

SNCA gene

[Alpha-synuclein](#) is a member of the synuclein family, which also includes beta- and gamma-synuclein. Synucleins are abundantly expressed in the brain and alpha- and beta-synuclein inhibit phospholipase D2 selectively. SNCA may serve to integrate presynaptic signaling and membrane trafficking. Defects in SNCA have been implicated in the [Parkinson's disease pathogenesis](#). SNCA peptides are a major component of amyloid plaques in the brains of patients with Alzheimer's disease. Alternatively, spliced transcripts encoding different isoforms have been identified for this gene

A study demonstrated the importance of the SNCA locus for the etiology of [Parkinson's disease](#) in Latinos. By leveraging the demographic history of a [cohort](#) via admixture mapping, they identified two potential PD risk loci that merit further study ¹⁾.

2: Ye S, Zhong J, Huang J, Chen L, Yi L, Li X, Lv J, Miao J, Li H, Chen D, Li C. Protective effect of plastrum testudinis extract on dopaminergic neurons in a Parkinson's disease model through DNMT1 nuclear translocation and SNCA's methylation. *Biomed Pharmacother*. 2021 Jun 18;141:111832. doi: 10.1016/j.biopha.2021.111832. Epub ahead of print. PMID: 34153844.

3: He X, Yuan W, Yang CQ, Zhu L, Liu F, Feng J, Xue YX. Ghrelin alleviates 6-hydroxydopamine-induced neurotoxicity in SH-SY5Y cells. *Neural Regen Res*. 2022 Jan;17(1):170-177. doi: 10.4103/1673-5374.314314. PMID: 34100453.

4: Ramezani M, Mouches P, Yoon E, Rajashekar D, Ruskey JA, Leveille E, Martens K, Kibreab M, Hammer T, Kathol I, Maarouf N, Sarna J, Martino D, Pfeffer G, Gan- Or Z, Forkert ND, Monchi O. Investigating the relationship between the SNCA gene and cognitive abilities in idiopathic Parkinson's disease using machine learning. *Sci Rep*. 2021 Mar 1;11(1):4917. doi: 10.1038/s41598-021-84316-4. PMID: 33649398; PMCID: PMC7921412.

5: Chia R, Sabir MS, Bandres-Ciga S, Saez-Atienzar S, Reynolds RH, Gustavsson E, Walton RL, Ahmed S, Viollet C, Ding J, Makarios MB, Diez-Fairen M, Portley MK, Shah Z, Abramzon Y, Hernandez DG, Blauwendraat C, Stone DJ, Eicher J, Parkkinen L, Ansorge O, Clark L, Honig LS, Marder K, Lemstra A, St George-Hyslop P, Londos E, Morgan K, Lashley T, Warner TT, Jaunmuktane Z, Galasko D, Santana I, Tienari PJ, Myllykangas L, Oinas M, Cairns NJ, Morris JC, Halliday GM, Van Deerlin VM, Trojanowski JQ, Grassano M, Calvo A, Mora G, Canosa A, Floris G, Bohannon RC, Brett F, Gan-Or Z, Geiger JT, Moore A, May P, Krüger R, Goldstein DS, Lopez G, Tayebi N, Sidransky E; American Genome Center, Norcliffe-Kaufmann L, Palma JA, Kaufmann H, Shakkottai VG, Perkins M, Newell KL, Gasser T, Schulte C, Landi F, Salvi E, Cusi D, Masliah E, Kim RC, Caraway CA, Monuki ES, Brunetti M, Dawson TM, Rosenthal LS, Albert MS, Pletnikova O, Troncoso JC, Flanagan ME, Mao Q, Bigio EH, Rodríguez-Rodríguez E, Infante J, Lage C, González-Aramburu I, Sanchez-Juan P, Ghetti B, Keith J, Black SE, Masellis M, Rogaeva E, Duyckaerts C, Brice A, Lesage S, Xiromerisiou G, Barrett MJ, Tilley BS, Gentleman S, Logroscino G, Serrano GE, Beach TG, McKeith IG, Thomas AJ, Attems J, Morris CM, Palmer L, Love S, Troakes C, Al-Sarraj S, Hodges AK, Aarsland D, Klein G, Kaiser SM, Woltjer R, Pastor P, Bekris LM, Leverenz JB, Besser LM, Kuzma A, Renton AE, Goate A, Bennett DA, Scherzer CR, Morris HR, Ferrari R, Albani D, Pickering- Brown S, Faber K, Kukull WA, Morenas-Rodriguez E, Lleó A, Fortea J, Alcolea D, Clarimon J, Nalls MA, Ferrucci L, Resnick SM, Tanaka T, Foroud TM, Graff-Radford NR, Wszolek ZK, Ferman T, Boeve BF, Hardy JA, Topol EJ, Torkamani A, Singleton AB, Ryten M, Dickson DW, Chiò A, Ross OA, Gibbs JR, Dalgard CL, Traynor BJ, Scholz SW. Genome sequencing analysis identifies new loci associated with Lewy body dementia and provides insights into its genetic architecture. *Nat Genet*.

2021 Mar;53(3):294-303. doi: 10.1038/s41588-021-00785-3. Epub 2021 Feb 15. PMID: 33589841; PMCID: PMC7946812.

6: Pilliod J, Desjardins A, Pernègre C, Jamann H, Larochelle C, Fon EA, Leclerc N. Clearance of intracellular tau protein from neuronal cells via VAMP8-induced secretion. *J Biol Chem*. 2020 Dec 18;295(51):17827-17841. doi: 10.1074/jbc.RA120.013553. PMID: 33454017; PMCID: PMC7762943.

7: Rudakou U, Yu E, Krohn L, Ruskey JA, Asayesh F, Dauvilliers Y, Spiegelman D, Greenbaum L, Fahn S, Waters CH, Dupré N, Rouleau GA, Hassin-Baer S, Fon EA, Alcalay RN, Gan-Or Z. Targeted sequencing of Parkinson's disease loci genes highlights SYT11, FGF20 and other associations. *Brain*. 2021 Mar 3;144(2):462-472. doi: 10.1093/brain/awaa401. PMID: 33349842; PMCID: PMC7940168.

8: Fukusumi H, Togo K, Sumida M, Nakamori M, Obika S, Baba K, Shofuda T, Ito D, Okano H, Mochizuki H, Kanemura Y. Alpha-synuclein dynamics in induced pluripotent stem cell-derived dopaminergic neurons from a Parkinson's disease patient (PARK4) with SNCA triplication. *FEBS Open Bio*. 2021 Feb;11(2):354-366. doi: 10.1002/2211-5463.13060. Epub 2021 Jan 5. PMID: 33301617; PMCID: PMC7876504.

9: Alimohammadi E, Khedri M, Miri Jahromi A, Maleki R, Rezaian M. Graphene-Based Nanoparticles as Potential Treatment Options for Parkinson's Disease: A Molecular Dynamics Study. *Int J Nanomedicine*. 2020 Sep 18;15:6887-6903. doi: 10.2147/IJN.S265140. PMID: 32982240; PMCID: PMC7509323.

10: Lobbestael E, Van den Haute C, Macchi F, Taymans JM, Baekelandt V. Pathogenic LRRK2 requires secondary factors to induce cellular toxicity. *Biosci Rep*. 2020 Oct 30;40(10):BSR20202225. doi: 10.1042/BSR20202225. PMID: 32975566; PMCID: PMC7560525.

11: Siddu A, David LS, Lauinger N, Chen X, Saint-Pierre M, Alpaugh M, Durcan T, Cicchetti F. Beneficial effects of cysteamine in Thy1- α -Syn mice and induced pluripotent stem cells with a SNCA gene triplication. *Neurobiol Dis*. 2020 Nov;145:105042. doi: 10.1016/j.nbd.2020.105042. Epub 2020 Aug 13. PMID: 32798729.

12: Siokas V, Aloizou AM, Tsouris Z, Liampas I, Aslanidou P, Dastamani M, Brotis AG, Bogdanos DP, Hadjigeorgiou GM, Dardiotis E. Genetic Risk Factors for Essential Tremor: A Review. *Tremor Other Hyperkinet Mov (N Y)*. 2020 Jun 11;10:4. doi: 10.5334/tohm.67. PMID: 32775018; PMCID: PMC7394223.

13: O'Hara DM, Pawar G, Kalia SK, Kalia LV. LRRK2 and α -Synuclein: Distinct or Synergistic Players in Parkinson's Disease? *Front Neurosci*. 2020 Jun 17;14:577. doi: 10.3389/fnins.2020.00577. PMID: 32625052; PMCID: PMC7311858.

14: Tsai RT, Tsai CW, Liu SP, Gao JX, Kuo YH, Chao PM, Hung HS, Shyu WC, Lin SZ, Fu RH. Maackiain Ameliorates 6-Hydroxydopamine and *SNCA* Pathologies by Modulating the PINK1/Parkin Pathway in Models of Parkinson's Disease in *Caenorhabditis elegans* and the SH-SY5Y Cell Line. *Int J Mol Sci*. 2020 Jun 23;21(12):4455. doi: 10.3390/ijms21124455. PMID: 32585871; PMCID: PMC7352553.

15: Wang L, Wang G, Duan Y, Wang F, Lin S, Zhang F, Li H, Li A, Li H. A Comparative Study of the Diagnostic Potential of Plasma and Erythrocytic α -Synuclein in Parkinson's Disease. *Neurodegener Dis*. 2019;19(5-6):204-210. doi: 10.1159/000506480. Epub 2020 Jun 2. PMID: 32485710.

16: Wang XJ, Ma MM, Zhou LB, Jiang XY, Hao MM, Teng RKF, Wu E, Tang BS, Li JY, Teng JF, Ding XB. Autonomic ganglionic injection of α -synuclein fibrils as a model of pure autonomic failure α -synucleinopathy. *Nat Commun*. 2020 Feb 18;11(1):934. doi: 10.1038/s41467-019-14189-9. PMID:

32071315; PMCID: PMC7028908.

17: Krohn L, Wu RYJ, Heilbron K, Ruskey JA, Laurent SB, Blauwendraat C, Alam A, Arnulf I, Hu MTM, Dauvilliers Y, Högl B, Toft M, Bjørnarå KA, Stefani A, Holzknecht E, Monaca CC, Abril B, Plazzi G, Antelmi E, Ferini-Strambi L, Young P, Heidebreder A, Cochen De Cock V, Mollenhauer B, Sixel-Döring F, Trenkwalder C, Sonka K, Kemlink D, Figorilli M, Puligheddu M, Dijkstra F, Viaene M, Oertel W, Toffoli M, Gigli GL, Valente M, Gagnon JF, Nalls MA, Singleton AB; 23andMe Research Team, Desautels A, Montplaisir JY, Cannon P, Ross OA, Boeve BF, Dupré N, Fon EA, Postuma RB, Pihlstrøm L, Rouleau GA, Gan-Or Z. Fine-Mapping of SNCA in Rapid Eye Movement Sleep Behavior Disorder and Overt Synucleinopathies. *Ann Neurol*. 2020 Apr;87(4):584-598. doi: 10.1002/ana.25687. Epub 2020 Feb 12. PMID: 31976583; PMCID: PMC8025046.

18: Earls RH, Menees KB, Chung J, Gutekunst CA, Lee HJ, Hazim MG, Rada B, Wood LB, Lee JK. NK cells clear α -synuclein and the depletion of NK cells exacerbates synuclein pathology in a mouse model of α -synucleinopathy. *Proc Natl Acad Sci U S A*. 2020 Jan 21;117(3):1762-1771. doi: 10.1073/pnas.1909110117. Epub 2020 Jan 3. PMID: 31900358; PMCID: PMC6983411.

19: Perez-Rodriguez D, Kalyva M, Leija-Salazar M, Lashley T, Tarabichi M, Chelban V, Gentleman S, Schottlaender L, Franklin H, Vasmatzis G, Houlden H, Schapira AHV, Warner TT, Holton JL, Jaunmuktane Z, Proukakis C. Investigation of somatic CNVs in brains of synucleinopathy cases using targeted SNCA analysis and single cell sequencing. *Acta Neuropathol Commun*. 2019 Dec 23;7(1):219. doi: 10.1186/s40478-019-0873-5. PMID: 31870437; PMCID: PMC6929293.

20: Earls RH, Menees KB, Chung J, Barber J, Gutekunst CA, Hazim MG, Lee JK. Intrastriatal injection of preformed alpha-synuclein fibrils alters central and peripheral immune cell profiles in non-transgenic mice. *J Neuroinflammation*. 2019 Dec 3;16(1):250. doi: 10.1186/s12974-019-1636-8. PMID: 31796095; PMCID: PMC6889316.

21: Senkevich K, Gan-Or Z. Autophagy lysosomal pathway dysfunction in Parkinson's disease; evidence from human genetics. *Parkinsonism Relat Disord*. 2020 Apr;73:60-71. doi: 10.1016/j.parkreldis.2019.11.015. Epub 2019 Nov 17. PMID: 31761667.

22: Zhang R, Wang S, Huang X, Yang Y, Fan H, Yang F, Li J, Dong X, Feng S, Anbu P, Gopinath SCB, Xin T. Gold-nanourchin seeded single-walled carbon nanotube on voltammetry sensor for diagnosing neurodegenerative Parkinson's disease. *Anal Chim Acta*. 2020 Jan 15;1094:142-150. doi: 10.1016/j.aca.2019.10.012. Epub 2019 Oct 12. PMID: 31761041.

23: Manne S, Kondru N, Jin H, Anantharam V, Huang X, Kanthasamy A, Kanthasamy AG. α -Synuclein real-time quaking-induced conversion in the submandibular glands of Parkinson's disease patients. *Mov Disord*. 2020 Feb;35(2):268-278. doi: 10.1002/mds.27907. Epub 2019 Nov 23. PMID: 31758740; PMCID: PMC7102508.

24: Du B, Xue Q, Liang C, Fan C, Liang M, Zhang Y, Bi X, Hou L. Association between alpha-synuclein (SNCA) rs11931074 variability and susceptibility to Parkinson's disease: an updated meta-analysis of 41,811 patients. *Neurol Sci*. 2020 Feb;41(2):271-280. doi: 10.1007/s10072-019-04107-8. Epub 2019 Nov 22. PMID: 31758346.

25: Blauwendraat C, Reed X, Krohn L, Heilbron K, Bandres-Ciga S, Tan M, Gibbs JR, Hernandez DG, Kumaran R, Langston R, Bonet-Ponce L, Alcalay RN, Hassin-Baer S, Greenbaum L, Iwaki H, Leonard HL, Grenn FP, Ruskey JA, Sabir M, Ahmed S, Makarios MB, Pihlstrøm L, Toft M, van Hilten JJ, Marinus J, Schulte C, Brockmann K, Sharma M, Siitonen A, Majamaa K, Eerola-Rautio J, Tienari PJ; 23andMe Research Team, Pantelyat A, Hillis AE, Dawson TM, Rosenthal LS, Albert MS, Resnick SM, Ferrucci L,

Morris CM, Pletnikova O, Troncoso J, Grosset D, Lesage S, Corvol JC, Brice A, Noyce AJ, Masliah E, Wood N, Hardy J, Shulman LM, Jankovic J, Shulman JM, Heutink P, Gasser T, Cannon P, Scholz SW, Morris H, Cookson MR, Nalls MA, Gan-Or Z, Singleton AB. Genetic modifiers of risk and age at onset in GBA associated Parkinson's disease and Lewy body dementia. *Brain*. 2020 Jan 1;143(1):234-248. doi: 10.1093/brain/awz350. Erratum in: *Brain*. 2020 Apr 1;143(4):e33. Erratum in: *Brain*. 2020 Mar 1;143(3):e24. PMID: 31755958; PMCID: PMC6935749.

26: Lavenir I, Passarella D, Masuda-Suzukake M, Curry A, Holton JL, Ghetti B, Goedert M. Silver staining (Campbell-Switzer) of neuronal α -synuclein assemblies induced by multiple system atrophy and Parkinson's disease brain extracts in transgenic mice. *Acta Neuropathol Commun*. 2019 Sep 16;7(1):148. doi: 10.1186/s40478-019-0804-5. PMID: 31522685; PMCID: PMC6745790.

27: Kim S, Kwon SH, Kam TI, Panicker N, Karuppagounder SS, Lee S, Lee JH, Kim WR, Kook M, Foss CA, Shen C, Lee H, Kulkarni S, Pasricha PJ, Lee G, Pomper MG, Dawson VL, Dawson TM, Ko HS. Transneuronal Propagation of Pathologic α -Synuclein from the Gut to the Brain Models Parkinson's Disease. *Neuron*. 2019 Aug 21;103(4):627-641.e7. doi: 10.1016/j.neuron.2019.05.035. Epub 2019 Jun 26. PMID: 31255487; PMCID: PMC6706297.

28: Kobayashi J, Hasegawa T, Sugeno N, Yoshida S, Akiyama T, Fujimori K, Hatakeyama H, Miki Y, Tomiyama A, Kawata Y, Fukuda M, Kawahata I, Yamakuni T, Ezura M, Kikuchi A, Baba T, Takeda A, Kanzaki M, Wakabayashi K, Okano H, Aoki M. Extracellular α -synuclein enters dopaminergic cells by modulating flotillin-1-assisted dopamine transporter endocytosis. *FASEB J*. 2019 Sep;33(9):10240-10256. doi: 10.1096/fj.201802051R. Epub 2019 Jun 18. PMID: 31211923.

29: Cressatti M, Song W, Turk AZ, Garabed LR, Benchaya JA, Galindez C, Liberman A, Schipper HM. Glial HMOX1 expression promotes central and peripheral α -synuclein dysregulation and pathogenicity in parkinsonian mice. *Glia*. 2019 Sep;67(9):1730-1744. doi: 10.1002/glia.23645. Epub 2019 Jun 10. PMID: 31180611.

30: Blauwendraat C, Heilbron K, Vallerga CL, Bandres-Ciga S, von Coelln R, Pihlstrøm L, Simón-Sánchez J, Schulte C, Sharma M, Krohn L, Siitonen A, Iwaki H, Leonard H, Noyce AJ, Tan M, Gibbs JR, Hernandez DG, Scholz SW, Jankovic J, Shulman LM, Lesage S, Corvol JC, Brice A, van Hilten JJ, Marinus J; 23andMe Research Team, Eerola-Rautio J, Tienari P, Majamaa K, Toft M, Grosset DG, Gasser T, Heutink P, Shulman JM, Wood N, Hardy J, Morris HR, Hinds DA, Gratten J, Visscher PM, Gan-Or Z, Nalls MA, Singleton AB; International Parkinson's Disease Genomics Consortium (IPDGC). Parkinson's disease age at onset genome-wide association study: Defining heritability, genetic loci, and α -synuclein mechanisms. *Mov Disord*. 2019 Jun;34(6):866-875. doi: 10.1002/mds.27659. Epub 2019 Apr 7. PMID: 30957308; PMCID: PMC6579628.

31: Bieri G, Brahic M, Bousset L, Couthouis J, Kramer NJ, Ma R, Nakayama L, Monbureau M, Defensor E, Schüle B, Shamloo M, Melki R, Gitler AD. LRRK2 modifies α -syn pathology and spread in mouse models and human neurons. *Acta Neuropathol*. 2019 Jun;137(6):961-980. doi: 10.1007/s00401-019-01995-0. Epub 2019 Mar 29. PMID: 30927072; PMCID: PMC6531417.

32: Espay AJ, Vizcarra JA, Marsili L, Lang AE, Simon DK, Merola A, Josephs KA, Fasano A, Morgante F, Savica R, Greenamyre JT, Cambi F, Yamasaki TR, Tanner CM, Gan-Or Z, Litvan I, Mata IF, Zabetian CP, Brundin P, Fernandez HH, Standaert DG, Kauffman MA, Schwarzschild MA, Sardi SP, Sherer T, Perry G, Leverenz JB. Revisiting protein aggregation as pathogenic in sporadic Parkinson and Alzheimer diseases. *Neurology*. 2019 Feb 12;92(7):329-337. doi: 10.1212/WNL.0000000000006926. PMID: 30745444; PMCID: PMC6382364.

33: Gao H, Zhao Z, He Z, Wang H, Liu M, Hu Z, Cheng O, Yang Y, Zhu L. Detection of Parkinson's

Disease through the Peptoid Recognizing α -Synuclein in Serum. *ACS Chem Neurosci*. 2019 Mar 20;10(3):1204-1208. doi: 10.1021/acschemneuro.8b00540. Epub 2019 Jan 29. PMID: 30682886.

34: Kim T, Mehta SL, Morris-Blanco KC, Chokkalla AK, Chelluboina B, Lopez M, Sullivan R, Kim HT, Cook TD, Kim JY, Kim H, Kim C, Vemuganti R. The microRNA miR-7a-5p ameliorates ischemic brain damage by repressing α -synuclein. *Sci Signal*. 2018 Dec 11;11(560):eaat4285. doi: 10.1126/scisignal.aat4285. PMID: 30538177; PMCID: PMC7005928.

35: Kun-Rodrigues C, Orme T, Carmona S, Hernandez DG, Ross OA, Eicher JD, Shepherd C, Parkkinen L, Darwent L, Heckman MG, Scholz SW, Troncoso JC, Pletnikova O, Dawson T, Rosenthal L, Ansorge O, Clarimon J, Lleo A, Morenas- Rodriguez E, Clark L, Honig LS, Marder K, Lemstra A, Rogaeva E, St George-Hyslop P, Londos E, Zetterberg H, Barber I, Braae A, Brown K, Morgan K, Troakes C, Al-Sarraj S, Lashley T, Holton J, Compta Y, Van Deerlin V, Serrano GE, Beach TG, Lesage S, Galasko D, Masliah E, Santana I, Pastor P, Diez-Fairen M, Aguilar M, Tienari PJ, Myllykangas L, Oinas M, Revesz T, Lees A, Boeve BF, Petersen RC, Ferman TJ, Escott-Price V, Graff-Radford N, Cairns NJ, Morris JC, Pickering-Brown S, Mann D, Halliday GM, Hardy J, Trojanowski JQ, Dickson DW, Singleton A, Stone DJ, Guerreiro R, Bras J. A comprehensive screening of copy number variability in dementia with Lewy bodies. *Neurobiol Aging*. 2019 Mar;75:223.e1-223.e10. doi: 10.1016/j.neurobiolaging.2018.10.019. Epub 2018 Oct 24. PMID: 30448004; PMCID: PMC6541211.

36: Picillo M, Lizarraga KJ, Friesen EL, Chau H, Zhang M, Sato C, Rooke G, Munhoz RP, Rogaeva E, Fraser PE, Kalia SK, Kalia LV. Parkinsonism due to A53E α -synuclein gene mutation: Clinical, genetic, epigenetic, and biochemical features. *Mov Disord*. 2018 Dec;33(12):1950-1955. doi: 10.1002/mds.27506. Epub 2018 Nov 13. PMID: 30423204.

37: Xia D, Sui R, Zhang Z. Administration of resveratrol improved Parkinson's disease-like phenotype by suppressing apoptosis of neurons via modulating the MALAT1/miR-129/SNCA signaling pathway. *J Cell Biochem*. 2019 Apr;120(4):4942-4951. doi: 10.1002/jcb.27769. Epub 2018 Sep 27. PMID: 30260025.

38: Cooper JF, Spielbauer KK, Senchuk MM, Nadarajan S, Colaiácovo MP, Van Raamsdonk JM. α -synuclein expression from a single copy transgene increases sensitivity to stress and accelerates neuronal loss in genetic models of Parkinson's disease. *Exp Neurol*. 2018 Dec;310:58-69. doi: 10.1016/j.expneurol.2018.09.001. Epub 2018 Sep 5. PMID: 30194957; PMCID: PMC6203651.

39: Seo Y, Pak K, Nam HY, Seok JW, Lee MJ, Kim EJ, Lee JM, Kim SJ, Kim IJ. Effect of rs3910105 in the Synuclein Gene on Dopamine Transporter Availability in Healthy Subjects. *Yonsei Med J*. 2018 Aug;59(6):787-792. doi: 10.3349/ymj.2018.59.6.787. PMID: 29978616; PMCID: PMC6037603.

40: Shaltouki A, Hsieh CH, Kim MJ, Wang X. Alpha-synuclein delays mitophagy and targeting Miro rescues neuron loss in Parkinson's models. *Acta Neuropathol*. 2018 Oct;136(4):607-620. doi: 10.1007/s00401-018-1873-4. Epub 2018 Jun 9. PMID: 29923074; PMCID: PMC6123262.

41: Diez-Fairen M, Benitez BA, Ortega-Cubero S, Lorenzo-Betancor O, Cruchaga C, Lorenzo E, Samaranch L, Carcel M, Obeso JA, Rodriguez-Oroz MC, Aguilar M, Coria F, Pastor MA, Pastor P. Pooled-DNA target sequencing of Parkinson genes reveals novel phenotypic associations in Spanish population. *Neurobiol Aging*. 2018 Oct;70:325.e1-325.e5. doi: 10.1016/j.neurobiolaging.2018.05.008. Epub 2018 May 14. PMID: 29887346.

42: Ugras S, Daniels MJ, Fazelinia H, Gould NS, Yocum AK, Luk KC, Luna E, Ding H, McKennan C, Seeholzer S, Martinez D, Evans P, Brown D, Duda JE, Ischiropoulos H. Induction of the Immunoproteasome Subunit Lmp7 Links Proteostasis and Immunity in α -Synuclein Aggregation

- Disorders. *EBioMedicine*. 2018 May;31:307-319. doi: 10.1016/j.ebiom.2018.05.007. PMID: 29759483; PMCID: PMC6014061.
- 43: Kimiskidis VK, Papayiannopoulos S, Sotirakoglou K, Karakasis H, Katsarou Z, Kazis DA, Papaliagkas V, Gatzonis S, Papadimitriou A, Hadjigeorgiou G, Bostanjopoulou S. The cortical excitability profile of patients with the G209A SNCA mutation versus patients with sporadic Parkinson's disease: A transcranial magnetic stimulation study. *Neurophysiol Clin*. 2018 Sep;48(4):203-206. doi: 10.1016/j.neucli.2018.04.002. Epub 2018 May 3. PMID: 29729894.
- 44: Chelban V, Vichayanrat E, Schottlaende L, Iodice V, Houlden H. Autonomic dysfunction in genetic forms of synucleinopathies. *Mov Disord*. 2018 Mar;33(3):359-371. doi: 10.1002/mds.27343. PMID: 29508456.
- 45: Rui Q, Ni H, Li D, Gao R, Chen G. The Role of LRRK2 in Neurodegeneration of Parkinson's disease. *Curr Neuropharmacol*. 2018;16(9):1348-1357. doi: 10.2174/1570159x16666180222165418. PMID: 29473513; PMCID: PMC6251048.
- 46: Blauwendraat C, Kia DA, Pihlstrøm L, Gan-Or Z, Lesage S, Gibbs JR, Ding J, Alcalay RN, Hassin-Baer S, Pittman AM, Brooks J, Edsall C, Chung SJ, Goldwurm S, Toft M, Schulte C; International Parkinson's Disease Genomics Consortium (IPDGC), COURAGE-PD Consortium, Hernandez D, Singleton AB, Nalls MA, Brice A, Scholz SW, Wood NW. Insufficient evidence for pathogenicity of SNCA His50Gln (H50Q) in Parkinson's disease. *Neurobiol Aging*. 2018 Apr;64:159.e5-159.e8. doi: 10.1016/j.neurobiolaging.2017.12.012. Epub 2017 Dec 20. PMID: 29398121; PMCID: PMC5823280.
- 47: Li YX, Yu ZW, Jiang T, Shao LW, Liu Y, Li N, Wu YF, Zheng C, Wu XY, Zhang M, Zheng DF, Qi XL, Ding M, Zhang J, Chang Q. SNCA, a novel biomarker for Group 4 medulloblastomas, can inhibit tumor invasion and induce apoptosis. *Cancer Sci*. 2018 Apr;109(4):1263-1275. doi: 10.1111/cas.13515. Epub 2018 Feb 20. PMID: 29369502; PMCID: PMC5891175.
- 48: Guerreiro R, Ross OA, Kun-Rodrigues C, Hernandez DG, Orme T, Eicher JD, Shepherd CE, Parkkinen L, Darwent L, Heckman MG, Scholz SW, Troncoso JC, Pletnikova O, Ansorge O, Clarimon J, Lleo A, Morenas-Rodriguez E, Clark L, Honig LS, Marder K, Lemstra A, Rogaeva E, St George-Hyslop P, Londos E, Zetterberg H, Barber I, Braae A, Brown K, Morgan K, Troakes C, Al-Sarraj S, Lashley T, Holton J, Compta Y, Van Deerlin V, Serrano GE, Beach TG, Lesage S, Galasko D, Masliah E, Santana I, Pastor P, Diez-Fairen M, Aguilar M, Tienari PJ, Myllykangas L, Oinas M, Revesz T, Lees A, Boeve BF, Petersen RC, Ferman TJ, Escott-Price V, Graff-Radford N, Cairns NJ, Morris JC, Pickering-Brown S, Mann D, Halliday GM, Hardy J, Trojanowski JQ, Dickson DW, Singleton A, Stone DJ, Bras J. Investigating the genetic architecture of dementia with Lewy bodies: a two-stage genome-wide association study. *Lancet Neurol*. 2018 Jan;17(1):64-74. doi: 10.1016/S1474-4422(17)30400-3. Epub 2017 Dec 16. PMID: 29263008; PMCID: PMC5805394.
- 49: Minakaki G, Menges S, Kittel A, Emmanouilidou E, Schaeffner I, Barkovits K, Bergmann A, Rockenstein E, Adame A, Marxreiter F, Mollenhauer B, Galasko D, Buzás EI, Schlötzer-Schrehardt U, Marcus K, Xiang W, Lie DC, Vekrellis K, Masliah E, Winkler J, Klucken J. Autophagy inhibition promotes SNCA/alpha-synuclein release and transfer via extracellular vesicles with a hybrid autophagosome-exosome-like phenotype. *Autophagy*. 2018;14(1):98-119. doi: 10.1080/15548627.2017.1395992. Epub 2018 Jan 15. PMID: 29198173; PMCID: PMC5846507.
- 50: Phan JA, Stokholm K, Zareba-Paslawska J, Jakobsen S, Vang K, Gjedde A, Landau AM, Romero-Ramos M. Early synaptic dysfunction induced by α -synuclein in a rat model of Parkinson's disease. *Sci Rep*. 2017 Jul 25;7(1):6363. doi: 10.1038/s41598-017-06724-9. PMID: 28743955; PMCID: PMC5526979.

- 51: Raunio A, Myllykangas L, Kero M, Polvikoski T, Paetau A, Oinas M. Amygdala α -Synuclein Pathology in the Population-Based Vantaa 85+ Study. *J Alzheimers Dis.* 2017;58(3):669-674. doi: 10.3233/JAD-170104. PMID: 28482633; PMCID: PMC6218117.
- 52: Rochester L, Galna B, Lord S, Yarnall AJ, Morris R, Duncan G, Khoo TK, Mollenhauer B, Burn DJ. Decrease in A β 42 predicts dopa-resistant gait progression in early Parkinson's disease. *Neurology.* 2017 Apr 18;88(16):1501-1511. doi: 10.1212/WNL.0000000000003840. Epub 2017 Mar 22. Erratum in: *Neurology.* 2017 Jul 4;89(1):107. PMID: 28330963; PMCID: PMC5395075.
- 53: Szejder-Pacholek A, Joniec-Maciejak I, Wawer A, Ciesielska A, Mirowska-Guzel D. The effect of α -synuclein on gliosis and IL-1 α , TNF α , IFN γ , TGF β expression in murine brain. *Pharmacol Rep.* 2017 Apr;69(2):242-251. doi: 10.1016/j.pharep.2016.11.003. Epub 2016 Nov 9. PMID: 28126640.
- 54: Llorens F, Kruse N, Schmitz M, Gotzmann N, Golanska E, Thüne K, Zejneli O, Kanata E, Knipper T, Cramm M, Lange P, Zafar S, Sikorska B, Liberski PP, Mitrova E, Varges D, Schmidt C, Sklaviadis T, Mollenhauer B, Zerr I. Evaluation of α -synuclein as a novel cerebrospinal fluid biomarker in different forms of prion diseases. *Alzheimers Dement.* 2017 Jun;13(6):710-719. doi: 10.1016/j.jalz.2016.09.013. Epub 2016 Nov 18. PMID: 27870938.
- 55: Davila-Ortiz de Montellano DJ, Rodriguez-Violante M, Fresan A, Monroy-Jaramillo N, Yescas-Gomez P. Frecuencia de polimorfismos de nucleotido unico y haplotipos de alfa-sinucleina asociados con la enfermedad de Parkinson esporadica en poblacion mexicana [Frequency of single nucleotide polymorphisms and alpha-synuclein haplotypes associated with sporadic Parkinson's disease in the Mexican population]. *Rev Neurol.* 2016 Oct 16;63(8):345-350. Spanish. PMID: 27699750.
- 56: Chan DK, Braidy N, Xu YH, Chataway T, Guo F, Guillemin GJ, Teo C, Gai WP. Interference of α -Synuclein Uptake by Monomeric β -Amyloid1-40 and Potential Core Acting Site of the Interference. *Neurotox Res.* 2016 Oct;30(3):479-85. doi: 10.1007/s12640-016-9644-2. Epub 2016 Jun 30. PMID: 27364697.
- 57: Weiss D, Herrmann S, Wang L, Schulte C, Brockmann K, Plewnia C, Gasser T, Sharma M, Gharabaghi A, Krüger R. Alpha-synuclein gene variants may predict neurostimulation outcome. *Mov Disord.* 2016 Apr;31(4):601-3. doi: 10.1002/mds.26558. Epub 2016 Feb 16. PMID: 26880248.
- 58: Kiely AP, Ling H, Asi YT, Kara E, Proukakis C, Schapira AH, Morris HR, Roberts HC, Lubbe S, Limousin P, Lewis PA, Lees AJ, Quinn N, Hardy J, Love S, Revesz T, Houlden H, Holton JL. Distinct clinical and neuropathological features of G51D SNCA mutation cases compared with SNCA duplication and H50Q mutation. *Mol Neurodegener.* 2015 Aug 27;10:41. doi: 10.1186/s13024-015-0038-3. PMID: 26306801; PMCID: PMC4549856.
- 59: Gan-Or Z, Dion PA, Rouleau GA. Genetic perspective on the role of the autophagy-lysosome pathway in Parkinson's disease. *Autophagy.* 2015;11(9):1443-57. doi: 10.1080/15548627.2015.1067364. PMID: 26207393; PMCID: PMC4590678.
- 60: Fu RH, Wang YC, Chen CS, Tsai RT, Liu SP, Chang WL, Lin HL, Lu CH, Wei JR, Wang ZW, Shyu WC, Lin SZ. Acetylcholine attenuates dopaminergic neuron degeneration and α -synuclein aggregation in animal models of Parkinson's disease. *Neuropharmacology.* 2014 Jul;82:108-20. doi: 10.1016/j.neuropharm.2013.08.007. Epub 2013 Aug 21. PMID: 23973292.
- 61: Rey NL, Petit GH, Bousset L, Melki R, Brundin P. Transfer of human α -synuclein from the olfactory bulb to interconnected brain regions in mice. *Acta Neuropathol.* 2013 Oct;126(4):555-73. doi: 10.1007/s00401-013-1160-3. Epub 2013 Aug 8. PMID: 23925565; PMCID: PMC3789892.

- 62: Tijero B, Gómez-Esteban JC, Lezcano E, Fernández-González C, Somme J, Llorens V, Martínez A, Ruiz-Martínez J, Foncela N, Escalza I, Berganzo K, Aniel- Quiroga MA, Ruiz V, Terán N, Kaufmann H, Zarranz JJ. Cardiac sympathetic denervation in symptomatic and asymptomatic carriers of the E46K mutation in the α synuclein gene. *Parkinsonism Relat Disord*. 2013 Jan;19(1):95-100. doi: 10.1016/j.parkreldis.2012.08.001. Epub 2012 Sep 19. PMID: 23000061.
- 63: Houlden H, Singleton AB. The genetics and neuropathology of Parkinson's disease. *Acta Neuropathol*. 2012 Sep;124(3):325-38. doi: 10.1007/s00401-012-1013-5. Epub 2012 Jul 18. PMID: 22806825; PMCID: PMC3589971.
- 64: Antonini A, Pilleri M, Padoan A, Landi A, Ferla S, Biundo R, D'Avella D. Successful subthalamic stimulation in genetic Parkinson's disease caused by duplication of the α -synuclein gene. *J Neurol*. 2012 Jan;259(1):165-7. doi: 10.1007/s00415-011-6162-2. Epub 2011 Jul 15. PMID: 21761143.
- 65: Tijero B, Gomez-Esteban JC, Llorens V, Lezcano E, Gonzalez-Fernández MC, de Pancorbo MM, Ruiz-Martinez J, Cembellin JC, Zarranz JJ. Cardiac sympathetic denervation precedes nigrostriatal loss in the E46K mutation of the alpha- synuclein gene (SNCA). *Clin Auton Res*. 2010 Aug;20(4):267-9. doi: 10.1007/s10286-010-0068-4. Epub 2010 May 5. PMID: 20443127.
- 66: Orimo S, Uchiyama T, Nakamura A, Mori F, Ikeuchi T, Onodera O, Nishizawa M, Ishikawa A, Kakita A, Wakabayashi K, Takahashi H. Cardiac sympathetic denervation in Parkinson's disease linked to SNCA duplication. *Acta Neuropathol*. 2008 Nov;116(5):575-7. doi: 10.1007/s00401-008-0428-5. Epub 2008 Aug 28. PMID: 18751989.
- 67: Wood-Kaczmar A, Gandhi S, Wood NW. Understanding the molecular causes of Parkinson's disease. *Trends Mol Med*. 2006 Nov;12(11):521-8. doi: 10.1016/j.molmed.2006.09.007. Epub 2006 Oct 5. PMID: 17027339.
- 68: Quilty MC, Gai WP, Pountney DL, West AK, Vickers JC. Localization of alpha-, beta-, and gamma-synuclein during neuronal development and alterations associated with the neuronal response to axonal trauma. *Exp Neurol*. 2003 Jul;182(1):195-207. doi: 10.1016/s0014-4886(03)00108-0. PMID: 12821390.
- 69: Moran LB, Kösel S, Spitzer C, Schwaiger FW, Riess O, Kreutzberg GW, Graeber MB. Expression of alpha-synuclein in non-apoptotic, slowly degenerating facial motoneurons. *J Neurocytol*. 2001 Jun;30(6):515-21. doi: 10.1023/a:1015697318437. PMID: 12037467.
- 70: Jensen PH, Li JY, Dahlström A, Dotti CG. Axonal transport of synucleins is mediated by all rate components. *Eur J Neurosci*. 1999 Oct;11(10):3369-76. doi: 10.1046/j.1460-9568.1999.00754.x. PMID: 10564344.
- 1)
- Loesch DP, Horimoto ARVR, Heilbron K, Sarihan EI, Inca-Martinez M, Mason E, Cornejo-Olivas M, Torres L, Mazzetti P, Cosentino C, Sarapura-Castro E, Rivera-Valdivia A, Medina AC, Dieguez E, Raggio V, Lescano A, Tumas V, Borges V, Ferraz HB, Rieder CR, Schumacher-Schuh A, Santos-Lobato BL, Velez-Pardo C, Jimenez-Del-Rio M, Lopera F, Moreno S, Chana-Cuevas P, Fernandez W, Arboleda G, Arboleda H, Arboleda-Bustos CE, Yearout D, Zabetian CP; 23andMe Research Team, Cannon P, Thornton TA, O'Connor TD, Mata IF; Latin American Research Consortium on the Genetics of Parkinson's Disease (LARGE-PD). Characterizing the Genetic Architecture of Parkinson's Disease in Latinos. *Ann Neurol*. 2021 Jul 6. doi: 10.1002/ana.26153. Epub ahead of print. PMID: 34227697.

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