

Jeremie GUEDJ

Research Director, INSERM

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Mathematical Modeling of Infectious Diseases

CV in research

2021	Research Director (INSERM, Paris)
2012	Research Scientist (INSERM, Paris)
2009 – 2012	Postdoctoral research fellow Supervision : Pr. Alan S. Perelson <i>Theoretical Biology & Biophysics, Los Alamos National Laboratory, NM, USA</i>
2007 – 2009	Postdoctoral research fellow Supervision : Pr. Avidan U. Neumann <i>Mina & Everard Goodman Faculty of Life Sciences, Bar-Ilan University, Tel-Aviv, Israel</i>
2003- 2006	PhD in biostatistics: “Inference in dynamical models of population: application to HIV & HCV” Supervision : Dr. Rodolphe Thiébaud & Pr. Daniel Commenges <i>ISPED, University Bordeaux II, France</i>

Publications

1. Kerioui M, Bertrand J, Desmée S, Le Tourneau C, Mercier F, Bruo R, **Guedj J**. Assessing the increased variability in individual lesion kinetics during immunotherapy: does it exist, and does it matter ? JCO Precision Oncology 2022.
2. Mitja O, et al. Viral dynamics in patients with monkeypox infection: a prospective cohort study in Spain. The Lancet Infectious Diseases 2022.
3. El Messaoudi S, Gonçalves A, Lemenuel-Diot A, **Guedj J**. A semi-mechanistic model to characterize the long-term dynamic of HBV markers during treatment with lamivudine and Peg-IFN. Clinical Pharmacology & Therapeutics 2022.
4. Marlin R, Desjardins D, Contreras V, Lingas G, Solas C, Roques P, Naninck T, Pascal Q, Behillil S, Maisonnasse P, de Lamballerie X, **Guedj J***, Le Grand R*. Antiviral efficacy of favipiravir against Zika and SARS-CoV-2 viruses in non-human primates. Nature communications 2022.
5. Delattre R, Seurat J, Haddad F, Nguyen TT, Gaborieau B, Kane R, Dufour N, Ricard JD, **Guedj J***, Debarbieux*. Combination of in vivo phage therapy data with in silico model highlights key parameters for treatment efficacy. Cell reports 39, 110825. 2022.
6. Guk J Bridier-Nahmias A, Magnan M, Grall N, Duval X, Clermont O, Ruppé E, d’Humières C, Tenailon O, Denamur E, Mentré F, **Guedj J**, Burdet C. for Modelling the bacterial dynamics in the gut microbiota following an antibiotic-induced perturbation. CPT:PSP 2022.
7. Prague M, Alexandre M, Thiébaud R, **Guedj J**. Within-host models of SARS-CoV-2: What can it teach us on the biological factors driving virus pathogenesis and transmission? Anaesthesia Critical Care & Pain Medicine 2022.
8. Lingas L, Néant N, Gaymard A, Belhadi D, Peytavin F, Hites M, Staub T, Greil R , Paiva JA, Poissy J, Peiffer-Smadja N, Costagliola D, Yazdanpanah Y, Wallet F, Gagneux-Brunon A, Mentré F, Ader F, Burdet C, **Guedj J**, Bouscambert-Duchamp M. Effect of remdesivir on viral dynamics in COVID-19

- hospitalized patients: a modeling analysis of the randomized, controlled, open-label DisCoVeRy trial. *Journal of Antimicrobial Chemotherapy* 2022.
9. Kerioui M, Desmée S, Mercier F, Lin A, Wu B, Jin J, Shen X, Le Tourneau C, Bruno R, **Guedj J**. Assessing the impact of organ-specific lesion dynamics on survival in patients with recurrent urothelial carcinoma treated with atezolizumab or chemotherapy. *ESMO Open* 2021.
 10. Kerioui M, Bertrand J, Bruno R, Mercier F, **Guedj J**, Desmée S. Modelling the association between biomarkers and clinical outcome: an introduction to nonlinear joint models. *British Journal of Clinical Pharmacology* 2021.
 11. Thielebein et al. Virus persistence after recovery from acute Lassa fever in Nigeria: a 2-year interim analysis of a prospective longitudinal cohort study. *Lancet Microbe* 2021.
 12. Eloy P, Malvy D, Le Grand R, **Guedj J**. Combined treatment of molnupiravir and favipiravir against SARS-CoV-2 infection: one + zero equals two? *Ebio medicine* 2021.
 13. Ader F, Bouscambert-Duchamp M, Hites M, Peiffer-Smadja N, Poissy J, Belhadi D, Diallo A, Lê MP, Peytavin P, Staub T, Greil R, **Guedj J**, Paiva JA, Costagliola D, Yazdanpanah Y, Burdet C, Mentré F. Remdesivir plus standard of care versus standard of care alone for the treatment of patients admitted to hospital with COVID-19 (DisCoVeRy): a phase 3, randomised, controlled, open-label trial. *Lancet Infectious Diseases* 2021.
 14. Marc A, Kerioui M, Blanquart F, Bertrand J, Mitjà O, Corbacho-Monné M, Marks M, **Guedj J**. Quantifying the relationship between SARS-CoV-2 viral load and infectiousness. *Elife* 2021.
 15. Cosentino G, Bernard M, Giannoli JM, **Guedj J**, Debarre F, Blanquart F. SARS-CoV-2 viral dynamics in infections with Alpha and Beta variants of concern in the French community. *Journal of Infection* 2021.
 16. Maisonnasse P, Aldon Y, Marc A, Marlin R..., Montefiori DC, Wilson IA, Ginoux E, de Bree GJ, García-Sastre A, Schotsaert M, Coughlan L, Bukreyev A, van der Werf S, **Guedj J**, Sanders RW, van Gils MJ, Le Grand R. COVA1-18 neutralizing antibody protects against SARS-CoV-2 in three preclinical models. *Nature Communications* 2021.
 17. Bonil L, Lingas G, Coupeau D, Lucet JC, **Guedj J**, Visseaux B, Muijckens B. Survival of SARS-CoV-2 on non-porous materials in an experimental setting representative of fomites. *Coatings* 2021.
 18. Reynard S, Gloaguen E, Baillet N, Madelain V, **Guedj J**, Raoul H, de Lamballerie X, Mullaert J, Baize S. Early control of viral load by favipiravir promotes survival to Ebola virus challenge and prevents cytokine storm in non-human primates. *PLoS Neglected Tropical Diseases* 2021.
 19. Gonçalves A, Maisonnasse P, Donati F, Albert M, Behillil S, Contreras V, Naninck T, Marlin R, Solas C, Pizzorno A, Lemaitre J, Kahlaoui N, Terrier O, Ho Tsong Fang R, Enouf V, Dereuddre-Bosquet N, Brisebarre A, Touret F, Chapon C, Hoen B, Lina B, Rosa Calatrava M, de Lamballerie X, Mentré F, Le Grand R, van der Werf S, **Guedj J**. SARS-CoV-2 viral dynamics in non-human primates. *PLoS Computational Biology* 2021.
 20. Czuppon P, Débarre F, Goncalves A, Tenailon O, Perelson AS, **Guedj J***, Blanquart F*. Success of prophylactic antiviral therapy for SARS-CoV-2: predicted critical efficacies and impact of different drug-specific mechanisms of action. *PLoS Computational Biology* 2021.
 21. Driouich JS, Cochin M, Lingas G, Moureau G, Touret F, Remi Petit P, Piorkowski G, Barthélémy K, **Guedj J**, de Lamballerie X, Solas C, Nougairède A. Favipiravir antiviral efficacy against SARS-CoV-2 in a hamster model. *Nature Communications* 2021.
 22. Néant N, Lingas G, Le Hingrat Q, Ghosn J, Engelmann I, Lepiller Q, Gaymard A, Ferré V, Hartard C, Plantier JC, Thibault V, Marlet J, Montes B, Bouiller K, Lescure FX, Timsit JF, Faure E, Poissy J, Chidiac C, Raffi F, Kimmoun A, Etienne M, Richard JC, Tattevin P, Garot D, Le Moing V, Bachelet D, Tardivon C, Duval X, Yazdanpanah Y, Mentré F, Laouénan C*, Visseaux B*, **Guedj J***. Modeling SARS-CoV-2 viral kinetics and association with mortality in hospitalized patients: results from the French Covid-19 cohort. *PNAS* 2021.
 23. Best K, Barouch DH, **Guedj J**, Ribeiro RM, Perelson AS. Zika virus dynamics: Effects of inoculum dose, the innate immune response and viral interference. *PLoS Computational Biology* 2020
 24. Lingas G, Safronetz D, Rosenke K, **Guedj J**. Lassa viral dynamics in non-human primates treated with favipiravir or ribavirin. *PLoS Computational Biology* 2020.
 25. Gonçalves A, Lemenuel-Diot A, Cosson V, Jin Y, Feng S, Bo Q and **Guedj J**. What drives the dynamics of HBV RNA during treatment? *Journal of Viral Hepatitis* 2020.
 26. Mercier F, Kerioui M, Desmée S, **Guedj J**, Bruno R, Krieter O. Longitudinal analysis of individual tumor lesion size in metastatic colorectal cancer patients receiving first line standard chemotherapy in combination with anti-angiogenic treatment: A retrospective analysis. *Journal of pharmacokinetics and pharmacodynamics* 2020.

27. Kerioui M, Mercier F, Bertrand J, Tardivon C, Bruno R, **Guedj J**, Desmée S. Bayesian inference using Hamiltonian Monte-Carlo algorithm for nonlinear joint modelling in the context of cancer immunotherapy. *Statistics in Medicine* 2020.
28. Passaes C, Millet A, Madelain V, Monceaux V, David A, Versmisse P, Sylla N, Gostick E, Price DA, Blancher A, Dereuddre-Bosquet N, Desjardins D, Pancino G, Le Grand R, Lambotte O, Müller-Trutwin M, Rouzioux C, **Guedj J**, Avettand-Fenoel V, Vaslin B, Sáez-Ciri3n A. Optimal maturation of the SIV specific CD8+ T-cell response after primary infection is associated with natural control of SIV. *Cell reports* 2020.
29. Maisonnasse P*, **Guedj J***, Contreras V*, Behillil S*, Solas C*, Marlin R, Naninck T, Pizzorno A, Lemaitre J, Gonalves A, Kahlaoui N, Terrier O, Ho Tsong Fang R, Enouf V, Dereuddre-Bosquet N, Brisebarre A, Touret F, Chapon C, Hoen B, Lina B, Rosa-Calatrava M, van der Werf S, de Lamballerie X, Le Grand R. Hydroxychloroquine against SARS-CoV-2 infection in non-human primates. *Nature* 2020
30. Guk J, **Guedj J**, Burdet C, Andremont A, de Gunzburg J, Ducher A, Mentr3 F. Modeling the effect of DAV132, a novel colon-targeted adsorbent, on fecal concentrations of moxifloxacin and gut microbiota diversity in healthy volunteers. *Clinical Pharmacology & Therapeutics* 2020
31. Gonalves A, Bertrand J, Ke R, Comets E, de Lamballerie X, Malvy D, Pizzorno A, Terrier O, Calatrava M, Mentr3 F, Smith P, Perelson AS, **Guedj J**. Timing of antiviral treatment initiation is critical to reduce SARS-CoV-2 viral load. *Clinical Pharmacology & Therapeutics: PSP* 2020.
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33. Eloy P, Solas C, Touret F, Mentr3 F, Malvy D, de Lamballerie X, **Guedj J**. Dose rationale for favipiravir use in patients infected with SARS-CoV-2 [letter]. *Clinical Pharmacology & Therapeutics* 2020.
34. Madelain V, Duthey A, Mentr3 F, Jacquot F, Solas C, Lacarelle B, Vallv3 A, Barron S, Barrot C, Munweiler S, Thomas D, Carbonnelle C, Raoul H, de Lamballerie X, **Guedj J**. Ribavirin does not potentiate favipiravir antiviral activity against Ebola virus in non-human primates. *Antiviral Research* 2020.
35. Madelain V, Passaes C, Millet A, Avettand-Fenoel V, Djidjou-Demasse R, Dereuddre-Bosquet N, Le Grand R, Rouzioux C, Vaslin B, Saez-Cirion A, **Guedj J**. Modeling SIV kinetics supports that cytotoxic response drives natural control and unravels heterogeneous populations of infected cells. *BiorXiv* 2020.
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37. Madelain V, Mentr3 F, Baize S, Anglaret X, Laou3nan V, Oestereich L, Nguyen THT, Malvy D, Piorkowski G, Graw F, G3nther S, Raoul H, de Lamballerie X, **Guedj J**. Modeling favipiravir antiviral efficacy against emerging viruses: from animal studies to clinical trials. *CPT:PSP* 2019.
38. Friberg L & **Guedj J**. Acute bacterial or viral infection – What's the difference? A perspective from PKPD modellers. *Clinical Microbiology & Infection* 2019.
39. Bruno R, Bottino D, de Alwis DP, Fojo T, **Guedj J**, Liu C, Swanson KR, Zheng JJ, Zheng Y, Jin JY. Progress and Opportunities to Advance Clinical Cancer Therapeutics Using Tumor Dynamics Models. *Clinical Cancer Research* 2019.
40. Burdet C, Nguyen TT, Duval X, Ferreira S, Andremont A, **Guedj J**, Mentr3 F. Impact of antibiotic gut exposure on the temporal changes in microbiome diversity. *Antimicrobial Agents & Chemotherapy* 2019; 63: e00820-19.
41. Tardivon C, Desmée S, Kerioui M, Bruno R, Wu B, Mentr3 F, Mercier F, **Guedj J**. Association between tumor size kinetics and survival in urothelial carcinoma patients treated with atezolizumab: implication for patient's follow-up. *Clinical Pharmacology & Therapeutics* 2019; 106: 810-820.
42. Madelain V, Baize S, Jacquot F, Reynard S, Fizet A, Barron S, Solas C, Lacarelle B, Carbonnelle C, Mentr3 F, Raoul H, de Lamballerie X, **Guedj J**. Ebola viral dynamics in nonhuman primates: insights into virus immuno-pathogenesis and antiviral strategies. *Nature Communications* 2018; 9: 4013.
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44. Quintela BD, Conway JM, Hyman JM, **Guedj J**, Dos Santos RW, Lobosco M, Perelson AS. A New Age-Structured Multiscale Model of the Hepatitis C Virus Life-cycle During Infection and Therapy with Direct-Acting Antiviral Agents. *Frontiers in Microbiology* 2018; 9: 601.

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47. Petit C, Samson A, Morita S, Ursino M, **Guedj J**, Jullien V, Comets E, Zohar S. Unified approach for extrapolation and bridging of adult information in early phase dose-finding paediatric studies. *Statistical Methods in Medical Research* 2018; 27(6): 1860-77.
48. Carrillo-Bustamante P, Nguyen THT, Oestereich L, Gunther S, **Guedj J**, Graw F. Determining Ribavirin's mechanism of action against Lassa virus infection. *Scientific Report* 2017; 7: e11693.
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51. Desmée S, Mentré F, Veyrat-Follet C, Sébastien B, **Guedj J**. Nonlinear joint models for individual dynamic prediction of risk of death using Hamiltonian Monte Carlo: Application to metastatic prostate cancer. *BMC Medical Research Methodology* 2017; 17: e105.
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 - ⇒ **See commentary:** Goyal A, Murray JM. Effect of interferon-alpha on hepatitis D virus. *Hepatology* (in press)
 - ⇒ **See commentary:** Guedj J, Canini L, Cottler SH, Dahari H. Response to Goyal et al. *Hepatology* (in press)
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*: equal contributors

Invited speaker in international conferences

1. Integrating correlates of protection into mathematical models of SARS-CoV-2 viral dynamics. American Society of Clinical Pharmacology & Therapeutics, Atlanta, March 2023.
2. Viral dynamics of SARS-CoV2 and role of antiviral treatments. Sesstim webinars. December 2022.
3. Modeling viral kinetics during HBV treatment. What it can teach us to optimize future therapies. European Meeting on HIV & Hepatitis, Paris, June 2022.
4. Pharmacometrics to support clinical investigation during COVID-19 pandemics. Page Virtual Meeting, September 2021.
5. Modeling SARS-Cov-2 viral dynamics to optimize antiviral therapy. PK/UK Virtual Meeting. November 2020.
6. Modeling SARS-Cov-2 viral dynamics to optimize therapy. ACOP. Virtual Meeting. November 2020
7. SARS-Cov-2 viral dynamics in NHPs and hospitalized patients. Modelling Heterogeneous Populations with applications in Biology. Grenoble. November 2020
8. Modeling SARS-Cov-2 viral dynamics to optimize therapy. AAPS. Virtual meeting. October 2020
9. Pitfalls of PK/PD of repurposed drugs. ESCMID Conference on Coronavirus Disease (ECCVID). Virtual Meeting. September 2020.
10. Ebola viral dynamics. HPV & microbiota dynamics. Montpellier. March 2019.
11. Mechanistic models in oncology. Recent advances in joint models for cancer and the new statistical challenge of immunotherapy clinical studies. Bordeaux. January 2019.
12. Ebola viral dynamics. Mathematical Biosciences Institute Workshop. Columbia. February 2018.
13. Joint modeling of tumor kinetic and OS. FDA-ISoP Public Workshop: Model Informed Drug Development (MIDD) for Oncology Products. FDA, February 2018.
14. Joint modeling in pharmacokinetics. Fort-Lauderdale. October 2017
15. PK/PD in infectious diseases. FIP Pharmaceutical Sciences World Congress. Stockholm. May 2017
16. The role of pharmacometrics in viral dynamics. Viral dynamics: past, present & future. Santa Fe. May 2017.
17. HCV modeling: insights on drug development. PK UK. London. November 2016.
18. HCV modeling: insights on drug development. Synergie & Résistances. Aix-en-Provence. October 2016.

19. Review on HCV modeling. Kinetic and Dynamic Complexity in Drug Transit-Response in the Human Body. PAGE meeting. Crete. June 2015
20. Viral Dynamic Modeling of DAAs. Journées du Groupement de Recherche Statistique et Santé. Rennes. September 2012.
21. Viral Dynamic Modeling of DAAs. 7th International Workshop on Clinical Pharmacology of Hepatitis Drug. Boston. June 2012
22. Understanding silibinin's modes of action against HCV using viral kinetic modeling. Workshop on Silibinin, Cologn. February 2012.

PhD supervision and cosupervision

1. Maxime Beaulieu, "Modeling the efficacy of antiviral strategies against variants of concerns of Sars-CoV-2: from general community to hospitalized patients, since 2022
2. Selma El Messaoudi, "Modeling to support HBV cure", since 2020
3. Aurélien Marc, "SARS-CoV-2 viral dynamics and transmission", since 2020
4. Guillaume Lingas, "Modélisation de la dynamique virale du SARS-CoV-2 : implications pour l'évaluation thérapeutique », 2019-2022 (now Medical Student).
5. Marion Keroui, "Modèles conjoints de la dynamique des lésions cibles et de la survie : application à la prédiction de la réponse à l'immunothérapie dans le cancer de la vessie", 2018-2022 (now postdoc at the Sloan Kettering Memorial Center)
 - ⇒ Recipient of the 2023 prize Daniel Schwartz rewarding the best PhD thesis in biostatistics in 2020-2022
6. Antonio Gonçalves, "Development of a modeling framework to optimize combination therapy of new antiviral agents against HBV", 2017-2020 (now at Certara).
7. Vincent Madelain, "Viral dynamics during infection with Ebola virus and treatment with favipiravir", 2015-2018 (now at Servier).
8. Solène Desmée, "Modélisation conjointe de données longitudinales non-linéaires et de données de survie : applications au cancer de la prostate métastatique", 2013-2016 (now associate professor at Université de Tours)
9. Tram Nguyen, "Handling data below the quantification limit in viral kinetic modeling for model evaluation and prediction of treatment outcome", 2011-2014 (now at Sanofi)
10. Cédric Laouénan, "Utilisation des modèles dynamiques pour l'évaluation des traitements de l'hépatite C", 2011-2014 (now Professor of Biostatistics at Université Paris Cité).

PhD & HDR reviewer

1. Raphaëlle Metras, HDR Sorbonne Université, 2022
2. Denis Rustand, "Modèles conjoints pour un biomarqueur semi-continu et un évènement terminal avec application aux essais cliniques en cancérologie", Dr Virginie Rondeau, 2020.
3. Thibault Etienne, « Modélisation mathématique de la dégradation des ARNm bactériens et intégration de données omiques », Dr Delphine Roppers, 2020.
4. Ronan Duchesne, "Erythroid differentiation in vitro under the lens of mathematical modelling", ENS Lyon, Dr Fabien Crauste, 2019.
5. Vincent Aranzana-Climent, « Apport de la modélisation semi-mécanistique dans l'étude PK/PD des antibiotiques seuls et en combinaison dans la lutte contre les bactéries résistantes », Université de Poitiers, Prof. Nicolas Grégoire, 2019.
6. R. Raja, "Modelling and optimization of novel therapies for HIV and hepatitis C virus infections", Indian Institute of Science, Prof. Narendra Dixit, 2018.
7. L. Villain, "Analyse et modélisation de l'effet des injections d'interleukine 7 sur les patients infectés par le VIH", University Bordeaux 2, Prof R. Thiébaud. 2018.

Reviewer (not exhaustive)

Bioinformatics, Bulletin of Mathematical Biology, Epidemics, CPT: Pharmacometrics & System Pharmacology, Journal of Statistical Planning & Inference, Journal of

Biostatistics & Biomathematics	Pharmacokinetics & Pharmacodynamics, Journal of the Royal Statistical Society C, Journal of Theoretical Biology, Mathematical Biosciences, Mathematical Medicine & Biology, Philosophical Transactions of the Royal Society B, PLoS Computational Biology, Statistical Methods & Applications
Medicine	Antimicrobial Agents & Chemotherapy, Antiviral Therapy, Antiviral Research, Clinical Infectious Diseases, Clinical Pharmacology & Therapeutics, Ebio medicine, Journal of Hepatology, Journal of Virology, Hepatology, Lancet Infectious Diseases, Microbiome, Nature Communications, Nature Medicine, PLoS Biology, PNAS, PLoS Pathogens, Science
Editorial Board	Journal of Hepatology

Scientific & Educational Societies

Since 2023	Member of the ANRS « groupe sur les antiviraux et les anticorps monoclonaux thérapeutiques »
Since 2021	Member of the INSERM evaluation and recruitment committee (CSS 6)
Since 2021	AC ANRS « Modélisation des maladies infectieuses »
2020-2022	Member of the preclinical group on SARS-CoV-2 (ANRS)
2020-2022	Drug expert committee, EU Response
2020-2022	Groupe d'évaluation des mAbs anti-Covid, Reacting (ANRS)
Since 2019	Conseil de l'école doctorale ED393 Pierre Louis de Santé Publique
2012-2016	ANRS CSS3 « Recherches cliniques et thérapeutiques sur le VIH »
Since 2014	AC34 (since 2014) « HBV Cure »

Grant as PI (or WP PI)

2022-2025	Modelling of viral respiratory co-infection dynamics in human epithelium (ANR/DGF)
2022-2024	Modeling dynamics during MonkeyPox infection, ANRS
2021-2023	Emergen, ANRS
2021-2024	Multiscale modeling in HBV, PI, Roche.
2020-2023	Mechanism of natural control of HIV, French Embassy in India
2020-2023	Therapeutics accelerator for Covid-19, PI, Bill & Melinda Gates Foundation
2020-2022	Viral dynamics modeling, PI, ANR
2020-2022	HIV modeling control, WP leader, NIH
2020-2022	Phage therapy, WP leader, French-German ANR
2020-2023	Nipah pathogenesis, WP leader, MESRI.
2018-2021	Modeling immune-oncology, PI, Genentech.
2017-2020	HBV Modeling, PI, Roche.
2014-2017	Prostate cancer therapeutic optimization, PI, Sanofi.
2014-2016	Favipiravir against Ebola, WP leader, EU H2020

Prize & Fellowship

2015-2018	Laureate APHP « Contrat d'Interface »
2012-2024	INSERM « Prime d'Excellence »
2009-2012	Los Alamos Postdoctoral Fellowship
2008-2009	French Consulate in Tel-Aviv, « Volontaire-International Chercheur »
2007	Postdoctoral Fellowship « Fondation de la recherche médicale »
2003-2006	PhD fellowship from the National Agency for Research in AIDS (ANRS)
