

BIOGRAPHICAL SKETCH

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NAME: Clara, Di Vito

eRA COMMONS USER NAME (credential, e.g., agency login): cdivito

POSITION TITLE: Assistant Professor, MEDS-26/A

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of Pavia, Italy	Bachelor's degree	07/2005	Medical Biotechnology
University of Pavia, Italy	Master's degree	11/2007	Medical Biotechnology
University of Eastern Piedmont, Novara, Italy	PhD	03/2011	Biochemistry, platelet pathophysiology
University of Eastern Piedmont, Novara, Italy	Postdoctoral	12/2011	Biochemistry, platelet pathophysiology in hematologic malignancies
University of Milan, Italy	Postdoctoral	12/2015	Biochemistry, sphingolipids in cancer aggressiveness
Ministry of Education, University and Research (MIUR)	Achievement of the "Idoneità Nazionale a Professore di II Fascia (Eligibility for being recruited as Associate Professor)	05/2021	SSD 06/N1

A. Personal Statement

I am an Assistant Professor at the University of Milan and Senior Staff Scientist at the Unit of Clinical and Experimental Immunology Humanitas Research Hospital, Rozzano (MI), Italy.

I'm currently leading a research team composed by two PhD students, three undergraduate student, a technician and a bioinformatician.

My ongoing research is primarily focused on the role of Natural Killer (NK) cells, Innate Lymphoid cells (ILCs) in hematologic malignancies and of their immune-reconstitution in patients undergoing hematopoietic stem cell transplantation. In the context of NK cells immune-reconstitution, in collaboration with the Bone Marrow Transplantation Unit of the Humanitas Research Hospital, we identified a new NK cell subpopulation (unCD56dim) that is particularly prevalent in the first weeks after transplantation. These cells express high levels of NKG2A, an inhibitory receptor, which when blocked, results in an increase in the alloreactive capabilities of NK cells. Based on these results, in collaboration with AstraZeneca, we are conducting a Phase II clinical trial in which Monalizumab, a monoclonal antibody that blocks NKG2A, is administered to patients with acute myeloid

leukemia or chronic myeloproliferative diseases who are receiving an haploidentical hematopoietic stem cell transplantation. These results laid the groundwork for this proposal.

In addition, as a PI of a grant funded by the Italian Ministry of Health, I'm currently investigating the role of immune cells in myelodysplastic syndromes, with the goal of developing a new prognostic score that better predicts the risk of progression to acute myeloid leukemia and response to current therapies (hypomethylating agents).

B. Positions, Scientific Appointments, and Honors

Positions, Scientific Appointments

04/2024-present	Assistant Professor (RTT), MEDS-26/A Department of Biomedical Technology and Translational Medicine (BIOMETRA), University of Milan, Milano (Italy)
12/2021-present	Scientific Coordinator BIOMETRA Flow Cytometry Facility Department of BIOMETRA, University of Milan, Milano (Italy)
01/2021-present	Scientific Advisor UniMiFlow Academy Department of BIOMETRA, University of Milan, Milano (Italy)
04/2017-07/2017	Visiting researcher Prof. Mirko Trilling laboratories Institut für Virologie Universitätsklinikum Essen University Hospital Essen, Germany
04/2016-present	Senior Staff Scientist Unit of Clinical and Experimental Immunology (Supervisor: Prof Domenico Mavilio) Department of BIOMETRA University of Milan and Humanitas Research Hospital, Milano (Italy)
01/2012-12/2015	Post Doc Researcher (Supervisor: Prof Laura Riboni) Department of BIOMETRA, University of Milan, Milano (Italy)
01/2011-12/2011	Post Doc researcher (Supervisor: Prof Fabiola Sinigaglia) Department of Clinical and Experimental Medicine University of Eastern Piedmont, Novara (Italy)
11/2007-11/2010	PhD Student in Molecular Medicine (Supervisor: Prof Fabiola Sinigaglia) Department of Clinical and Experimental Medicine University of Eastern Piedmont, Novara (Italy)

Awards

Best oral presentation at Quinto meeting Stem Cell Research Italy. Salerno, Italy, May 28-30, 2014

Travel Award for the FEBS Congress. Torino, Italy, June 25-30, 2011

Research Supports/Grants

Ricerca Finalizzata 2021, bando Giovani Ricercatori - Ministero della Salute

April 2023-March 2026

Proposal GR-2021-12374166

"Phenotypic and molecular characterization of innate lymphoid cells in

Myelodysplastic syndromes: towards the comprehension of their role in disease etiology and prognosis"

(Amount funded: 450.000,00 euro) Ongoing

PI: C. Di Vito

Ricerca Finalizzata 2016 - Ministero della Salute

July 2019-June 2022

Proposal RF-2016-02364099

"Infusion of anti-NKG2A monoclonal antibody to improve Natural Killer cell allo-reactivity and clinical outcome in patients affected by hematological malignancies after unmanipulated haploidentical stem cell transplantation and post-transplant cyclophosphamide"

(Amount funded 434.025,00 euro) Closed

PI: L. Castagna

UO Responsible: C. Di Vito

Fondazione Umberto Veronesi Post-Doctoral Fellowship-2019

April 2019-March 2020

Proposal 2563

"Impact of donor age in the immune-reconstitution of NK cells and in the clinical outcome of haploidentical hematopoietic stem cell transplantation" (Amount funded: 28.500 euro)

Associazione Italiana per la Ricerca sul Cancro (AIRC)

January 2019-December 2024

Proposal IG 21567

"Targeting allo-reactive Natural Killer cell immune reconstitution in hematologic tumors after bone marrow transplant"

(Amount funded: 578.000,00 euro) Ongoing

PI: Prof. D. Mavilio Team member: C. Di Vito

Fondazione Umberto Veronesi Post-Doctoral Fellowship-2018

April 2018-March 2019

Proposal 1976

"Targeting the expansion of alloreactive NKG2AposCD56dimCD16neg NK cells to improve the clinical outcome of patients receiving haploidentical hematopoietic stem cell transplantation to cure hematologic malignancies" (Amount funded: 27.000 euro)

EMBO Short-term fellowship

to support the visit of the laboratory of Prof. Trilling, Essen, Germany, April-July 2017

Proposal 6947

"NK cell responses against HCMV and effect of HCMV in driving the expansion of NK cell subsets with memory-like responses after allogeneic bone marrow transplantation in patients affected by hematologic malignancies" (Amount funded: 7.736,30)

Fondazione Umberto Veronesi Post-Doctoral Fellowship-2017

April 2017-March 2018

Proposal 1464

"Impact of viral infections on NK cell reconstitution after allogeneic bone marrow transplantation to cure patients affected by hematologic malignancies" (Amount funded: 27.000 euro)

C. Contributions to Science

Publication records

46 peer-reviewed publications

Total H Index (Scopus) 22

Total citations (Scopus) 1328

Scopus ID: 56781393000

ORCID ID: 0000-0001-7248-1710

Publons ID: ABC-3385-2020

List of the most relevant publications for this application:

1. Terzoli S, Marzano P, Cazzetta V, Piazza R, Sandrock I, Ravens S, Tan L, Prinz I, Balin S, Calvi M, Carletti A, Cancellara A, Coianiz N, Franzese S, Frigo A, Voza A, Calcaterra F, **Di Vito C**, Della Bella S, Mikulak J, Mavilio D. Expansion of memory V δ 2 T cells following SARS-CoV-2 vaccination revealed by temporal single-cell transcriptomics. NPJ Vaccines. 2024 Mar 20;9(1):63. doi: 10.1038/s41541-024-00853-9.
2. **Di Vito C**#, Coianiz N, Calvi M, Terzoli S, Zaghi E, Puccio S, Frigo A, Mariotti J, De Philippis C, Mannina D, Sarina B, Mineri R, Le-Trilling VTK, Trilling M, Castagna L, Bramanti S, Santoro A, Mavilio D#. Persistence of KIRneg NK cells after haploidentical hematopoietic stem cell transplantation protects from human cytomegalovirus infection/reactivation. Front Immunol. 2024 Jan 10;14:1266051. doi: 10.3389/fimmu.2023.1266051. eCollection 2023.
3. Marzano P, Balin S, Terzoli S, Della Bella S, Cazzetta V, Piazza R, Sandrock I, Ravens S, Tan L, Prinz I, Calcaterra F, **Di Vito C**, Cancellara A, Calvi M, Carletti A, Franzese S, Frigo A, Darwish A, Voza A, Mikulak J, Mavilio D. Transcriptomic profile of TNFhigh MAIT cells is linked to B cell response following SARS-CoV-2 vaccination. Front Immunol. 2023 Jul 26;14:1208662. doi: 10.3389/fimmu.2023.1208662.
4. van Beek JJP, Puccio S, **Di Vito C**, De Paoli F, Zaghi E, Calvi M, Scarpa A, Peano C, Basso G, Cibella J, De Philippis C, Sarina B, Timofeeva I, Capizzuto R, Mannina D, Mineri R, Mariotti J, Crocchiolo R, Santoro A, Castagna L, Bramanti S, Mavilio D, Lugli E. Selected memory T cells infused post-haploidentical hematopoietic stem cell transplantation persist and hyperexpand. Blood Adv. 2023 Jul 25;7(14):3458-3468. doi: 10.1182/bloodadvances.2022007735.
5. **Di Vito C***#, Calcaterra F*, Coianiz N, Terzoli S, Voza A, Mikulak J, Della Bella S, Mavilio D. Natural Killer Cells in SARS-CoV-2 Infection: Pathophysiology and Therapeutic Implications. Front Immunol. 2022 Jun 30;13:888248. doi: 10.3389/fimmu.2022.888248.
6. Calvi M, **Di Vito C**, Frigo A, Trabanelli S, Jandus C, Mavilio D. Development of Human ILCs and Impact of Unconventional Cytotoxic Subsets in the Pathophysiology of Inflammatory Diseases and Cancer. Front Immunol. 2022 May 26;13:914266. doi: 10.3389/fimmu.2022.914266.
7. Lia G*, **Di Vito C***, Bruno S, Tapparo M, Brunello L, Santoro A, Mariotti J, Bramanti S, Zaghi E, Calvi M, Comba L, Fasci M, Giaccone L, Camussi G, Boyle EM, Castagna L, Evangelista A, Mavilio D, Bruno B. Extracellular Vesicles as Biomarkers of Acute Graft-vs.-Host Disease After Haploidentical Stem Cell Transplantation and Post-Transplant Cyclophosphamide. Front Immunol. 2022 Jan 25;12:816231. doi: 10.3389/fimmu.2021.816231.
8. Van Beek JJP, Puccio S, Roberto A, De Paoli F, Graziano G, Salviato E, Alvisi G, Zanon V, Scarpa A, Zaghi E, Calvi M, **Di Vito C**, Mineri R, Sarina B, De Philippis C, Santoro A, Mariotti J, Bramanti S, Ferrari F, Castagna L, Mavilio D, Lugli E. Single-cell profiling reveals the dynamics of cytomegalovirus-specific T-cells in haploidentical hematopoietic stem cell transplantation. Haematologica. 2021 Jul 8. doi: 10.3324/haematol.2020.276352.
9. Zaghi E, Calvi M, Puccio S, Spata G, Terzoli S, Peano C, Roberto A, De Paoli F, van Beek JJ, Mariotti J, De Philippis C, Sarina B, Mineri R, Bramanti S, Santoro A, Le-Trilling VTK, Trilling M, Marcenaro E, Castagna L, **Di Vito C**#, Lugli E, Mavilio D*#. Single-cell profiling identifies impaired adaptive NK cells

expanded after HCMV reactivation in haploidentical HSCT. JCI Insight. 2021;6(12):e146973. doi: 10.1172/jci.insight.146973.

10. Castagna L, Valli V, Timofeeva I, Capizzuto R, Bramanti S, Mariotti J, De Philippis C, Sarina B, Mannina D, Giordano L, De Paoli F, van Beek JJP, Zaghi E, Calvi M, **Di Vito C**, Mavilio D, Crocchiolo R, Lugli E. Feasibility and Efficacy of CD45RA+ Depleted Donor Lymphocytes Infusion After Haploidentical Transplantation With Post-Transplantation Cyclophosphamide in Patients With Hematological Malignancies. Transplant Cell Ther. 2021;27(6):478.e1-478.e5. doi: 10.1016/j.jtct.2021.03.010.
11. Giaccone L, Faraci DG, Butera S, Lia G, **Di Vito C**, Gabrielli G, Cerrano M, Mariotti J, Dellacasa C, Felicetti F, Brignardello E, Mavilio D, Bruno B. Biomarkers for acute and chronic graft versus host disease: state of the art. Expert Rev Hematol. 2021;14(1):79-96. doi: 10.1080/17474086.2021.1860001.
12. Pesce S, Trabanelli S, **Di Vito C**, Greppi M, Obino V, Guolo F, Minetto P, Bozzo M, Calvi M, Zaghi E, Candiani S, Lemoli RM, Jandus C, Mavilio D, Marcenaro E. Cancer Immunotherapy by Blocking Immune Checkpoints on Innate Lymphocytes. Cancers (Basel). 2020;12(12):3504. doi: 10.3390/cancers12123504.
13. Lia G, **Di Vito C**, Cerrano M, Brunello L, Calcaterra F, Tapparo M, Giaccone L, Mavilio D, Bruno B. Extracellular Vesicles After Allogeneic Hematopoietic Cell Transplantation: Emerging Role in Post-Transplant Complications. Front Immunol. 11:422; 2020. doi: 10.3389/fimmu.2020.00422.
14. Zaghi E, Calvi M, **Di Vito C**, Mavilio D. Innate Immune Responses in the Outcome of Haploidentical Hematopoietic Stem Cell Transplantation to Cure Hematologic Malignancies. Front Immunol. 10:2794; 2019. Review. doi: 10.3389/fimmu.2019.02794.
15. Mariotti J, Taurino D, Marino F, Bramanti S, Sarina B, Morabito L, De Philippis C, **Di Vito C**, Mavilio D, Carlo-Stella C, Della Porta M, Santoro A, Castagna L. Pretransplant active disease status and HLA class II mismatching are associated with increased incidence and severity of cytokine release syndrome after haploidentical transplantation with posttransplant cyclophosphamide. Cancer Med. 2019. doi: 10.1002/cam4.2607.
16. **Di Vito C**, Mikulak J, Mavilio D. On the Way to Become a Natural Killer Cell. Front Immunol. 10:1812; 2019. Review. doi: 10.3389/fimmu.2019.01812.
17. **Di Vito C**, Mikulak J, Zaghi E, Pesce S, Marcenaro E, Mavilio D. NK cells to cure cancer. Semin Immunol. 41:101272; 2019. Review. doi: 10.1016/j.smim.2019.03.004.
18. Zaghi E, Calvi M, Marcenaro E, Mavilio D, **Di Vito C**. Targeting NKG2A to elucidate natural killer cell ontogenesis and to develop novel immune-therapeutic strategies in cancer therapy. J Leukoc Biol. 2019. Review. doi: 10.1002/JLB.MR0718-300R.
19. Roberto A*, **Di Vito C***, Zaghi E, Mazza EMC, Cappuccetti A, Tentorio P, Zanon V, Sarina B, Mariotti J, Bramanti S, Tenedini E, Tagliafico E, Bicciato S, Santoro A, Roederer M, Castagna L, Lugli E, Mavilio D. The early expansion of anergic NKG2Apos/CD56dim/CD16neg NK cells represents a therapeutic target in haploidentical HSCT. Haematologica. 103:1390-1402; 2018. doi: 10.3324/haematol.2017.186619.

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