

BIOGRAPHICAL SKETCH

Last name, First name: Balabanian, Karl	Date of birth: 23/07/1973	ORCID iD: 0000-0002-0534-3198	Current position : Team leader Deputy head of the INSERM Unit U1342 Institut de Recherche Saint-Louis Université Paris Cité
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EDUCATION

Institution and location	Degree	Completion date	Field of study
INSERM	DR1	12/2025	Immuno-hemato-pathology
INSERM	DR2	10/2018	Immuno-hemato-pathology
Paris Saclay University	HDR	06/2011	Immuno-physio-pathology
INSERM	CR1	06/2007	Immuno-physio-pathology
Paris Saclay University	PhD	01/2003	Immunology
University of Paris VII	Master	09/1999	Immunology
Université Sorbonne Paris Cité	Magistère	09/1999	Genetic

Personal Statement and keywords

I am class 1 Research Director INSERM and lead a team at Saint-Louis Hospital in the U1342 unit associating INSERM and University Paris Cité and for which I am deputy head. I am an Immunologist specialized in molecular and functional aspects of the interactions between chemokines and their receptors in lymphoid progenitors and mature lymphocytes as well as on their environment at steady state and in the course of immuno-hematological disorders. By using bedside-to-bench approaches combining molecular and functional investigations on human samples and pre-clinical mouse models and thanks to collaborations with academic and clinical departments, I made seminal breakthroughs including the discovery of ACKR3/CXCR7 and identification and modeling of CXCR4 dysfunctions in rare immunodeficiencies, notably the WHIM Syndrome (WS). Over the past 6 years, our team has built a strong reputation in the field of molecular hematopoiesis in health and disease. In particular, state-of-the-art preclinical mouse and human models have led to clinically-relevant findings in the field of early hematopoiesis, B-cell biology and pathology, as well as in myeloid leukemia tumor immuno-surveillance. These axes share the common interest of studying the crosstalk between normal and malignant hematopoietic cells and the bone marrow (BM) microenvironment. Genetic and functional studies to identify microenvironmental and immunological defects associated to the pathogenesis of myeloid neoplasms, WS and Waldenström Macroglobulinemia (WM) witness our commitment to translate basic research findings into clinical setting. This translates into groundbreaking works published in top ranking journals (JEM, Blood, Nat Commun, Science Signaling...), steady invitations to international conferences (GRC, SBI, ECMC, EHA/ESH...), participation to panels of experts in funding and evaluating bodies (INSERM CSS5) and coordinating scientific networks (ANR PRC, FHU PROTHEE). I am also strongly involved in structures created by the Future Investments Program as steering committee or board member of IHU Institut de la Leucémie and Institut Carnot OPALE that are dedicated to leukemia and related diseases. This contributes to great international visibility and research collaborations (NIH), but also to strong collaborations with national reference centers in hemato-oncology and immunology. I advocate locally and nationally for research integrity and open access publication, while developing links to industry and valorizing our results as witnessed by the filing of 4 patents since 2018. Since January 2025 and for the next 5 years, our team is composed of 11 tenured researchers (7 being accredited to supervise research [HDR] and 3 HDR pending), 5 engineers/ research assistants, and between 7 and 10 PhD students at any given point (see below flow-chart). The team is directed by M. Espéli (deputy team leader) and myself (team leader). Since 2025, we were joined by Pr. H. Moins-Teisserenc (PU-PH UP Cité) and Pr. A. Toubert (PU-PH UP Cité Emerite)/Dr. K. Benlagha (DR2 INSERM) that integrate their project on malignant T cell environment in Sezary Syndrome (SS), a cutaneous T-cell lymphoma, and on thymic function and development in health and disease, respectively, in the frame of our lab. Our global scientific strategy aims to delineate molecular & cellular aspects of the cross-talk established between lymphoid and stromal cells within the BM, skin & thymus with a focus

on the chemokine signaling system to better understand and fight rare immuno-hematological disorders, namely the WS, WM, MDS, SS and T-cell acute lymphoblastic leukemia. As a team, we develop fundamental and translational projects to tackle these questions through the use of original mouse models, innovative co-culture systems and state-of-the-art omics techniques. Access to clinical samples is also an asset for the project to translate results to human and to highlight original findings directly from human samples.

Positions and scientific appointments

2025-29 Senior INSERM scientist, Team leader, Deputy head of the Saint-Louis Research Institute

INSERM UMR_S1342 (headed by Pr. J. Soulier, Paris)

2019-24 Senior INSERM scientist, Team leader, Deputy head of the Unit

INSERM UMR_S1160 (headed by Pr. A. Toubert, Paris)

2010-18 Senior INSERM scientist, Team leader

INSERM UMR_S996 (headed by Pr. D. Emilie, Pr. M. Pallardy and Dr. F. Bachelierie, Clamart)

2007-09 Recruitment as Research Associate (Class I INSERM), Group leader

INSERM UMR_S764 (headed by Pr. D. Emilie, Clamart)

2005-07 Young Investigator Position from INSERM

INSERM U819 (headed by Dr. F. Arenzana-Seisdedos, Institut Pasteur, Paris)

2003-05 Post-doctoral Position in Virology

Unité d'Immunologie Virale (headed by Pr. J.L. Virelizier, Institut Pasteur, Paris)

1998-2003 Master and Ph.D. in Immunology

INSERM U131 (headed by Pr. P. Galanaud, Clamart)

Honors and Awards

2017, 2021, 2025	PEDR/RIPEC C3 promoted by INSERM
2018	Association Saint Louis pour la Recherche sur les Leucémies Award
2010	Laureate of the Young Investigators Program promoted by ANR
2005	Laureate of the Young Investigators Program promoted by INSERM
2001	François Brenot Award by the European Respiratory Society

Supervision of students and postdoctoral fellows during the last 10 years

PhD students :

2025-28 [F. Castillo-Elena](#)

2022-26 [M. Kalogeraki](#) (PMID: 40604201 ; PMID: 39588369 ; PMID: 39471249 ; PMID: 37045841); [C. Moulin](#) (PMID: 39471249 ; PMID: 38442908)

2022-25 [PE. Debureau](#) (PMID: 39571148 ; PMID: 37584289)

2019-22 [Z. Abou-Nader](#) (PMID: 39588369 ; PMID: 39471249; PMID: 37045841; PMID: 34057712)

2016-20 [V. Rondeau](#) (PMID: 39588369 ; PMID: 39471249 ; PMID: 37045841 ; PMID: 35021072 ; PMID: 34386488; PMID: 34057713; PMID: 33512437; PMID: 28550161)

2014-18 [J. Nguyen](#) (PMID: 38598804 ; PMID: 37045841 ; PMID: 33512437; PMID: 28550161)

2014-17 [J. Natt](#) (PMID: 27681431 ; PMID: 25836304)

2012-16 [C. Freitas](#) (PMID: 39471249 ; PMID: 28550161 ; PMID: 27681431 ; PMID: 24853339; PMID: 23244336)

Postdoctoral fellows:

2021-23 [L. Roland](#) (PMID: 40239948 ; PMID: 39588369; PMID: 39471249 ; PMID: 34017329)

2019-21 [J. Lemos](#) (PMID: 39471249 ; PMID: 37217705 ; PMID: 37045841 ; PMID: 33936091; PMID: 34057712)

Major grants obtained over the last 10 years

2026-29 FRM team label (coordinator)

2026-27 Industrial contract with Cellura (coordinator)

2026-28 PLBIO INCa (PI, partner)

2026-27 Carnot OPALE Internal Call (PI, partner); LabEx INFIBREX Amorçage (PI, partner)

2025-26 Association Laurette Fugain (co-coordinator); DIM Immunotherapy Autoimmunity Cancer (PI, partner)

2023-25 Société Française de Rhumatologie (PI, partner)

2023-24 Inserm Transfert- Proof of Concept (coordinator)

2022-25 FRM team label (coordinator); ITMO Cancer FRFT (coordinator)

2022-24 IHU THEMA Internal Call (coordinator)
2021-24 FHU PROTHEE (PI, partner)
2020-23 Industrial contract with X4 Pharma (coordinator)
2018-22 ANR PRC (coordinator)
2018-21 PRT-K INCa (PI, partner)
2016-17 Inserm Transfert- Proof of Concept (coordinator)

Major recent invited conferences

2027 ESH 6th Scientific Workshop (London, UK) *Keynote*
2026 Gordon Research Conference on Chemotactic Cytokines (Les Diablerets, Switzerland) *Keynote*
2025 5th European Chemokine and Cell Migration Conference (Copenhagen, Denmark) *Keynote*
2024 Institute of Hematology/Oncology (Erevan, Armenia) *Keynote*
2022 Joint annual meetings of the SFI & AFC (Nice); 27^{ème} Congrès CHO (Giens) *Lectures*
2020 CBF Charité (Berlin, Germany) *Keynote*
2019 Immunobiology in the Era of Immunotherapy (Florianopolis, Brazil) *Keynote*
2018 Gordon Research Conference on Chemotactic Cytokines (Newry, USA) *Keynote*

Other activities

2025- Member of the Management Board of UFR Médecine Paris Cité
2025- Member of the Steering Committee of LabEx InFibrex and elected member of the Scientific Council of SFH
2024- Member of the Scientific Council of the RHU SPRINT and Steering Committee of IHU Institut Leucémie
2023- Member of the Steering Committee of the IRP2 SIRIC InSiTu
2022-26 Elected member of the CSS5 "Immunologie, microbiologie, infection" (INSERM)
2022- Cofounder & secretary of the French Society of Tumor Microenvironment (www.cancer-fstm.fr)
2021- Editorial Board of Cytokines in Immunity (Front Immunol) & Bone Research (Front Endocrinol)
2021- Director of studies of the doctoral school "Hematology, Oncology, Biotherapies" (HOB)
2020- Elected member of the IRSL Research Commission; Member of Scientific Council of HOB Doctoral School, Institut Carnot OPALE and FHU PROTHEE
2019- Member of the Steering Committee of the GDR 3697 Micronit; Member of Scientific Council of Association Saint-Louis pour les Leucémies and the IHU THEMA 1

Ten Major outputs over the past 4 years (team members in bold)

1- Houde N[#], Beuret L[#], **Bonaud A**, Fortier-Beaulieu SP, Truchon-Landry K, Aoidi R, Pic É, **Alouche N**, **Rondeau V**, Schlecht-Louf G, **Balabanian K**, **Espéli M***, Charron J*. Fine-tuning of MEK signaling is pivotal for limiting B and T cell activation. **Cell Rep.** **2022** Jan 11;38(2):110223. #co-first, *co-last author.

2- **Bonaud A**, **Gargowitsch L**, Gilbert SM, Rajan E, Canales-Herrerias P, Stockholm D, Rahman NF, Collins MO, Taskiran H, Hill DL, Alloatti A, **Alouche N**, Balor S, Soldan V, Gillet D, Barbier J, Bachelier F, Smith KGC, Jellusova J, Bruhns P, Amigorena S, **Balabanian K**, Linterman MA, Peden AA, **Espéli M**. Sec22b is a critical and nonredundant regulator of plasma cell maintenance. **Proc Natl Acad Sci U S A.** **2023** Jan 10;120(2):e2213056120. doi: 10.1073/pnas.2213056120. Epub 2023 Jan 3. PMID: 36595686.

3- **Boy M**, **Bisio V**, **Zhao LP**, Guidez F, **Schell B**, **Lereclus E**, Henry G, Villemonteix J, Rodrigues-Lima F, Gagne K, Retiere C, Larcher L, Kim R, Clappier E, Sebert M, Mekinian A, Fain O, Caignard A, **Espeli M**, **Balabanian K**, **Toubert A**, Fenaux P, Ades L, **Dulphy N**. Myelodysplastic Syndrome associated TET2 mutations affect NK cell function and genome methylation. **Nat Commun.** **2023** Feb 3;14(1):588. doi: 10.1038/s41467-023-36193-w. PMID: 36737440.

4- **Anginot A**, **Nguyen J**, **Abou Nader Z**, **Rondeau V**, **Bonaud A**, **Kalogeraki M**, Boutin A, **Lemos JP**, **Bisio V**, **Koenen J**, Hanna Doumit Sakr L, Picart A, Coudert A, Provot S, **Dulphy N**, Aurrand-Lions M, Mancini SJC, Lazennec G, McDermott DH, Guidez F, Blin-Wakkach C, Murphy PM, Cohen-Solal M, **Espéli M**, Rouleau M, **Balabanian K**. WHIM Syndrome-linked CXCR4 mutations drive osteoporosis. **Nat Commun.** **2023** Apr 12;14(1):2058. doi: 10.1038/s41467-023-37791-4. PMID: 37045841.

5- **Debureaux PE**, Forgeard N, Elessa D, Harel S, Frenzel L, Royer B, Talbot A, Choquet S, Davi F, Nguyen-Khac F, Cuccini W, Cheminant M, Bravetti C, Lazarian G, Kaltenbach S, Hermine O, Roos-Weil D, **Espéli M***, **Balabanian K***, Arnulf B*. Inflammation is predictive of outcome in Waldenström macroglobulinemia treated by Bruton tyrosine kinase inhibitors: a multicentric real-life study. **Haematologica.** **2024** Jan 1;109(1):325-330. doi: 10.3324/haematol.2023.283141. PMID: 37584289. *Co-senior authors.

6- Rondeau V, Kalogeraki M, Roland L, Abou Nader Z, Gourhand V, Bonaud A, Lemos J, Khamyath M, Moulin C, Schell B, Delord M, Bidaut G, Lecourt S, Freitas C, Anginot A, Mazure N, McDermott DH, Parietti V, Setterblad N, Dulphy N, Bachelier F, Aurrand-Lions M, Stockholm D, Lobry C, Murphy PM, Espéli M, Mancini SJC, Balabanian K. CXCR4 signaling determines the fate of hematopoietic multipotent progenitors by stimulating mTOR activity and mitochondrial metabolism. **Sci Signal.** **2024** Oct 29;17(860):eadl5100. doi: 10.1126/scisignal.adl5100. PMID: 39471249.

7- Roland L, Nguyen CH, Zmajkovicova K, Khamyath M, Kalogeraki M, Schell B, Gourhand V, Rondeau V, Abou Nader Z, Monticelli H, Maierhofer B, Johnson R, Taveras A, Espéli M*, Balabanian K*. CXCR4 antagonism ameliorates leukocyte abnormalities in a preclinical model of WHIM syndrome. **Front Immunol.** **2024** Nov 11;15:1468823. doi: 10.3389/fimmu.2024.1468823. eCollection 2024. PMID: 39588369. *Co-senior authors.

8- Debureaux PE, Poulain S, Harel S, Passet M, Templé M, Friedrich C, Forgeard N, Elessa D, Plas W, Chat L, Lazarian G, Willems L, Royer B, Talbot A, Vaugeois T Dr, Theves F, Terré A, Brignier AC, Malphettes M, Krzisch D, Frenzel L, Davi F, Bravetti C, Nguyen-Khac F, Dupuis J, Cuccuini W, Bouscary D, Hermine O, Roos-Weil D, Kosmider O, Clappier E*, Espéli M*, Balabanian K*, Arnulf B*. Inflammatory Waldenström Macroglobulinemia is associated with clonal hematopoiesis: a multicentric cohort. **Blood.** **2025** Jan 23;145(4):450-454. doi: 10.1182/blood.2024025738. PMID: 39571148. *Co-senior authors.

9- Schell B, Zhao LP, M'Sibih I, Kalogeraki M, Kergaravat C, Lereclus E, Fenaux P, Adès L, Toubert A, Espéli M, Balabanian K, Clave E, Dulphy N*, Bisio V*. Modeling mesenchymal stromal cell support to hematopoiesis within a novel 3D artificial marrow organoid system. **Sci Rep.** **2025** Jul 2;15(1):23603. doi: 10.1038/s41598-025-07717-9. PMID: 40604201.

10- Kalogeraki M, Rondeau V, Abou Nader Z, Espéli M, Balabanian K. Metabolic and epigenetic interplay in HSPC specification: A balance between extrinsic and intrinsic cues. **iScience.** **2026** Feb 6;29(3):114921. doi: 10.1016/j.isci.2026.114921. eCollection 2026 Mar 20. PMID: 41816285. Review.