

EMMANUEL BROUILLET

60 year-old, married, 3 children, Research Director, DR1 CNRS

CONTACT

Lab Address: Brain-C Lab, Christian Neri's team, B2A, Institut de Biologie Paris-Seine, 9 quai St-Bernard, 75005, Paris, France

Tel +33 6 89 92 31 56 ; Email emmanuel.brouillet@cnrs.fr

<https://www.ibps.sorbonne-universite.fr/fr/Recherche/umr-8256/brainc>

EDUCATION

- 2001** "Habilitation à Diriger des Recherches" (Paris-Sud Univ., 13 juin 2001)
- 1995** National Degree in animal experimentation and surgery
- 1991** Ph.D. in Neuropharmacology (B. Rossignol, Paris-Sud Univ.)
- 1984** Master in Biochemistry and molecular biology

EMPLOYMENT HISTORY in RESEARCH

- 2021 -** Head, Europe & International Affairs, National Institute of Biological Sciences, CNRS, Paris
- 2021 -** Researcher, Brain_C Lab, Institute of Biology Paris-Seine (IBPS), Paris
- 2010-2021** Head, Neurodegenerative Disease Lab, (URA CEA-CNRS- Univ Paris-Saclay UMR9199)
- 1993-96** Class 2 Research Scientist at CNRS, PET imaging Centre, CEA, Orsay, France
- 1991-93** Post-doctoral fellowship at Harvard Medical School, Boston:
 - ✓ Department of Neurology (Pr M.F Beal), Mass. General Hospital
 - ✓ NMR Group (Dr B. Rosen), Mass. General Hospital-East
 - ✓ Consultant in Neurochemistry at ESA Inc. (Dr W. Matson), Bedford
- 1986-91** Ph.D. at Service Hospitalier Frédéric Joliot (Pr A. Syrota), PET imaging Centre, CEA, Orsay

MEMBERSHIPS-SOCIETIES

- Society for Neuroscience (USA)
- Société des Neurosciences (Paris)
- Réseau Huntington France
- European Huntington Disease Network

STUDENT / YOUNG RESEARCHERS SUPERVISING

- Fanny Lebourg, 50%, MESRI, 2018-2021
- Jean-Baptiste Perrot, 50%- Univ Paris-Saclay, eRARE-ERA-NET TreatPolyQ, 2018-2021
- Francesco Gubinelli, 100% PhD thesis, Univ Paris-Saclay, ITN Marie S. Curie, "BrainMatTrain", 2016-2019
- Lucie de Longprez, 100% PhD thesis, Univ Paris-Saclay, FRM/Pomaret award, 2015-2018

TEACHING (recent)

- Responsible for teaching course "Neuroscience Clinique et NeuroImagerie", Master 2, Biologie et Santé, Paris XI (Pr. Hervé Daniel), 2 "unités d'enseignement" 2x25h, 2015-2020

EVALUATION/EXPERTISE

- ✓ PhD Committees
Isaac Adanyeguh (UPMC, 2017); Jaime Fuentealba (UPMC, 2017); Valentin Prevost (Aix-Marseille Univ, 2018); Jérémy Pépin (Paris-Saclay Univ 2017); Amandine Virlogeux (GIN, Univ Grenoble 2018); Valentin Prévost (CRMBM, AMU, 2018); Fiona Bonello (ICM, Paris-Sorbonne, 2018); Matthieu Drouyer (JPARC, Univ Lille, 2018), Radhia Kacher (Paris-Sorbonne 2019), Silvia Cabre (NUI Galway 2019), Emeline Hamon (Paris-Sorbonne 2020), Camille Godreuil-Ravel (Paris-Sorbonne 2021), Ouda Nebie (Internationa PhD Lille University- Santé (ED446) and Taipei Medical University, College of Biomedical Engineering)
- ✓ HDR Committees
Magali Dumont (ICM, 2017), Françoise Piguet (Paris-Saclay, 2018), Alexandra Benchoua (Univ Evry, 2019), François Mouton-Liger (Univ Paris Sorbonne, 2020), Marion Szelechowski (Université Paul Sabatier - Toulouse III, 2020)
- ✓ Grant reviewing : 2017-2022
ANR ; Leuven Univ Concerted Action 2017; FNRS (Belgium) 2017; Parkinson UK; NS&E Research Council of Canada; Research Foundation Flanders (FWO); Katholieke Universiteit Leuven, Concerted Action and Various Research grants; European Science Foundation / Axa Research grants; FNRS (Belgium) 2017; OSR Saudi Arabia (KAUST action); NS&E Research Council of Canada, University of Laval; Russian Academy of Science – Mega Grant, 2020. European Science Foundation, 2021; DBT Wellcome trust IndiaAlliance

- ✓ Scientific Boards:
 - Scientific Board, UFR Science, Univ. Paris-Sorbonne, 2020
 - CNRS committee, Section 28 CNRS 2016-2020
 - Board of Supervisor, “BrainMatTrain”, “New therapies for PD”, Marie Curie EU grant, 2016-2020
 - Association Huntington France (2012-)
 - NeurATRIS, « Infrastructure Biologie-Santé », WP3 leader (Brain Imaging) (2012-2021)
 - Association France Parkinson (2012-2018)
 - C.A. Société des Neurosciences Française (2015-2018)
- ✓ Laboratory/Research Scientist evaluations and recruitments:
 - ANR CE17 Translational Research Panel”, 2019-2021
 - HCERES Lab evaluations, committee member 2016-2020, Chairman, 2021
 - Lille university, Professor Recruitment committee, 2020
 - Toulouse University, Assistant Professor Recruitment committee, 2020
 - John Hopkins, Evaluation for Associate Professor Candidates 2018
- ✓ Manuscript reviewing: Nature, Journal of Cell Biology, Cell Death and Differentiation, P.N.A.S., Brain, Neurobiol. Disease, Aging Cell, Journal of Neuroscience, Neurobiol. Aging, Movement Disorder, Frontiers in Molecular Neurobiology, International Journal of Molecular sciences, European Journal of Neuroscience; Journal of Neurochemistry, BMC Neuroscience; Huntington’s Disease Journal.

CURRENT / RECENT GRANTS

- ✓ ANR “HD-EPINERGY”, *Linking energy metabolism to chromatin in Huntington’s disease*, Partner, Coordinator: Karine Merienne, LNA Strasbourg), (182,000€) 2022-2025
- ✓ NeurATRIS - Infrastructure Biologie-Santé incitative funds, “Brain Imaging knockin mouse model of HD”, Sandrine Humbert, P.I., (28,000€) 2019
- ✓ ANR “EpiHD” Epigenetics in Huntington’s disease. Partner, (Coordinator Karine Merienne, LNA Strasbourg), (250,000€) 2018
- ✓ ERA-net eRARE H2020, “TreatPolyQ”: *Allele-specific lowering of mutant polyQ proteins as treatment for Huntington disease, spinocerebellar ataxia type 3 and spinocerebellar ataxia type 7*. Partner (coordinator: Hoa HP Nguyen, Ruhr Univ, Bochum, Germany), Maciej Figiel (Institute of Bioinorganic chemistry PAS, Poznan, Poland), Michael Hayden (British Columbia Univ, Vancouver, Canada), Nicole Déglon (Lausanne Univ Hospital, Lausanne, Switzerland), and Yvon Trottier (IGBMC, Illkirch, France). 250,000€, 2018-2021
- ✓ H2020 Marie S. Curie EU (ITN) grant, “BrainMatTrain” project, supervisor ESR10 and Leader of WP3 (243,000€), 2015-2020
- ✓ Association France Parkinson, “Potential synergy between LRRK2 G2019S mutation and alpha-synuclein in vivo (PhD extension grant) (15,000€) 2017.
- ✓ ANR “HDeNERGY”, “Validation of molecular neuroimaging biomarkers in Huntington’s disease in view of therapeutic trials targeting the Krebs cycle”. Coordinator, (ANR, 320,000€ -preclinic; DGOS, 400,000€ - clinic). 2015-2017

PUBLICATIONS

2017-2022 publications (among ~157) see orcid.org/0000-0001-6322-7403

Peer-reviewed research articles

1. Pérot JB, Célestine M, Palombo M, Dhenain M, Humbert S, Brouillet E, Flament F. Identification of the key role of white matter alteration in the pathogenesis of Huntington’s Disease, *Human Molecular Genetics*, 2022, doi: 10.1093/hmg/ddac036. Online ahead of print.
2. Abjean L, Ben Haim L, Riquelme-Perez M, Gipchtein P, Derbois C, Palomares MA, Petit F, Hérard AS, Gaillard MC, Guillemier M, Gaudin-Guérif M, Sagar N, Dufour N, Robil N, Kabani M, Melki R, De la Grange P, Bemelmans AP, Bonvento G, Deleuze JF, Hantraye P, Bonnet E, Brohard S, Olaso R, Brouillet E, Carrillo-de Sauvage MA, Escartin C. The JAK2-STAT3 pathway controls a beneficial proteostasis response of reactive astrocytes in Huntington’s disease. *Brain*, 2022, doi: <https://doi.org/10.1101/2021.04.29.441924> . Online ahead of print.
3. Cresto N, Gardier C, Gaillard MC, Gubinelli F, Roost P, Molina D, Josephine C, Dufour N, Auregan G, Guillemier M, Bernier S, Jan C, Gipchtein P, Hantraye P, Chartier-Harlin MC, Bonvento G, Van Camp N, Taymans JM, Cambon K, Liot G, Bemelmans A.L. and Brouillet E. The C-terminal domain of LRRK2 with the G2019S substitution increases mutant A53T α -synuclein toxicity in dopaminergic neurons in vivo. *Int J. Mol. Sci.* 2021, 22(13):6760. doi: 10.3390/ijms22136760. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8268201/pdf/ijms-22-06760.pdf>

4. Wiatr K., Marczak L., Perot J-B., [Brouillet E.](#), Flament J., and Figiel M. Broad influence of mutant ataxin-3 on the proteome of the adult brain, young neurons, and axons reveals central molecular processes and biomarkers in SCA3/MJD using knock-in mouse model. *Front. Mol. Neurosci.* (2021) doi: 10.3389/fnmol.2021.658339
5. Vautheny A, Duwat C, Aurégan G, Joséphine C, Hérard AS, Jan C, Mitja J, Gipchtein P, Gaillard MC, Buée L, Blum D, Hantraye P, Bonvento G, Brouillet E, Cambon K, Bemelmans AP. THY-Tau22 mouse model accumulates more tauopathy at late stage of the disease in response to microglia deactivation through TREM2 deficiency. *Neurobiol Dis.* 2021, 155:105398. doi: 10.1016/j.nbd.2021.105398
6. Niewiadomska-Cimicka A, Doussau F, Perot JB, Roux MJ, Keime C, Hache A, Piguet F, Novati A, Weber C, Yalcin B, Meziane H, Champy MF, Grandgirard E, Karam A, Messaddeq N, Eisenmann A, [Brouillet E.](#), Nguyen HHP, Flament J, Isope P, Trottier Y. SCA7 Mouse Cerebellar Pathology Reveals Preferential Downregulation of Key Purkinje Cell-Identity Genes and Shared Disease Signature with SCA1 and SCA2. *J Neurosci.* 2021, 41(22):4910-4936. doi: 10.1523/JNEUROSCI.1882-20.2021.
7. Rebelo AL, Gubinelli F, Roost P, Jan C, Brouillet E, Van Camp N, Drake RR, Saldova R, Pandit A. Complete spatial characterisation of N-glycosylation upon striatal neuroinflammation in the rodent brain. *J Neuroinflammation.* 2021, 18(1):116. doi: 10.1186/s12974-021-02163-6.
8. Maté de Gérando A, d'Orange M, Augustin E, Joséphine C, Aurégan G, Gaudin-Guérif M, Guillermier M, Hérard AS, Stimmer L, Petit F, Gipchtein P, Jan C, Escartin C, Selingue E, Carvalho K, Blum D, [Brouillet E.](#), Hantraye P, Gaillard MC, Bonvento G, Bemelmans AP, Cambon K. Neuronal tau species transfer to astrocytes and induce their loss according to tau aggregation state. *Brain.* 2021, 144(4):1167-1182. doi: 10.1093/brain/awab011.
9. Pépin J, de Longprez L, Trovero F, [Brouillet E.](#), Valette J, Flament J. Complementarity of gluCEST and 1 H-MRS for the study of mouse models of Huntington's disease. *NMR Biomed.* 2020, 33(7):e4301. doi: 10.1002/nbm.4301.
10. Le Douce J, Maugard M, Veran J, Matos M, Jégo P, Vigneron PA, Faivre E, Toussay X, Vandenberghe M, Balbastre Y, Piquet J, Guiot E, Tran NT, Taverna M, Marinesco S, Koyanagi A, Furuya S, Gaudin-Guérif M, Goutal S, Ghetas A, Pruvost A, Bemelmans AP, Gaillard MC, Cambon K, Stimmer L, Sazdovitch V, Duyckaerts C, Knott G, Hérard AS, Delzescaux T, Hantraye P, Brouillet E, Cauli B, Olié SHR, Panatier A, Bonvento G. Impairment of Glycolysis-Derived L-Serine Production in Astrocytes Contributes to Cognitive Deficits in Alzheimer's Disease. *Cell Metab.* 2020, 31(3):503-517.e8. doi: 10.1016/j.cmet.2020.02.004.
11. Guillemaud O, Ceyzériat K, Saint-Georges T, Cambon K, Petit F, Ben Haim L, Carrillo-de Sauvage MA, Guillermier M, Bernier S, Hérard AS, Joséphine C, Bémelmans AP, Brouillet E, Hantraye P, Bonvento G, Escartin C. Complex roles for reactive astrocytes in the triple transgenic mouse model of Alzheimer disease. *Neurobiol Aging.* 2020, 90:135-146. doi: 10.1016/j.neurobiolaging.2020.02.010.
12. Cresto N, Gaillard MC, Gardier C, Gubinelli F, Diguët E, Bellet D, Legroux L, Mitja J, Auregan G, Guillermier M, Josephine C, Jan C, Dufour N, Joliot A, Hantraye P, Bonvento G, Déglon N, Bemelmans AP, Cambon K, Liot G, [Brouillet E.](#) The C-terminal domain of LRRK2 with the G2019S mutation is sufficient to produce neurodegeneration of dopaminergic neurons in vivo. *Neurobiol Dis.* 2019 Oct 9;134:104614. doi: 10.1016/j.nbd.2019.104614. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8268201/>
13. Gary C, Lam S, Hérard AS, Koch JE, Petit F, Gipchtein P, Sawiak SJ, Caillierez R, Eddarkaoui S, Colin M, Aujard F, Deslys JP; French Neuropathology Network, Brouillet E, Buée L, Comoy EE, Pifferi F, Picq JL, Dhenain M. Encephalopathy induced by Alzheimer brain inoculation in a non-human primate. *Acta Neuropathol Commun.* 2019 Sep 4;7:126.
14. Ligneul C, Palombo M, Hernández-Garzón E, Carrillo-de Sauvage MA, Flament J, Hantraye P, Brouillet E, Bonvento G, Escartin C, Valette J. Diffusion-weighted magnetic resonance spectroscopy enables cell-specific monitoring of astrocyte reactivity in vivo. *Neuroimage.* 2019, 191:457-469.
15. Ceyzériat K, Ben Haim L, Denizot A, Pommier D, Matos M, Guillemaud O, Palomares MA, Abjean L, Petit F, Gipchtein P, Gaillard MC, Guillermier M, Bernier S, Gaudin M, Aurégan G, Joséphine C, Déchamps N, Veran J, Langlais V, Cambon K, Bemelmans AP, Baijer J, Bonvento G, Dhenain M, Deleuze JF, Olié SHR, [Brouillet E.](#), Hantraye P, Carrillo-de Sauvage MA, Olaso R, Panatier A, Escartin C. Modulation of astrocyte reactivity improves functional deficits in mouse models of Alzheimer's disease. *Acta Neuropathol Commun.* 2018, 6(1):104. doi: 10.1186/s40478-018-0606-1.
16. Galvan* L, Francelle* L, Gaillard M-C, de Longprez L, Carrillo-de Sauvage MA, Liot G, Cambon K, Stimmer L, Luccantonio S, Flament J, Valette J, de Chaldée M, Auregan G, Guillermier M, Joséphine C, Petit F, Jan C, Jarrige M, Dufour N, Bonvento G, Humbert S, Saudou F, Hantraye P, Merienne K, Bemelmans AP, Perrier AL, Déglon N, [Brouillet E.](#) The striatal kinase DCLK3 produces neuroprotection against mutant huntingtin. *Brain.* 2018, 141(5):1434-1454. doi: 10.1093/brain/awy057. <https://hal.archives-ouvertes.fr/hal-03060272>
17. Senova S, Poupon C, Daguët J, Stewart HJ, Dugué GP, Jan C, Hosomi K, Ralph GS, Barnes L, Drouot X, Pouzat C, Mangin JF, Pain F, Doignon I, Aron-Badin R, [Brouillet E.](#), Boyden ES, Mitrophanous KA, Hantraye P, Palfi S. Optogenetic Tractography for anatomo-functional characterization of cortico-subcortical neural circuits in non-human primates. *Sci Rep.* 2018, 8(1):3362. doi: 10.1038/s41598-018-21486-8.
18. d'Orange M, Aurégan G, Cheramy D, Gaudin-Guérif M, Lieger S, Guillermier M, Stimmer L, Joséphine C, Hérard AS, Gaillard MC, Petit F, Kiessling MC, Schmitz C, Colin M, Buée L, Panayi F, Diguët E, Brouillet E, Hantraye P, Bemelmans AP, Cambon K. Potentiating tangle formation reduces acute toxicity of soluble tau species in the rat. *Brain.* 2018, 141(2):535-549. doi: 10.1093/brain/awx342.
19. Merienne N, Vachey G, de Longprez L, Meunier C, Zimmer V, Perriard G, Canales M, Mathias A, Herrgott L, Beltraminelli T, Maulet A, Dequesne T, Pythoud C, Rey M, Pellerin L, [Brouillet E.](#), Perrier AL, du Pasquier R, Déglon N. The Self-Inactivating KamiCas9 System for the Editing of CNS Disease Genes. *Cell Rep.* 2017, 20(12):2980-2991. doi: 10.1016/j.celrep.2017.08.075.
20. Le Gras S, Keime C, Anthony A, Lotz C, De Longprez L, [Brouillet E.](#), Cassel JC, Boutillier AL, Merienne K. Altered enhancer transcription underlies Huntington's disease striatal transcriptional signature. *Sci Rep.* 2017 Feb 22;7:42875. doi: 10.1038/srep42875.

21. Francelle L, Lotz C, Outeiro T, Brouillet E, Merienne K. Contribution of Neuroepigenetics to Huntington's Disease. *Front Hum Neurosci*. 2017 Jan 30;11:17. doi: 10.3389/fnhum.2017.00017. Review.

Peer-reviewed review

1. Cresto N, Gardier C, Gubinelli F, Gaillard MC, Liot G, West AB, Brouillet E. The unlikely partnership between LRRK2 and α -synuclein in Parkinson's disease. *Eur J Neurosci*. 2018, 49:339-363 doi: 10.1111/ejn.14182. [Epub ahead of print]
2. Bonvento G, Valette J, Flament J, Mochel F, Brouillet E. Imaging and spectroscopic approaches to probe brain energy metabolism dysregulation in neurodegenerative diseases. *J Cereb Blood Flow Metab*. 2017 Jan 1:271678X17697989. doi: 10.1177/0271678X17697989. [Epub ahead of print]
<https://hal.sorbonne-universite.fr/hal-01539753/document>
3. Francelle L, Lotz C, Outeiro T, Brouillet E, Merienne K. Contribution of Neuroepigenetics to Huntington's Disease. *Front Hum Neurosci*. 2017 Jan 30;11:17. doi: 10.3389/fnhum.2017.00017. Review. <https://hal.archives-ouvertes.fr/hal-03060269>

Editorial

1. Brouillet, E. Extreme conservation of the poly-glutamine tract in huntingtin is related to neurodevelopmental functions: the "better" may become the "enemy of the good" in the course of evolution. *Cell Death Differ*, 2022, <https://doi.org/10.1038/s41418-021-00927-4>
2. Brouillet E, Merienne K. What is gained or 'lost in translation' in Huntington's disease. *Brain*. 2019, 1;142:2900-2902

Recent invited conferences (International)

1. Brouillet E., ERA-NET eRARE TreatPolyQ European consortium, Lausanne (Suisse) European Infrastructure for Translational Medicine (EATRIS Workshop (international), "Biomarkers in Neurological Diseases: the example of Huntington's disease", Lisbonne, 21-23 May 2022.
2. Brouillet E., "Imaging and NMR spectroscopy developments for Huntington's disease : from rodent models to the patients", 2nd Translational Neuroscience Meeting" (organized by NeurATRIS), 25 Janvier 2019
3. Brouillet E., The neuronal kinase DCLK3: its potential roles in the normal brain and in Huntington's disease, NeuroSummit, Montreal, 26-27 September, 2018
4. Brouillet E. "Functional interaction of LRRK2 and α -synuclein in dopaminergic neurons in vivo, Lille, HOPE 2018
5. Brouillet E. & Hantraye P. "Positron emission tomography imaging to study PD", Research Summer School, BrainMatTrain, Essinborg, Danemark, 8-11 may 2017

Invited lectures (national)

1. Brouillet E., Club Ganglions de la Base (Bordeaux), "DCLK3 in Huntington's disease and beyond" Mars 2021
2. Brouillet E. Institut de Biologie Paris-Seine, Paris-Sorbonne Univ. , February 2020
3. Brouillet E. Université de Paris (Descartes), T3S, "Potential roles of the kinase DCLK3 in neurons: from diseases to basic research", September 2020.
4. Brouillet E. and Isaac Adanyeguh, "Imaging and NMR spectroscopy developments for Huntington's disease : from rodent models to the patients". NeurATRIS, **Translational Neuroscience**, 25 January 2019
5. Brouillet E. Imaging and NMR spectroscopy developments for Huntington's disease : Preclinical models", **Journée Nationale des maladies à polyglutamines**, Paris, Hôpital Salpêtrière/ ICM, 11 April 2019
6. Brouillet E., DCLK3, a neuronal kinase whose functions remain to be elucidated, **GIN Grenoble**, 5 juin 2018
7. Brouillet E., Functional interaction of LRRK2 and α -synuclein in dopaminergic neurons *in vivo*, Congrès "HOPE" 21 Avril 2018, Lille, 2018
8. Brouillet E., DCLK3, "The neuronal kinase DCLK3 is neuroprotective against mutant Huntingtin toxicity and regulates gene expression in striatal neurons", **Kickoff meeting EpiHD ANR**, Strasbourg 9 February 2017

Dissemination of knowledge/"grand public"

- ✓ La Semaine du Cerveau 2021, « Conversation autour des maladies rares: la maladie de Huntington », <https://www.youtube.com/watch?v=y9rOnwSfzuM>
- ✓ Journée Mondiale « Parkinson », poster de vulgarisation, Musée des Sciences de La Villette, 2017
- ✓ Journées « porte ouverte » du centre CEA de Fontenay (dimanches Octobre 2014, 2016, 2017, 2019), Ateliers, conférences et visite du centre MIRCen.
- ✓ Journées Annuelles « Huntington », Conférence « Etat de l'art physiopathologie de la maladie de Huntington », Musée des Sciences de la Villette, 1st December 2017

Organization of Congress and Symposium

- Co-organizer of **NeuroFrance 2017** (Bordeaux) and **NeuroFrance 2019** (Marseille)
- Co-organizer of « **HOPE** » Congress (PHysiopathology Of Parkinson's disease) Lille, 25-26 November 2018
- Co-organizer of Nectar 2018, Paris, December 2018
- Co-organized of **HOPE** Congress, Paris, ICM, January, 2020