# **Supplementary Material**

**HSP90 and Its Novel Co-Chaperones, SGT1 and CHP-1, in Brain of Patients with Parkinson’s Disease and Dementia with Lewy Bodies**

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# **Supplementary Figure 1.** **Immunohistochemical staining of α-synuclein in the substantia nigra of a PD patient showing Lewy bodies.** Microscope image with 20x magnification is shown.



**Supplementary Figure 2. Level of HSP90 in the substantia nigra, frontal and temporal cortex.** (A) Western blot (upper panel) and densitometric analysis of HSP90 level (lower panel). (B) RT-qPCR of HSP90 mRNA level. In (A**)** and (B**)** samples from 3 control and 3 DLB patients were analyzed. White and blue bars represent control and DLB cases, respectively. Error bars indicate mean ± SEM; \*\*\*p<0.001.



**Supplementary Figure 3. Level of SGT1 in the substantia nigra, frontal and temporal cortex.** **(A)** Western blot (upper panel) and densitometric analysis of SGT1 level (lower panel). **(B)** RT-qPCR of SGT1 mRNA level. In (A**)** and (B**)** samples from 3 control and 3 DLB patients were analyzed. White and orange bars represent control and DLB cases, respectively. Error bars indicate mean ± SEM; \*\*\*p<0.001.



**Supplementary Figure 4. Level of CHP-1 in the substantia nigra, frontal and temporal cortex.** **(A)** Western blot (upper panel) and densitometric analysis of CHP-1 level (lower panel). **(B)** RT-qPCR of CHP-1 mRNA level. In (A**)** and (B**)** samples from 3 control and 3 DLB patients were analyzed. White and yellow bars represent control and DLB cases, respectively. Error bars indicate mean ± SEM; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001.

**Supplementary Table 1. Data regarding control patients.** PM, postmortem delay in hours;Braak & Braak, neurofibrillary tangle staging after Braak & Braak [34]; CERAD [35, 36]; Braak et al. [37]; NIA Montine et al. 2012 [38, 39]; McKeith et al. [40]; CAA, cerebral amyloid angiopathy; LB-FC, LB-TC, LB-SN; presence of Lewy bodies in the frontal cortex, temporal cortex, and in the substantia nigra, respectively. 0, absent; NA, not applicable; NSTEMI, Non ST-segment elevation myocardial infarction; M, male, F, female.

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| **Controls** | **Sex** | **Age** | **PM delay** | **Clinical Diagnosis** | **Neuropathology Diagnoses** | **Braak & Braak Neurofibrillary Tangle Stages** | **CERAD** | **NIA-** **Montine et al. 2012** | **CAA** | **Braak et al.** | **McKeith et al.** | **LB-FC** | **LB-TC** | **LB-SN** |
| 10032- | M | 59.4 | 24.00 | Dilatative cardiomyopathy, Chronic alcoholism | Braak & Braak stage II | I-II | 0 | NA | 0 | NA | NA | 0 | 0 | 0 |
| 10087- | M | 74.3 | 20.00 | Aspiration pneumonia, Dysphagia of unknown cause | Braak & Braak stage I | I-II | 0 | NA | 0 | NA | NA | 0 | 0 | 0 |
| 10089- | M | 60.9 |  | Coronary heart disease,Non ST-segment elevation myocardial infarction (NSTEMI) | Braak & Braak stage I,microinfarct in the globus pallidus, microcalcifications in the globus pallidus and hippocampal CA1 | I-II | 0 | NA | 0 | NA | NA | 0 | 0 | 0 |
| 10112- | M | 69.1 | 24.00 | Arrosion bleeding of the common hepatic arteria, Duodenal ulcer | Braak & Braak stage II,microinfarcts | I-II | 0 | NA | 0 | NA | NA | 0 | 0 | 0 |
| 10116- | F | 77.3 | 24.00 | Pulmonal embolism, Hypertension | Braak & Braak stage II | I-II | 0 | NA | 0 | NA | NA | 0 | 0 | 0 |

**Supplementary Table 2. Data regarding PD patients.** PM, postmortem delay in hours;Braak & Braak, neurofibrillary staging after Braak & Braak [34]; CERAD [35, 36]; Braak et al., [37]; NIA Montine et al. 2012 [38, 39]; McKeith et al. [40]; CAA, cerebral amyloid angiopathy; LB-FC, LB-TC, LB-SN; presence of Lewy bodies in the frontal cortex, temporal cortex, and in the substantia nigra, respectively. 0, absent; Low, low neuropathological changes; L, low density; M, moderate density; H, high density; NA, not applicable; M, male, F, female.

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| PD | **Sex** | **Age** | **PM delay** | **Clinical Diagnosis** | **Neuropathology Diagnoses** | **Braak & Braak Neurofibrillary Tangle Stages** | **CERAD** | **NIA-** **Montine et al. 2012** | **CAA** | **Braak et al.** | **McKeith et al.** | **LB-FC** | **LB-TC** | **LB-SN** |
| 10082 | F | 82.4 | 30.00 | PD,Chronic subdural hematoma | PD, AD possible Subdural hematoma, Cerebral amyloid angiopathy | III-IV | C | Low | 1 | 6 | NA | H | H | H |
| 10163 | M | 88.6 | 24.00 | Dementia, PD | PD, Microinfarcts | III-IV | 0 | NA | 1 | 3 | NA | 0 | 0 | M |
| 10210 | M | 80.5 | 24.00 | PD | PD | III-IV | 0 | NA | 0 | 5 | NA | L | L | L |
| 10228- | F | 75.6 | 24.00 |  | PD | I-II | 0 | NA | 0 | 5 | NA | L | L | H |
| 10240- | M | 84.7 | 12.00 | PD, Diabetes mellitus, Cardiac decompensation | PD | III-IV | 0 | NA | 0 | 4 | NA | 0 | 0 | H |

**Supplementary Table 3. Data regarding DLB patients.** PM, postmortem delay in hours;Braak & Braak, neurofibrillary staging after Braak & Braak [34]; CERAD [35, 36]; Braak et al. [37]; NIA Montine et al. 2012 [38, 39]; McKeith et al. [40]; CAA, cerebral amyloid angiopathy; LB-FC, LB-TC, LB-SN; presence of Lewy bodies in the frontal cortex, temporal cortex, and in the substantia nigra, respectively. 0, absent; Intermediate, intermediate neuropathological changes; High, high neuropathological changes; M, moderate density; H, high density; NA, not applicable; M, male, F, female.

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| **DLB** | **Sex** | **Age** | **PM delay** | **Clinical Diagnosis** | **Neuropathology Diagnoses** | **Braak & Braak Neurofibrillary Tangle Stages** | **CERAD** | **NIA-** **Montine et al. 2012** | **CAA** | **Braak et al.** | **McKeith et al.** | **LB-FC** | **LB-TC** | **LB-SN** |
| 10026- | F | 90.8 | 16.00 | Mixed dementia,PD syndrome | DLB-limbic stage | III-IV | B | Intermediate | 0 | NA | limbic | 0 | 0 | M |
| 10036- | M | 76.5 | 24.00 | Suspected CJD, Herpes encephalitis | DLB-diffuse neocortical stage | V-VI | C | High | 1 | NA | neocortical | M | H | H |
| 10190-3 | M | 78.3 | 12.00 | PD, Urothelial carcinoma of the urinary bladder | DLB-diffuse neocortical stage | III-IV | B | Intermediate | 1 | NA | neocortical | M | H | H |
| 10283- | M | 74.9 | 30.00 | Pneumonia, Renal insufficiency | DLB-brain stem stage | III-IV | B | Intermediate | 1 | NA | brain stem | 0 | 0 | M |

**Supplementary Table 4. The sequences of primers used for real time/quantitative PCR (RT-qPCR).**

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| 18S  | 5’CGC CGC TAG AGG TGA AAT TC 3’5’TTG GCA AATGCT TTC GCT C 3’  |
| HSP90 | 5’CCG TTT CTG AGA AGC AGGG CA 3’5’CTG TCT GAA GGC CAG TGA CG 3’ |
| CHORDC1 (CHP-1) | TagMan Gene Expression Assay Thermo Fisher ScientificAssay ID: [Hs01083564\_g1](https://www.thermofisher.com/taqman-gene-expression/product/Hs01083564_g1?CID=&ICID=&subtype=) |
| SGT1  | TagMan Gene Expression Assay Thermo Fisher Scientific Assay ID: Hs00993001\_g1 |
|  GAPD (GAPDH)  | TagMan Gene Expression Assay Thermo Fisher ScientificCatalog number: 4310884E |