Stanford



Maria Inmaculada Cobos Sillero

Associate Professor of Pathology

CLINICAL OFFICE (PRIMARY)

- **Pathology Department**

  300 Pasteur Dr R241

  MC 5324

  Stanford, CA 94305

  Tel (650) 725-8200 **Fax** (650) 498-5394

Bio

BIO

Inma Cobos is a physician-scientist and neuropathologist with expertise in neurodegeneration. She earned her MD and PhD from the University of Murcia in Spain and completed postdoctoral training in developmental neurobiology at the University of California, San Francisco. She then pursued a clinical residency and a fellowship in anatomic pathology and neuropathology at Massachusetts General Hospital, Harvard Medical School. Before joining Stanford, she was an assistant professor in the Department of Pathology and Neuropathology at the UCLA David Geffen School of Medicine. Her research program integrates diagnostic neuropathology with developmental neuroscience and state-of-the-art cellular and molecular technologies to advance understanding of Alzheimer's disease and related dementias. Her lab applies single-cell approaches to human brain tissue to dissect the contributions of distinct cell types to Alzheimer's disease pathogenesis and to investigate the mechanisms of tau-mediated neurodegeneration in the human brain.

CLINICAL FOCUS

- Neuropathology
- Anatomic and Clinical Pathology

ACADEMIC APPOINTMENTS

- Associate Prof-Univ Med Line, Pathology
- Member, Bio-X
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- Ben Barres Early Career Acceleration Award, Chan Zuckerberg Initiative (2018)
- Research Career Development Award, Stop Cancer (2016)
- NAAR Postdoctoral Fellowship, National Alliance for Autism Research/Autism Speaks (2004–2006)
- NARSAD Young Investigator Award, National Alliance for Research on Schizophrenia and Depression (2003–2005)

- Postdoctoral Fellowship, Spanish Ministry of Education and Science (2001-2003)
- Doctoral Extraordinary Prize, University of Murcia, Spain (2001)
- Neuroscience Master's Student Fellowship, International University of Andalusia, Spain (1997)
- Predoctoral Fellowship, Government of Murcia, Spain (1996–2000)

PROFESSIONAL EDUCATION

- Board Certification: Neuropathology, American Board of Pathology (2015)
- Board Certification: Anatomic Pathology, American Board of Pathology (2015)
- Fellowship: Massachusetts General Hospital Dept of Pathology (2015) MA
- Residency: Massachusetts General Hospital Dept of Pathology (2013) MA
- PhD, University of Murcia School of Medicine, Spain (2000)
- Medical Education: University of Murcia School of Medicine (1996) Spain

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our lab uses cellular and molecular methods, single-cell technology, and quantitative histology to study human neurodegenerative diseases. Current projects include:

- Using single-cell RNA-sequencing to understand selective vulnerability and disease progression in human Alzheimer's disease brain

- Investigating mechanisms of tau-related neurodegeneration in human brain

- Studying the neocortical and limbic systems in Diffuse Lewy Body Disease (DLBD) at the single cell level

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Jaume Fores Martos, Jie Pan, Dongkeun Park, Akilaparvathydharshini Sankaraeswaran, Jorge Sanz Ros

Publications

PUBLICATIONS

- **Molecular signatures of resilience to Alzheimer's disease in neocortical layer 4 neurons.** *Nature communications*
  Dharshini, S. A., Sanz-Ros, J., Pan, J., Tang, W., Vallejo, K., Liu, Y. C., Otero-Garcia, M., Cobos, I.
  2026
- **Molecular signatures underlying neurofibrillary tangle susceptibility in Alzheimer's disease.** *Neuron*
  Otero-Garcia, M., Mahajani, S. U., Wakhloo, D., Tang, W., Xue, Y., Morabito, S., Pan, J., Oberhauser, J., Madira, A. E., Shakouri, T., Deng, Y., Allison, T., He, et al
  2022
- **Mice lacking Dlx1 show subtype-specific loss of interneurons, reduced inhibition and epilepsy.** *Nature neuroscience*
  Cobos, I., Calcagnotto, M. E., Vilaythong, A. J., Thwin, M. T., Noebels, J. L., Baraban, S. C., Rubenstein, J. L.
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- **Origins of cortical interneuron subtypes.** *The Journal of neuroscience : the official journal of the Society for Neuroscience*
  Xu, Q., Cobos, I., De La Cruz, E., Rubenstein, J. L., Anderson, S. A.
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- **Correction to: Deciphering glial contributions to CSF1R-related disorder via single-nuclear transcriptomic profiling: a case study.** *Acta neuropathologica communications*
  Pan, J., Fores-Martos, J., Nouh, C. D., Jensen, T. D., Vallejo, K., Cayrol, R., Ahmadian, S., Ashley, E. A., Greicius, M. D., Cobos, I.
  2026; 14 (1)

- **Somatic mutations reveal the ontogeny of microglia in human ageing.** *Nature*
  Belk, J. A., Zhang, Y., Reilly, E. E., Shi, Q., Liu, D. D., Womack-Gambrel, N., van der Linde, M., Ma, L., Paul, D., Enciso, A. M., Kalluru, R., Weiss, J., Li, et al
  2026

- **Therapeutic targeting of fibrin-microglia interactions ameliorates Alzheimer's disease-related hyperexcitability and brain network dysfunction.** *bioRxiv : the preprint server for biology*
  Lauderdale, K., Yan, Z., Mendiola, A. S., Zhang, Y., Mallen, D., Nambiar, P., Brady, E., Miller, S. R., Acevedo, R. M., Cabriga, B., Jiang, F., Kaliss, N., Shen, et al
  2026

- **Characterizing ferrous versus ferric iron in Alzheimer's disease using X-ray fluorescence imaging and XANES spectroscopy.** *Journal of Alzheimer's disease : JAD*
  Tran, D., Georgiadis, M., DiGiacomo, P., Nirschl, J., Cobos, I., Rosenberg, J., Edwards, N., Bone, S., Webb, S., Zeineh, M.
  2026: 13872877261435561

- **APOE4-Aβ synergy drives brain network dysfunction and neuronal lysosomal-ER proteostasis dysregulation a preclinical Alzheimer's disease model.** *bioRxiv : the preprint server for biology*
  Shin, J., Brady, E., Chen, C., Lauderdale, K., Agrawal, A., Zhang, Y., Jiang, X., Nambiar, P., Herbert, J., Mallen, D. D., Ly, K. K., Honma, P. S., Guo, et al
  2025

- **Celebrating neuropathology's contributions to Alzheimer's Disease Research Centers.** *Alzheimer's & dementia : the journal of the Alzheimer's Association*
  Fischer, D. L., Grinberg, L. T., Ahrendsen, J. T., Beach, T. G., Bieniek, K. F., Castellani, R. J., Chkheidze, R., Cobos, I., Cohen, M., Crary, J. F., Dickson, D. W., Dugger, B. N., Dunlop, et al
  2025; 21 (10): e70734

- **Precise MRI-histology coregistration of paraffin-embedded tissue with blockface imaging.** *Imaging neuroscience (Cambridge, Mass.)*
  Wang, Y., Ho, W., Huszar, I. N., DiGiacomo, P., Taghavi, H. M., Tao, L., Choi, M., Nguyen, N., Leventis, S., Camarillo, D. B., Schlömer, P., Axer, M., Shao, et al
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- **Precise MRI-Histology Coregistration of Paraffin-Embedded Tissue with Blockface Imaging.** *bioRxiv : the preprint server for biology*
  Wang, Y., Ho, W., Huszar, I. N., DiGiacomo, P., Taghavi, H. M., Tao, L., Choi, M., Nguyen, N., Leventis, S., Camarillo, D. B., Schlomer, P., Axer, M., Wei, et al
  2025

- **Basic Science and Pathogenesis.** *Alzheimer's & dementia : the journal of the Alzheimer's Association*
  Talozzi, L., Peña-Tauber, A., Jensen, T. D., Wilson, E. N., Young, C. B., Stewart, I., Cobos, I., Vallejo, K., Hefti, M. M., Guen, Y. L., Williams, K., Vossler, H., Gorzynski, et al
  2024; 20 Suppl 1: e090996

- **Alzheimer's Imaging Consortium.** *Alzheimer's & dementia : the journal of the Alzheimer's Association*
  Talozzi, L., Peña-Tauber, A., Jensen, T. D., Wilson, E. N., Young, C. B., Stewart, I., Cobos, I., Vallejo, K., Hefti, M. M., Guen, Y. L., Williams, K., Vossler, H., Gorzynski, et al
  2024; 20 Suppl 9: e093931

- **Molecular Signatures of Resilience to Alzheimer's Disease in Neocortical Layer 4 Neurons.** *bioRxiv : the preprint server for biology*
  Dharshini, S. A., Sanz-Ros, J., Pan, J., Tang, W., Vallejo, K., Otero-Garcia, M., Cobos, I.
  2024

- **Majority voting of doctors improves appropriateness of AI reliance in pathology** *INTERNATIONAL JOURNAL OF HUMAN-COMPUTER STUDIES*
  Gu, H., Yang, C., Magaki, S., Zarrin-Khameh, N., Lakis, N. S., Cobos, I., Khanlou, N., Zhang, X. R., Assi, J., Byers, J. T., Hamza, A., Han, K., Meyer, et al
  2024; 190

- **Deciphering glial contributions to CSF1R-related disorder via single-nuclear transcriptomic profiling: a case study.** *Acta neuropathologica communications*
  Pan, J., Fores-Martos, J., Delpirou Nouh, C., Jensen, T. D., Vallejo, K., Cayrol, R., Ahmadian, S., Ashley, E. A., Greicius, M. D., Cobos, I.
  2024; 12 (1): 139

- **Endoscopic Endonasal Resection of a Thyroid-Stimulating Hormone-Secreting Pituitary Adenoma With Invasion of the Medial Wall of the Cavernous Sinus.** *Operative neurosurgery (Hagerstown, Md.)*
  Ljubimov, V. A., Rychen, J., Lee, C. K., Cobos Sillero, M. I., Xu, Y., Fernandez-Miranda, J. C.
  2024

- **Enhancing mitosis quantification and detection in meningiomas with computational digital pathology.** *Acta neuropathologica communications*
  Gu, H., Yang, C., Al-Kharouf, I., Magaki, S., Lakis, N., Williams, C. K., Alrosan, S. M., Onstott, E. K., Yan, W., Khanlou, N., Cobos, I., Zhang, X. R., Zarrin-Khameh, et al
  2024; 12 (1): 7

- **Nuclear RNA catabolism controls endogenous retroviruses, gene expression asymmetry, and dedifferentiation.** *Molecular cell*
  Torre, D., Fstkchyan, Y. S., Ho, J. S., Cheon, Y., Patel, R. S., Degrace, E. J., Mzoughi, S., Schwarz, M., Mohammed, K., Seo, J. S., Romero-Bueno, R., Demircioglu, D., Hasson, et al
  2023

- **Lifelong restructuring of 3D genome architecture in cerebellar granule cells.** *Science (New York, N.Y.)*
  Tan, L., Shi, J., Moghadami, S., Parasar, B., Wright, C. P., Seo, Y., Vallejo, K., Cobos, I., Duncan, L., Chen, R., Deisseroth, K.
  2023; 381 (6662): 1112-1119

- **Deregulation of ER-mitochondria contact formation and mitochondrial calcium homeostasis mediated by VDAC in fragile X syndrome.** *Developmental cell*
  Geng, J., Khaket, T. P., Pan, J., Li, W., Zhang, Y., Ping, Y., Cobos Sillero, M. I., Lu, B.
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- **Sex-Specific Oligodendroglia Response in Alzheimer's Disease**
  Bharani, K., Dharshini, A., Oberhauser, J., Cobos, I.
  ELSEVIER SCIENCE INC.2023: S1459

- **Cerebellar Granule Cells Develop Non-neuronal 3D Genome Architecture over the Lifespan.** *bioRxiv : the preprint server for biology*
  Tan, L., Shi, J., Moghadami, S., Wright, C. P., Parasar, B., Seo, Y., Vallejo, K., Cobos, I., Duncan, L., Chen, R., Deisseroth, K.
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- **Swollen axons impair neuronal circuits** *NATURE*
  Cobos, I., Palop, J. J.
  2022; 612 (7939): 218-220

- **Swollen axons impair neuronal circuits** *NATURE*
  Cobos, I., Palop, J. J. J.
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- **Divergent Cortical Tau Positron Emission Tomography Patterns Among Patients With Preclinical Alzheimer Disease.** *JAMA neurology*
  Young, C. B., Winer, J. R., Younes, K., Cody, K. A., Betthauser, T. J., Johnson, S. C., Schultz, A., Sperling, R. A., Greicius, M. D., Cobos, I., Poston, K. L., Mormino, E. C., Alzheimers Disease Neuroimaging Initiative and the Harvard Aging Brain Study, et al
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- **Whole-Transcriptome Profiling and circRNA-miRNA-mRNA Regulatory Networks in B-Cell Development.** *Frontiers in immunology*
  Pan, J., Hu, S., Ren, X., Hu, H., Deng, X., Yu, B., Cobos, I., Chen, X., Zhang, W.
  2022; 13: 812924

- **Human Astrocytes Exhibit Tumor Microenvironment-, Age-, and Sex-Related Transcriptomic Signatures.** *The Journal of neuroscience : the official journal of the Society for Neuroscience*
  Krawczyk, M. C., Haney, J. R., Pan, L., Caneda, C., Khankan, R. R., Reyes, S. D., Chang, J. W., Morselli, M., Vinters, H. V., Wang, A. C., Cobos, I., Gandal, M. J., Bergsneider, et al
  1800
- **Dysregulation of brain and choroid plexus cell types in severe COVID-19 (vol 595, pg 565, 2021)** *NATURE*
  Yang, A. C., Kern, F., Losada, P. M., Agam, M. R., Maat, C. A., Schmartz, G. P., Fehlmann, T., Stein, J. A., Schaum, N., Lee, D. P., Calcuttawala, K., Vest, R. T., Berdnik, et al
  2021
- **Defining the nature of human pluripotent stem cell-derived interneurons via single-cell analysis.** *Stem cell reports*
  Allison, T., Langerman, J., Sabri, S., Otero-Garcia, M., Lund, A., Huang, J., Wei, X., Samarasinghe, R. A., Polioudakis, D., Mody, I., Cobos, I., Novitch, B. G., Geschwind, et al
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- **Dysregulation of brain and choroid plexus cell types in severe COVID-19.** *Nature*
  Yang, A. C., Kern, F., Losada, P. M., Agam, M. R., Maat, C. A., Schmartz, G. P., Fehlmann, T., Stein, J. A., Schaum, N., Lee, D. P., Calcuttawala, K., Vest, R. T., Berdnik, et al
  2021
- **Genome-wide association study and functional validation implicates JADE1 in tauopathy.** *Acta neuropathologica*
  Farrell, K., Kim, S., Han, N., Iida, M. A., Gonzalez, E. M., Otero-Garcia, M., Walker, J. M., Richardson, T. E., Renton, A. E., Andrews, S. J., Fulton-Howard, B., Humphrey, J., Vialle, et al
  2021
- **The CD22-IGF2R interaction is a therapeutic target for microglial lysosome dysfunction in Niemann-Pick type C.** *Science translational medicine*
  Pluvinage, J. V., Sun, J., Claes, C., Flynn, R. A., Haney, M. S., Iram, T., Meng, X., Lindemann, R., Riley, N. M., Danhash, E., Chadarevian, J. P., Tapp, E., Gate, et al
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- **Hepatic arginase deficiency fosters dysmyelination during postnatal CNS development.** *JCI insight*
  Liu, X., Haney, J. R., Cantero, G., Lambert, J. R., Otero-Garcia, M., Truong, B., Gropman, A., Cobos, I., Cederbaum, S. D., Lipshutz, G. S.
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  Pla, R., Stanco, A., Howard, M. A., Rubin, A. N., Vogt, D., Mortimer, N., Cobos, I., Potter, G. B., Lindtner, S., Price, J. D., Nord, A. S., Visel, A., Schreiner, et al
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- **Nav1.1-Overexpressing Interneuron Transplants Restore Brain Rhythms and Cognition in a Mouse Model of Alzheimer's Disease.** *Neuron*
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  2018; 98 (1): 75-89.e5
- **GABAergic Interneuron Differentiation in the Basal Forebrain Is Mediated through Direct Regulation of Glutamic Acid Decarboxylase Isoforms by Dlx Homeobox Transcription Factors.** *The Journal of neuroscience : the official journal of the Society for Neuroscience*
  Le, T. N., Zhou, Q. P., Cobos, I., Zhang, S., Zagozewski, J., Japoni, S., Vriend, J., Parkinson, T., Du, G., Rubenstein, J. L., Eisenstat, D. D.
  2017; 37 (36): 8816-8829
- **A 63-Year-Old Man With Progressive Visual Symptoms.** *JAMA neurology*
  Mitchell, S. B., Lucente, D., Larvie, M., Cobos, M. I., Frosch, M., Dickerson, B. C.
  2017; 74 (1): 114-118
- **CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL. Case 23-2015. A 51-Year-Old Woman with Headache, Cognitive Impairment, and Weakness.** *The New England journal of medicine*
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Cobos, I., Seeley, W. W.
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- **Inhibitory interneuron deficit links altered network activity and cognitive dysfunction in Alzheimer model.** *Cell*
  Verret, L., Mann, E. O., Hang, G. B., Barth, A. M., Cobos, I., Ho, K., Devidze, N., Masliah, E., Kreitzer, A. C., Mody, I., Mucke, L., Palop, J. J.
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  Palop, J. J., Roberson, E. D., Cobos, I.
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  Long, J. E., Cobos, I., Potter, G. B., Rubenstein, J. L.
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- **Dlx1&2 and Mash1 transcription factors control striatal patterning and differentiation through parallel and overlapping pathways.** *The Journal of comparative neurology*
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  2008; 3: 17
- **Transcriptional regulation of cortical interneuron development.** *The Journal of neuroscience : the official journal of the Society for Neuroscience*
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  Cobos, I., Borello, U., Rubenstein, J. L. R.
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- **Chicken lateral septal organ and other circumventricular organs form in a striatal subdomain abutting the molecular striatopallidal border.** *The Journal of comparative neurology*
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