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EDUCATION AND RESEARCH EXPERIENCE

January 2022	Associate Professor of Molecular Biology, Department of Life Sciences, University of Modena and Reggio Emilia, Italy
2006- present	Member of “Collegio” for PhD in "MOLECULAR AND REGENERATIVE MEDICINE", University of Modena and Reggio Emilia, Italy
2005 – 2021	Assistant Professor of Molecular Biology, Department of Life Sciences, University of Modena and Reggio Emilia, Italy
2003 - 2005	Post doc fellow at DIBIT - San Raffaele Hospital, Milan, Italy
1999 - 2002	Post doc fellow at TIGET - San Raffaele Hospital, Milan, Italy
1997	Visiting scientist, Department of Biology-Pathology, McMaster University, Ontario, CANADA.
1995 -1999	PhD student at IRBM P. Angeletti, Rome and University of L’Aquila, Italy
1994 -1995	Fellow at IRBM P. Angeletti, Rome, Italy
1994	Graduation with honors in Biological Science, II University of Rome “Tor Vergata”

RESEARCH INTERESTS

- Development of Gene transfer and CRISPR-mediated gene editing technologies based on viral and non viral vector to correct genetic defects *in vitro* and in animal models. Proof-of-concept gene therapy approaches for some genetic diseases (e.g., retinitis pigmentosa) have been developed and reported (see publications). To date, CRISPR-mediated gene editing approach for congenital muscular dystrophies is ongoing in the laboratory.
- Gene editing technologies to engineer T cells receptor for adoptive immunotherapy: optimize a non-viral protocol to engineer T cells to redirect their specificity toward cancer associated antigens expressed in non-small cell lung cancer (NSCLC) and other solid tumors and evaluate the clearance of cancer cells in vitro and in animal models.

BIBLIOMETRIC INDEXES

H-index: 28 (SCOPUS)

Total citation: 3658 (SCOPUS)

Publication on peer-reviewed journals: 46

TEACHING

2005-2007: Vectorology; Genomic and proteomic laboratory

2007-2008: Vectorology; Gene transfer technologies; Genomic and proteomic and structural biology

2008-2010: Recombinant DNA technologies; Biology of the regenerative medicine

2010-2014: Recombinant DNA technologies

2014-2015: Recombinant DNA technologies; Gene transfer technologies

2015-2018: Recombinant DNA technologies; Molecular and genomic methodologies

2018- 2019: Molecular and genomic methodologies; Recombinant DNA technologies; Gene transfer technologies; Biomolecular and genomic methodologies

2019-present: Gene transfer technologies; Laboratory of Molecular Biology in the Experimental Biology course; Biomolecular and genomic methodologies.

AWARD

"European Society of Gene Therapy Young Investigation Award 2004" published on J Gene Med 2004; 6:1170

MEMBERSHIP

2003 to present: Active member of the American Society of Gene and Cell Therapy (ASGCT)

2007 to present: Active member of the European Society of Gene and Cell Therapy (ESGCT)

2020 to present: Acitve member of the American Society of Human Genetic

REVIEWER

Journals: Molecular Therapy, Frontiers in medicine journals, Gene Therapy, Human Gene Therapy, Nucleic Acid Research, International Journal of Molecular Sciences, Journal of Medical Genetics etc…

Projects: PRIN, DEBRA international, Retina France, AFM telethon etc…

Associate editor for Frontiers in Medicine (Gene and cell therapy), Frontiers in Genome Editing.

RESEARCH SUPPORT

- Participant to the project: LSHB-CT-2005-512073: "Gene therapy for epidermolysis bullosa: a model system for treatment of inherited skin diseases" (from 2005 to 2008)
- Participant to the project: FP6-2004-LIFESCIHEALTH-5 "Combined isolation and stable non viral transfection of hematopoietic cells a novel platform technology for ex vivo hematopoietic stem cell gene therapy" (from 2004 to 2007)

- Participant to the project Telethon GGP06101 2006: “Understanding the interactions between retroviral gene transfer vectors and the human genome” (from 2006 to 2008)
- Participant to the AFM 2006 project: “Gene therapy of junctional epidermolysis bullosa” (from 2006 to 2008)
- Participant to the project: FP7 HEALTH-2007-1.4-4: “Development of emerging gene therapy tools and technologies for clinical application” (from 2007 to 2011)
- Principal Investigator of Telethon grant GGP08095 (from 27/11/2008 to 29/1/2011): “Pre-clinical development of lentiviral vectors for gene therapy of junctional epidermolysis bullosa”
- Principal Investigator of research unit PRIN 2008: “Integrase-nuclease based technology for efficient and safe site-specific integration of therapeutic transgenes into the human genome” (from 22/3/2010 to 22/9/2012)
- Principal Investigator of FIRB Futuro in Ricerca 2008 “Understanding the interactions between retroviral gene transfer vectors and the human genome” (from December 1st 2010 to December 1st 2013)
- Participant to the project: ANRS 2009: “Persistent alteration of hematopoiesis in children after in utero AZT-3TC exposure”
- Principal Investigator of DEBRA international “Development of gene transfer vectors for recessive dystrophic epidermolysis bullosa (RDEB)” (2011-2013)
- Participants in research units of project Programma di ricerca Regione-Università 2010-2012. Title: Next-generation sequencing and gene therapy to diagnose and cure rare diseases in regione Emilia Romagna. (starting march 2013, 3 years project)
- Principal Investigator of AFM project “Development of a new tool for gene therapy approach for autosomal dominant retinitis pigmentosa” (19/4/2013-5/8/2016)
- Participants in research units of Epigen CNR “Progetto Bandiera” (January 1st 2012, postponed to June 30th 2016. “Genome wide mapping of regulatory regions in human somatic and stem cell”.
- Participants in research units of Fondazione Roma research project “Genomic and pharmacological therapeutic approaches to target dominant mutations in Rhodopsin” (July 2015- July 2018, postponed to December 2018)
- Research contract with Reithera s.r.l (January-December 2015; March 2016-December 2016) project: “Construction of stable cell line to package Adeno vector”
- Principal investigator of FAR UNIMORE 2017
- Principal investigator of Orphan Disease Center’s Million Dollar Bike Ride pilot grant program.” CRISPR/Cas9 nuclease design to target allele-specific Collagen VI mutations in patients' fibroblasts” (January - December 2018, will be postponed to June 2019)
- Principal investigator of FAR UNIMORE 2019
- Principal investigator of AIDMED onlus, Italy “Correct mutation in LMNA and EMD genes in fibroblasts of patients affected by Emery-Dreifuss muscular dystrophy by CRISPR/Cas9 gene editing. (2020-2021)
- Principal investigator of FAR UNIMORE 2021.

- Principal investigator of AIDMED onlus, Italy “Correct mutation in LMNA and EMD genes in fibroblasts of patients affected by Emery-Dreifuss muscular dystrophy by CRISPR/Cas9 gene editing. (2022-2024)

PUBBLICATIONS

1. F. Palombo, A. Monciotti, A. Recchia, R. Cortese, G. Ciliberto and N. La Monica (1998) Site-specific integration in mammalian cells mediated by a new hybrid baculovirus-adeno-associated virus vector. J. Virol. 72: 5025-5034.

2. Recchia A., Parks RJ., Lamartina S., Toniatti C., Pieroni L., Palombo F., Ciliberto G., Cortese R., La Monica N. and Colloca S. (1999) Site-specific integration mediated by a hybrid adenovirus/adeno-associated virus vector. Proc. Natl. Acad. Sci. USA. 96: 2615-2620

3. Recchia A., Perani L., Sartori D:, Olgiati C. and Mavilio F. (2004) Site-specific integration of functional transgene into the human genome by Adeno/AAV hybrid vectors. Mol. Ther. 10: 660-670

4. Recchia A, Mavilio F (2006). Site-specific integration into the human genome: ready for clinical application? Rejuvenation Res 9 446-9.

5. Recchia A., Bonini C., Magnani Z., Urbinati F., Sartori D., Muraro S., Tagliafico E., Bondanza A., Lupo Stanghellini M., Bernardi M., Pescarollo A., Ciceri F., Bordignon C. and Mavilio F. (2006) Retroviral vector integration deregulates gene expression but has no consequence on the biology and function of transplanted T cells. Proc. Natl. Acad. Sci. USA. 103: 1457-1462

6. Mavilio F, Pellegrini G, Ferrari S, Di Nunzio F, Di Iorio E, Recchia A, Maruggi G, Ferrari G, Provasi E, Bonini C, Capurro S, Conti A, Magnoni C, Giannetti A, De Luca M (2006). Correction of junctional epidermolysis bullosa by transplantation of genetically modified epidermal stem cells. Nat Med 12 1397-402.

7. Aiuti A, Cassani B, Andolfi G, Mirolo M, Biasco L, Recchia A, Urbinati F, Valacca C, Scaramuzza S, Aker M, Slavin S, Cazzola M, Sartori D, Ambrosi A, Di Serio C, Roncarolo MG, Mavilio F, Bordignon C (2007). Multilineage hematopoietic reconstitution without clonal selection in ADA-SCID patients treated with stem cell gene therapy. J Clin Invest 117 2233-2240.

8. Cattoglio C, Facchini G, Sartori D, Antonelli A, Miccio A, Cassani B, Schmidt M, von Kalle C, Howe S, Thrasher AJ, Aiuti A, Ferrari G, Recchia A, Mavilio F (2007). Hot spots of retroviral integration in human CD34+ hematopoietic cells. Blood 110 1770-1778

9. Nodari A, Zambroni D, Quattrini A, Court FA, D'Urso A, Recchia A, Tybulewicz VL, Wrabetz L, Feltri ML. (2007) Beta1 integrin activates Rac1 in Schwann cells to generate radial lamellae during axonal sorting and myelination. J Cell Biol Jun 18;177(6):1063-75.

10. Butti E., Bergami A., Recchia A., Brambilla E., Franciotta D., Cattalini A., Stornaiuolo A., Lachapelle F., Comi G., Mavilio F., Martino G., Furlan R. (2008) Absence of an intrathecal immune reaction to a helper dependent adenoviral vector delivered into the cerebrospinal fluid of non-human primates. Gene Therapy 15 233-238

11. Butti E., Bergami A., Recchia A., Brambilla E., Del Carro U., Amadio S., Cattalini A., Esposito M., Stornaiuolo A., Comi G., Pluchino S., Mavilio F., Martino G., Furlan R. (2008) IL4 gene delivery to the CNS recruits regulatory T cells and induces clinical recovery in mouse models of multiple sclerosis. Gene therapy 15 504-515

12. Guilbaud M., Chadeuf G., Avolio F., Francois A., Moullier P., Recchia A., Salvetti A. (2008) Relative influence of the Adeno-Associated Virus (AAV) type 2 p5 element for recombinant AAV vector site-specific integration. J. Virol. 82: 2590-2593

13. Felice B., Cattoglio C., Cittaro D., Testa A., Miccio A., Ferrari G., Luzi L., Recchia A. and Mavilio F. (2009) Transcription factor binding site are genetic determinants of retroviral integration in the human genome. PLoS One. 2009;4(2):e4571. Epub 2009 Feb 24.

14. Maruggi G, Porcellini S, Facchini G, Perna SK, Cattoglio C, Sartori D, Ambrosi A, Schambach A, Baum C, Bonini C, Bovolenta C, Mavilio F, Recchia A. (2009) Transcriptional enhancers induce insertional gene deregulation independently from the vector type and design. Mol Ther. 2009 May;17(5):851-6. Epub 2009 Mar 17.

15. Gabriel R, Eckenberg R, Paruzynski A, Bartholomae CC, Nowrouzi A, Arens A, Howe SJ, Recchia A, Cattoglio C, Wang W, Faber K, Schwarzwaelder K, Kirsten R, Deichmann A, Ball CR, Balaggan KS, Yáñez-Muñoz RJ, Ali RR, Gaspar HB, Biasco L, Aiuti A, Cesana D, Montini E, Naldini L, Cohen-Haguenauer O, Mavilio F, Thrasher AJ, Glimm H, von Kalle C, Saurin W, Schmidt M. (2009) Comprehensive genomic access to vector integration in clinical gene therapy. Nat Med. Dec;15(12):1431-6.

16. Recchia A., Mavilio F. (2009) Tracking Gene-Modified T Cells In Vivo. In: Baum C. (eds) Genetic Modification of Hematopoietic Stem Cells. Methods In Molecular Biology™, vol 506. Humana Press

17. Cattoglio C, Maruggi G, Bartholomae C, Malani N, Pellin D, Cocchiarella F, Magnani Z, Ciceri F, Ambrosi A, von Kalle C, Bushman FD, Bonini C, Schmidt M, Mavilio F, Recchia A. (2010) High-definition mapping of retroviral integration sites defines the fate of allogeneic T cells after donor lymphocyte infusion. PLoS One 22;5(12):e15688.

18. Recchia A, Mavilio F. (2011) Site-Specific Integration by the Adeno-associated Virus Rep Protein. Curr Gene Ther. 2011 Aug 9

19. Holkers M, Maggio I, Liu J, Janssen JM, Miselli F, Mussolino C, Recchia A, Cathomen T, Gonçalves MA (2013) Differential integrity of TALE nuclease genes following adenoviral and lentiviral vector gene transfer into human cells. Nucleic Acids Res. 2013 Mar 1;41(5):e63. doi: 10.1093/nar/gks1446. Epub 2012 Dec 28.

20. Cieri N, Camisa B, Cocchiarella F, Forcato M, Oliveira G, Provasi E, Bondanza A, Bordignon C, Peccatori J, Ciceri F, Lupo-Stanghellini MT, Mavilio F, Mondino A, Bicciato S, Recchia A, Bonini C (2013) IL-7 and IL-15 instruct the generation of human memory stem T cells from naive precursors. Blood. 2013 Jan 24;121(4):573-84. doi: 10.1182/blood-2012-05-431718. Epub 2012 Nov 15.

21. André-Schmutz I, Dal-Cortivo L, Six E, Kaltenbach S, Cocchiarella F, Le Chenadec J, Cagnard N, Cordier AG, Benachi A, Mandelbrot L, Azria E, Bouallag N, Luce S, Ternaux B, Reimann C, Revy P, Radford-Weiss I, Leschi C, Recchia A, Mavilio F, Cavazzana M, Blanche S (2013) Genotoxic Signature in Cord Blood Cells of Newborns Exposed In Utero to a Zidovudine-Based Antiretroviral Combination. J Infect Dis. May 24

22. Coluccio A, Miselli F, Lombardo A, Marconi A, Tagliazucchi G, Gonçalves MA, Pincelli C, Maruggi G, Del Rio M, Naldini L, Larcher F, Mavilio F, Recchia A. (2013) Targeted gene addition in human epithelial stem cells by zinc-finger nuclease-mediated homologous recombination. Mol Ther. 2013 Sep;21(9):1695-704.

23. De Rosa L, Carulli S, Cocchiarella F, Quaglino D, Enzo E, Franchini E, Giannetti A, De Santis G, Recchia A, Pellegrini G and De Luca M. (2014) Long-Term Stability and Safety of Transgenic Cultured Epidermal

Stem Cells in Gene Therapy of Junctional Epidermolysis Bullosa. Stem Cell Reports. http://dx.doi.org/10.1016/j.stemcr.2013.11.001.

24. Duarte B., Miselli F., Murillas R., Espinosa-Hevia L., Cigudosa JC, Recchia A., Del Río M., Larcher F. (2014) Long-term skin regeneration from a gene-targeted human epidermal stem cell clone. Mol Ther. 2014 Nov; 22(11):1878-80. doi: 10.1038/mt.2014.187

25. Turchiano G, Latella MC, Gogol-Döring A, Cattoglio C, Mavilio F, Izsvák Z, Ivics Z, Recchia A. (2014) Genomic analysis of sleeping beauty transposon integration in human somatic cells. PLoS One. 2014 Nov 12; 9(11):e112712. doi: 10.1371/journal.pone.0112712.

26. Droz-Georget Lathion S, Rochat A, Knott G, Recchia A, Martinet D, Benmohammed S, Grasset N, Zaffalon A, Besuchet Schmutz N, Savioz-Dayer E, Beckmann JS, Rougemont J, Mavilio F, Barrandon Y. (2015) A single epidermal stem cell strategy for safe ex vivo gene therapy. EMBO Mol Med. 2015 Feb 27. pii: e201404353. doi: 10.15252/emmm.201404353.

27. Marini B, Kertesz-Farkas A, Ali H, Lucic B, Lisek K, Manganaro L, Pongor S, Luzzati R, Recchia A, Mavilio F, Giacca M, Lusic M. (2015) Nuclear architecture dictates HIV-1 integration site selection. Nature. 2015 May 14;521(7551):227-31.

28. Ungari S, Montepeloso A, Morena F, Cocchiarella F, Recchia A, Martino S, Gentner B, Naldini L, Biffi A. (2015) Design of a regulated lentiviral vector for hematopoietic stem cell gene therapy of globoid cell leukodystrophy. Mol Ther Methods Clin Dev. 2015 Oct 14;2:15038

29. Cocchiarella F, Latella MC, Basile V, Miselli F, Galla M, Imbriano C, Recchia A. (2016) Transcriptionally regulated and non-toxic delivery of the hyperactive *Sleeping Beauty* Transposase. Mol Ther Methods Clin Dev. 2016 Jun 15;3:16038. doi:10.1038/mtm.2016.38.

30. Latella MC, Di Salvo MT, Cocchiarella F, Benati D, Grisendi G, Comitato A, Marigo V, Recchia A (2016) *In vivo* editing of the human mutant *Rhodopsin* gene by electroporation of plasmid-based CRISPR/Cas9 in the mouse retina. Mol Ther Nucleic Acids. 2016 Nov 22;5(11):e389. doi: 10.1038/mtna.2016.92.

31. Bauer JW, Koller J, Murauer EM, De Rosa L, Enzo E, Carulli S, Bondanza S, Recchia A, Muss W, Diem A, Mayr E, Schlager P, Gratz IK, Pellegrini G, De Luca M. (2016) *Closure of a Large Chronic Wound through Transplantation of Gene-Corrected Epidermal Stem Cells*. J Invest Dermatol. 2016 Nov 10

32. Latella MC, Cocchiarella F, De Rosa L, Turchiano G, Gonçalves MA, Larcher F, De Luca M, Recchia A. (2016) Correction of recessive dystrophic epidermolysis bullosa by transposon-mediated integration of COL7A1 in transplantable patient-derived primary keratinocytes. J Invest Dermatol. 2017 Apr;137(4):836-844. doi: 10.1016/j.jid.2016.11.038. Epub 2016 Dec 24.

33. Gherardi S, Bovolenta M, Passarelli C, Falzarano MS, Pigini P, Scotton C, Neri M, Armaroli A, Osman H, Selvatici R, Gualandi F, Recchia A, Mora M, Bernasconi P, Maggi L, Morandi L, Ferlini A, Perini G (2017) Transcriptional and epigenetic analyses of the DMD locus reveal novel cis-acting DNA elements that govern muscle dystrophin expression. Biochim Biophys Acta. 2017 Aug 31. pii: S1874-9399(17)30135-9. doi: 10.1016/j.bbagrm.2017.08.010

34. Benati D, Cocchiarella F, Recchia A. An Efficient In Vitro Transposition Method by a Transcriptionally Regulated Sleeping Beauty System Packaged into an Integration Defective Lentiviral Vector. J Vis Exp. 2018 Jan 12;(131).

35. Cortesi F, Delfanti G, Grilli A, Calcinotto A, Gorini F, Pucci F, Lucianò R, Grioni M, Recchia A, Benigni F, Briganti A, Salonia A, De Palma M, Bicciato S, Doglioni C, Bellone M, Casorati G,

Dellabona P. Bimodal CD40/Fas-Dependent Crosstalk between iNKT Cells and Tumor-Associated Macrophages Impairs Prostate Cancer Progression. Cell Rep. 2018 Mar 13;22(11):3006-3020

36. Rossignoli F, Grisendi G, Spano C, Golinelli G, Recchia A, Rovesti G, Orsi G, Veronesi E, Horwitz EM, Dominici M. Inducible Caspase9-mediated suicide gene for MSC-based cancer gene therapy. Cancer Gene Ther. 2019 Feb;26(1-2):11-16

37. Benati D, Miselli F, Cocchiarella F, Patrizi C, Carretero M, Baldassarri S, Ammendola V, Has C, Colloca S, Del Rio M, Larcher F, Recchia A. CRISPR/Cas9-Mediated In Situ Correction of LAMB3 Gene in Keratinocytes Derived from a Junctional Epidermolysis Bullosa Patient. Mol Ther. 2018 Nov 7;26(11):2592-2603.

38. Benati D, Marigo V, Recchia A. CRISPR/Cas9 Gene Editing In Vitro and in Retinal Cells In Vivo. Methods Mol Biol. 2019;1834:59-74

39. Recchia A. AAV-CRISPR Persistence in the Eye of the Beholder. Mol Ther. 2019 Jan 2;27(1):12-14

40. Spano C, Grisendi G, Golinelli G, Rossignoli F, Prapa M, Bestagno M, Candini O, Petrachi T, Recchia A, Miselli F, Rovesti G, Orsi G, Maiorana A, Manni P, Veronesi E, Piccinno MS, Murgia A, Pinelli M, Horwitz EM, Cascinu S, Conte P, Dominici M. Soluble TRAIL Armed Human MSC As Gene Therapy For Pancreatic Cancer. Sci Rep. 2019 Feb 11;9(1):1788.

41. Rossignoli F, Spano C, Grisendi G, Foppiani EM, Golinelli G, Mastrolia I, Bestagno M, Candini O, Petrachi T, Recchia A, Miselli F, Rovesti G, Orsi G, Veronesi E, Medici G, Petocchi B, Pinelli M, Horwitz EM, Conte P, Dominici M. MSC-Delivered Soluble TRAIL and Paclitaxel as Novel Combinatory Treatment for Pancreatic Adenocarcinoma. Theranostics. 2019 Jan 1;9(2):436-448.

42. Benati D, Patrizi C, Recchia A. Gene editing prospects for treating inherited retinal diseases. J Med Genet. 2020 Jul;57(7):437-444. doi: 10.1136/jmedgenet-2019-106473. Epub 2019 Dec 19. PMID: 31857428

43. Clarissa Patrizi, Manel Llado, Daniela Benati, Carolina Iodice, Elena Marrocco, Rosellina Guarascio, Enrico M. Surace, Michael E. Cheetham, Alberto Auricchio*, Alessandra Recchia*. Allele-specific editing ameliorates dominant retinitis pigmentosa in a transgenic mouse model. The American Journal of Human Genetics 108, 1–14, February 4,2021. doi.org/10.1016/j.ajhg.2021.01.006

44. Silvia Belluti, Valentina Semeghini, Giovanna Rigillo, Mirko Ronzio, Daniela Benati, Federica Torricelli, Luca Reggiani Bonetti, Gianluca Carnevale, Giulia Grisendi, Alessia Ciarrocchi, Massimo Dominici, Alessandra Recchia, Diletta Dolfini and Carol Imbriano. Alternative splicing of NF-YA promotes prostate cancer aggressiveness and represents a new molecular marker for clinical stratification of patients. J Exp Clin Cancer Res 2021 Nov 15;40(1):362. doi: 10.1186/s13046-021-02166-4.

45. Samantha Baldassarri, Daniela Benati Federica D'Alessio, Clarissa Patrizi, Eleonora Cattin, Michela Gentile, Angelo Raggioli, Alessandra Recchia. Engineered Sleeping Beauty Transposon as Efficient System to Optimize Chimp Adenoviral Production. Int J Mol Sci. 2022 Jul 7;23(14):7538. doi: 10.3390/ijms23147538.

46. Benati D, Leung A, Perdigao P, Toulis V, van der Spuy J, Recchia A. Induced Pluripotent Stem Cells and Genome-Editing Tools in Determining Gene Function and Therapy for Inherited Retinal Disorders. Int J Mol Sci 2022 Dec 3;23(23):15276. doi: 10.3390/ijms232315276.

PATENT

“Recombinant vectors derived from Adeno-associated virus suitable for Gene Therapy”

G. Ciliberto, S. Colloca, E. Fattori, C. Fipaldini, N. La Monica, A. Monciotti, F. Palombo, L. Pieroni, A. Recchia, G. Rizzuto

International Patent: C12N 15/86, 5/12, A61K 48/00

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