</i>	Aldo-keto reductase family 1 member B1	7	3.4	1.0	3.6	1.0	3.5	1.0	2.9	0.7	3.4	0.9
8	P10888	<i>Cox4i</i>	Cytochrome	1	3.1	1.1	2.9	1.4	3.0	1.4	2.9	1.3	2.9	1.3

		<i>1</i>	e c oxidase subunit 4 isoform 1, mitochondrial											
9	P11951	<i>Cox6c2</i>	Cytochrome c oxidase subunit 6C-2	1	2.0	0.9	2.8	1.4	2.6	1.3	3.1	1.7	2.7	1.4
10	P12075	<i>Cox5b</i>	Cytochrome c oxidase subunit 5B, mitochondrial	1	2.6	1.9	2.2	2.0	2.1	1.9	2.4	2.5	2.5	2.5
11	P13668	<i>Stmn1</i>	Stathmin	2	2.7	0.7	2.8	1.3	4.0	2.2	3.3	1.4	3.6	1.8
12	P19527	<i>Nefl</i>	Neurofilament light polypeptide	2	3.1	-0.8	3.7	-1.9	4.0	-1.9	4.4	-2.4	4.1	-1.9
13	P20788	<i>Uqcrl1</i>	Cytochrome b-c1 complex subunit Rieske, mitochondrial	1	2.1	1.8	2.2	2.3	2.6	2.9	2.7	3.1	2.6	2.9
14	A0A8I6AAG6	<i>Slc1a3</i>	Amino acid transporter	2	3.6	3.2	3.4	3.7	3.4	3.5	3.8	4.5	3.5	3.9
15	Q2I6B2	<i>Atp6v0a1</i>	V-type proton ATPase subunit a	2	4.5	4.5	3.4	4.3	3.2	3.8	3.5	4.5	3.3	4.1
16	A0A0A0MY31	<i>Itp1l</i>	Inositol 1,4,5-trisphosphate receptor	3	2.5	-0.6	3.1	-1.0	3.1	-0.9	3.1	-0.6	3.6	-1.1
17	A0A8L2R8Y3	<i>Mif</i>	Macrophage migration inhibitory factor	3	2.4	1.1	2.0	1.1	3.0	1.8	2.8	1.6	2.3	1.3
18	A0A8I5ZMM3	<i>Dlg4</i>	Discs large MAGUK scaffold protein 4	3	2.6	-0.5	4.7	-1.3	5.4	-1.6	3.7	-1.6	4.0	-1.6
19	P31596	<i>Gene</i>	Excitatory amino acid transporter 2	2	2.7	0.8	2.9	1.0	3.2	0.9	3.4	1.0	2.9	0.9

20	F1M2I5	<i>Opcml</i>	Opioid binding protein/cell adhesion molecule-like	3	6.2	2.4	3.6	1.6	2.8	0.9	2.6	1.1	3.0	0.9
21	P37377	<i>Snca</i>	Alpha-synuclein	4	1.6	2.5	2.3	6.0	2.4	6.5	2.3	5.6	2.4	6.3
22	A0A8I6A6P9	<i>Arl3</i>	ADP ribosylation factor like GTPase 3	3	2.7	0.9	2.8	0.9	2.2	0.8	2.3	0.8	1.8	0.9
23	P38983	<i>Rpsa</i>	40S ribosomal protein SA	5	4.0	1.5	3.3	1.5	3.0	1.4	3.4	1.7	3.4	1.6
24	P55051	<i>Fabp7</i>	Fatty acid-binding protein, brain	7	2.8	1.5	2.6	1.7	2.9	2.1	1.9	1.3	2.7	1.9
25	P62329	<i>Tmsb4x</i>	Thymosin beta-4 Gene Tmsb4x	2	2.4	1.6	2.0	0.7	3.7	1.4	3.3	2.6	2.7	1.7
26	P62744	<i>Ap2s1</i>	AP-2 complex subunit sigma	2	3.4	1.3	3.1	1.6	2.6	1.3	3.1	1.9	3.2	1.6
27	P62815	<i>Atp6v1b2</i>	V-type proton ATPase subunit B, brain isoform	2	4.4	0.8	3.7	0.9	3.3	0.6	2.5	0.5	3.4	0.6
28	P69682	<i>Necap1</i>	Adaptin ear-binding coat-associated protein 1	2	2.4	0.6	3.1	1.2	3.7	1.7	3.5	1.4	3.6	1.7
29	P81155	<i>Vdac2</i>	Voltage-dependent anion-selective channel protein 2	2	5.9	2.4	3.9	1.7	4.2	1.6	2.9	1.0	4.1	1.4
30	P84076	<i>Hpcan</i>	N3euron-specific calcium-binding protein hippocalin	3	4.2	1.4	2.7	0.9	2.3	0.7	3.2	1.3	2.9	1.3

31	P97697	<i>Impa1</i>	Inositol monophosphatase 1	3	3.5	1.6	2.0	1.1	2.2	1.2	2.2	1.2	2.2	1.1
32	P97846	<i>Cntnapi1</i>	Contactin-associated protein 1	3	4.9	1.6	5.1	1.3	3.7	1.0	3.6	1.2	4.5	1.0
33	F8WFS9	<i>Add2</i>	Adducin 2	2	2.7	-1.3	5.3	-1.2	5.8	-1.6	4.4	-1.7	5.6	-1.8
34	Q4FZT2	<i>Ppme1</i>	Protein phosphatase methylesterase 1	3	4.2	-0.8	2.6	-0.7	3.3	-0.9	3.1	-0.9	2.4	-0.7
35	Q5BK63	<i>Ndufa9</i>	NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial	1	3.8	0.8	3.3	0.9	3.4	0.9	3.8	1.2	3.0	1.0
36	Q5U2N3	<i>Pitpnm1</i>	Membrane-associated phosphatidylinositol transfer protein 1	2	2.3	-0.7	2.3	-0.7	3.6	-1.1	3.4	-0.7	3.3	-0.8
37	Q5U318	<i>Peal5</i>	Astrocytic phosphoprotein PEA-15	3	2.8	1.5	3.2	1.7	3.4	1.8	2.4	1.4	3.1	1.7
38	Q5XI22	<i>Acat2</i>	Acetyl-CoA acetyltransferase, cytosolic	7	1.9	1.3	2.1	1.2	2.7	2.0	2.1	1.3	2.4	1.6
39	Q5XIH7	<i>Phb2</i>	Prohibitin-2	3	2.8	1.2	2.9	1.4	2.9	1.3	2.9	1.4	2.6	1.2
40	Q5XIN6	<i>Letm1</i>	Mitochondrial proton/calcium exchanger protein	2	2.1	1.1	2.4	1.8	2.7	2.1	2.8	2.4	2.6	2.1
41	Q62813	<i>Lsamip</i>	Limbic system-associated membrane protein	3	2.7	3.9	1.7	2.9	1.5	2.5	1.7	3.0	1.7	3.0

42	Q63198	<i>Cntn1</i>	Contactin-1	3	3.0	1.9	2.2	1.7	1.8	1.2	2.2	1.6	2.1	1.5
43	Q63560	<i>Map6</i>	Microtubule-associated protein 6	1	2.0	1.1	4.6	2.5	4.8	2.9	5.3	3.0	5.7	3.3
44	A0A8L2Q7K1	<i>Ndufs1</i>	NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial	1	3.8	0.5	3.3	0.4	4.1	0.6	3.7	0.5	3.8	0.7
45	A0A8L2QK81	<i>Snd1</i>	Staphylococcal nuclease domain-containing protein	5	2.4	-0.8	2.5	-1.0	3.4	-1.5	2.9	-1.1	3.3	-1.5
46	Q6P0K8	<i>Jup</i>	Junction plakoglobin	2	3.0	3.4	2.1	2.9	2.4	3.5	2.8	4.5	3.1	5.4
47	A0A8I6A243	<i>Gpi</i>	Glucose-6-phosphate isomerase	1	2.9	0.8	3.8	1.3	3.8	1.3	3.3	1.1	3.4	1.1
48	Q812E9	<i>Gpm6a</i>	Neuronal membrane glycoprotein M6-a	5	2.8	1.2	3.7	1.4	4.1	1.2	4.8	2.1	3.5	1.6
49	A0A8I6AGZ2	<i>Pex5l</i>	Peroxin 2, isoform CRA_c	4	2.5	-0.9	2.5	-0.6	3.0	-0.7	3.1	-1.5	3.6	-1.0
50	A0A140TAA4	<i>Pdcd6ip</i>	Programmed cell death 6-interacting protein	4	2.3	-0.6	2.9	-0.7	3.3	-0.9	3.2	-0.9	3.3	-0.9
51	Q9Z2L0	<i>Vdac1</i>	Voltage-dependent anion-selective channel protein 1	2	4.3	1.6	3.8	1.5	3.8	1.5	3.5	1.3	3.6	1.5
52	A0A096MJT3	<i>Septin4</i>	Septin 4	1	3.2	-1.3	2.4	-0.7	2.7	-1.0	3.4	-1.5	3.6	-1.3
53	A0A0G2JSR0	<i>Vdac3</i>	Voltage-dependent anion channel 3	2	4.1	3.6	3.1	3.2	3.0	3.2	3.0	3.3	3.1	3.3
54	A0A0	<i>Ndufa</i>	NADH	1	1.9	1.2	1.7	1.5	2.1	2.0	2.0	1.9	2.1	1.9

	G2JVL6	8	dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8											
55	Q6S3A1	<i>Status UniProtKB unreviewed (TrEMBL)</i>	Plectin 4	2	2.4	-0.6	3.5	-1.8	4.5	-3.2	4.4	-3.4	4.5	-2.7
56	G3V9N8	<i>Ap1b1</i>	AP complex subunit beta	2	3.2	1.2	3.4	1.6	3.1	1.4	3.2	1.4	2.9	1.4
57	A0A0G2K7Y2	<i>Oxr1</i>	Oxidation resistance 1	3	2.7	1.4	1.9	1.2	2.2	1.5	2.1	1.4	2.2	1.4
58	A0A8I5Y7K3	<i>Trappc3</i>	Trafficking protein particle complex subunit	2	2.9	-0.6	2.7	-0.9	3.8	-1.3	2.7	-1.0	3.6	-1.3
59	F1LPG5	<i>Ndufb4</i>	NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4	1	2.1	1.0	3.6	1.2	4.2	1.5	3.9	1.4	3.4	1.0
60	A0A8I6A0P2	<i>Nomol1</i>	Nodal modulator 1	3	2.9	-1.9	2.5	-1.5	2.1	-1.2	2.3	-1.5	2.0	-1.3
61	A0A8I6A1Y1	<i>Ogdh</i>	Oxoglutarate dehydrogenase (succinyl-transferring)	1	3.4	-0.5	3.1	-0.5	2.9	-0.4	3.0	-0.6	3.2	-0.6
62	A0A8I6A304	<i>Baspl1</i>	Brain abundant, membrane attached signal protein 1	3	5.1	4.2	3.6	4.1	4.6	3.5	3.8	4.8	3.6	4.3
63	A0A8I6A522	<i>Rab2a</i>	RAB2A, member RAS oncogene family	3	3.4	0.7	2.7	0.6	2.9	0.5	3.4	0.7	2.8	0.5

64	A0A8I6A7U6	<i>Sfpq</i>	Splicing factor proline and glutamine rich Gene Sfpq	5	4.9	-1.5	3.9	-1.7	2.1	-2.8	3.5	-2.8	3.6	-2.6
65	A0A8I6ADT5	<i>Ndufs3</i>	NADH dehydrogenase [ubiquinone] iron-sulfur protein 3, mitochondrial	1	2.4	0.7	2.3	0.7	3.2	0.7	3.2	0.7	2.9	0.7
66	A0A8I6GEH9	<i>Ntm</i>	Neurotrimin	3	4.8	2.7	3.6	2.5	3.2	1.9	3.1	2.0	3.0	1.8
67	A0A8I6APA7	<i>Nefh</i>	Neurofilament heavy	2	3.6	-2.1	2.5	-2.8	3.4	-2.8	3.3	-4.1	2.9	-2.9
68	Q5BJZ3	<i>Nnt</i>	Proton-translocating NAD(P)(+) transhydrogenase	4	2.6	0.7	2.1	0.7	2.9	1.0	2.8	1.0	2.6	0.9
69	A0A8I6GH02	<i>Cntnap2</i>	Contactin associated protein 2	3	1.9	-0.9	2.2	-0.9	2.3	-1.0	2.3	-1.2	2.7	-1.3
70	A0A8I6GH75	<i>Ddb1</i>	DNA damage-binding protein 1	5	3.1	0.9	2.9	1.0	2.3	0.7	2.5	0.9	2.3	0.9
71	B2RYS8	<i>Ndufb8</i>	NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial	1	3.4	1.3	3.3	1.5	3.3	1.5	3.1	1.5	3.0	1.3
72	B2RYW3	<i>Ndufb9</i>	NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9	1	4.1	0.9	2.9	0.8	3.2	0.7	3.2	1.0	3.8	1.1
73	D3ZZK3	<i>Epha4</i>	Receptor protein-	3	3.2	-0.6	2.7	-0.8	3.4	-0.9	3.4	-1.0	2.5	-0.8

			tyrosine kinase											
74	D4A7L4	<i>Ndufb11</i>	NADH dehydrogenase [ubiquinone] 1 beta subcomplex 11, mitochondrial	1	1.8	1.3	2.4	1.3	2.0	1.2	1.8	1.1	2.5	1.3
75	D4ABT8	<i>Hnrnpul2</i>	Heterogeneous nuclear ribonucleoprotein U-like 2	5	2.8	-1.1	4.0	-1.1	2.3	-1.6	2.3	-1.8	2.8	-1.0
76	M0RAY1	<i>Pdcd5</i>	Programmed cell death 5	5	2.1	0.7	2.2	1.2	2.5	1.5	2.1	1.1	2.3	1.4
77	Q9JLT5	<i>Wfs1</i>	WFS1 (Wolfram Syndrome Protein 1)	3	2.7	3.0	2.1	2.5	2.0	2.2	2.5	3.3	2.1	2.4
78	F1LR17	<i>Aak1</i>	AP2 associated kinase 1	3	2.6	0.9	2.3	1.2	2.3	1.1	2.5	1.3	2.7	1.4
79	F1M8K0	<i>Dagl</i>	Dystroglycan 1	3	1.7	-1.2	3.1	-1.2	1.9	-0.9	2.1	-0.9	2.5	-0.7
80	F7EPH4	<i>Ppal</i>	Inorganic diphosphatase	7	4.0	3.3	3.2	3.4	3.2	3.0	3.2	3.2	3.2	3.2
81	Q6P9V1	<i>Cd81</i>	Tetraspanin	4	3.1	1.7	2.7	1.8	2.4	1.9	3.0	2.5	2.9	2.1
82	G3V7L8	<i>Atp6v1e1</i>	ATPase H ⁺ transporting V1 subunit E1	2	3.7	0.8	3.3	1.0	5.5	1.0	5.7	0.8	2.2	0.6
83	G3V9Z3	<i>Maoa</i>	Amine oxidase	6	2.9	1.8	2.4	1.6	2.6	1.9	2.5	1.8	2.4	1.7
84	H1UBM5	<i>Cpne6</i>	Copine 6 protein	2	5.2	1.8	4.1	1.5	3.8	1.2	2.9	1.2	3.4	1.3
85	Q52KS1	<i>Pfkm</i>	ATP-dependent 6-phosphofructokinase	1	5.5	0.7	2.7	0.6	4.4	0.3	3.1	0.8	5.8	0.5
86	Q5M7T6	<i>Atp6v0d1</i>	V-type proton ATPase subunit	3	6.7	4.4	5.2	4.3	5.1	3.7	5.2	4.4	5.1	4.1

*Difference from control: $\log_2 X$; X indicates the difference compared to control (shown in the diagrams in the article).

Protein functions:

1. Proteins/enzymes involved in energy generation and carbohydrate metabolism.

2. Proteins involved in cytoskeleton formation and exocytosis.
3. Proteins involved in signal transduction and regulation of enzyme activity.
4. Antioxidant and protective proteins/enzymes.
5. Protein regulators of gene expression, cell division and differentiation.
6. Enzymes involved in metabolism of proteins, amino acids, and other nitrogenous compounds.
7. Enzymes involved in metabolism of lipids.

Table to Figure 2. Uniprot accession numbers and names of proteins (and corresponding genes) listed in Figure 2

Uniprot accession number	Uniprot gene name	Uniprot protein name
P07895	<i>Sod2</i>	Superoxide dismutase [Mn], mitochondrial
S5RZM8	<i>COX2</i>	Cytochrome c oxidase subunit 2
P10888	<i>Cox4i1</i>	Cytochrome c oxidase subunit 4 isoform 1, mitochondrial
P11951	<i>Cox6c2</i>	Cytochrome c oxidase subunit 6C-2
P12075	<i>Cox5b</i>	Cytochrome c oxidase subunit 5B, mitochondrial
P20788	<i>Uqcrc1</i>	Cytochrome b-c1 complex subunit Rieske, mitochondrial
Q5XIH7	<i>Phb2</i>	Prohibitin-2
Q5XIN6	<i>Letm1</i>	Mitochondrial proton/calcium exchanger protein
A0A8L2Q7K1	<i>Ndufs1</i>	NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial
A0A0G2JVL6	<i>Ndufa8</i>	NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8
Q5BK63	<i>Ndufa9</i>	NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial
F1LPG5	<i>Ndufb4</i>	NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4
B2RYS8	<i>Ndufb8</i>	NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial
B2RYW3	<i>Ndufb9</i>	NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9
D4A7L4	<i>Ndufb11</i>	NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11, mitochondrial
A0A8I6ADT5	<i>Ndufs3</i>	NADH dehydrogenase [ubiquinone] iron-sulfur protein 3, mitochondrial
A0A8I6A1Y1	<i>Ogdh</i>	Oxoglutarate dehydrogenase (succinyl-transferring)
Q5BJZ3	<i>Nnt</i>	Proton-translocating NAD(P)(+) transhydrogenase
Q9Z2L0	<i>Vdac1</i>	Voltage-dependent anion-selective channel protein 1
P81155	<i>Vdac2</i>	Voltage-dependent anion-selective channel protein 2
A0A0G2JSR0	<i>Vdac3</i>	Voltage-dependent anion channel 3

Table to Figure 3. Uniprot accession numbers and names of proteins (and corresponding genes) listed in Figure 3

Uniprot accession number	Uniprot gene name	Uniprot protein name
P37377	<i>Snca</i>	Alpha-synuclein
O88767	<i>Park7</i>	Parkinson disease protein 7 homolog
P04797	<i>Gapdh</i>	Glyceraldehyde-3-phosphate dehydrogenase
D3ZQG6	<i>Trim2</i>	Tripartite motif-containing protein 2
Q9Z2L0	<i>Vdac1</i>	Voltage-dependent anion-selective channel protein 1
P81155	<i>Vdac2</i>	Voltage-dependent anion-selective channel protein 2
A0A0G2JSR0	<i>Vdac3</i>	Voltage-dependent anion-selective channel protein 3
Q5XIH7	<i>Phb2</i>	Prohibitin-2
Q9JLT5	<i>Wfs1</i>	WFS1 (Wolfram Syndrome Protein 1)