BIOGRAPHICAL SKETCH

NAME: Cereseto, Anna

POSITION TITLE: Full Professor

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	END DATE	FIELD OF STUDY
University of Genova	B.Sc./M.Sc	1990	Biological Sciences
International Ed. Eval. Inc. (NC)	PHD	1997	Certified Doctor of Philosophy in Molecular Biology
NIH, NCI	N/A	1991-1998	Postdoctoral Fellow

A. Personal Statement

I am a molecular biologist at the Cellular, Computational and Integrative Biology (CIBIO) Department at University of Trento (Italy) where I lead the Laboratory for Advanced Genome Editing Technologies (https://www.cibio.unitn.it/97/laboratory-of-advanced-genome-editing-technologies) My laboratory focuses on the development of innovative biotechnology tools, including optimized CRISPR-Cas systems and novel RNA-guided nucleases, for advanced gene therapies targeting genetic diseases. This research has led us to four patents and the founding of Alia Therapeutics (https://www.aliatherapeutics.com/en/home/), where I serve as Chair of the Scientific Advisory Board, actively bridging academic research with biotech entrepreneurship.
My work spans both basic and translational science and is supported by broad experience gained through diverse scientific environments and collaborative networks. I am an active member of European consortia such as UPGRADE and AAVolution, which aim to develop gene therapy approaches for muscular dystrophies, hypercholesterolemia, hematopoietic disorders, and rare diseases affecting liver, retina, and muscle. With support from the Cystic Fibrosis Foundation, my lab has also developed genome editing delivery strategies targeting lung tissue for the treatment of cystic fibrosis. Leveraging my multidisciplinary expertise and leadership across academia and industry, I am well positioned to lead pioneering research efforts in advancing next generation gene therapies.

B. Positions, Scientific Appointments, and Honors

Positions

2018 - present	Professor in Molecular Biology, DepCIBIO, University of Trento
2010 - present	Group Leader Laboratory of Advanced Genome Editing Technologies
2021 - 2024	Deputy Director, DepCIBIO, University of Trento
2010 - 2018	Associate Professor in Molecular Biology, DepCIBIO, University of Trento
2003 - 2010	Assistant Professor in Molecular Biology, DepCIBIO, University of Trento
2001 – 2003	Post-Doctoral Fellow, International Centre for Genetic Engineering and Biotechnology (ICGEB), Trieste, Italy
1999 - 2001	Senior Staff Scientist, Laboratory of Virology, ISS-National Health Institute, Rome, Italy
1998 - 1999	Instructor, Mount Sinai School of Medicine, Institute of Gene Therapy, New York, NY, USA
1998 - 1998	Post-Doctoral Fellow, Cornell University, Division of Immunology, Weill Medical College, New York, NY, USA
1991 - 1998	Visiting Fellow, National Institute of Health (NIH), National Cancer Institute (NCI), Laboratory of Tumor Cell Biology and Laboratory of Tumor Immunology and Biology, Bethesda, MD, USA

Commission of Trust

2024 - present	Scientific Advisory Board, Chiesi USA Inc
2023-present	Scientific Committee member of the European Gene and Cell Therapy (Genome editing)
2025	CRC-Transregio Review Panel for the German Research Foundation Dec 11-12 Munich

2023 - 2025	Scientific Advisory Board member of Cluster Alisei (National technology cluster)
2023 - 2025	Scientific Advisory Board member of CRISPR-Medicine conference
2019 - present	Chair Scientific Advisory Board of Alia Therapeutics
2019 - 2022	Scientific Committee member of the European Cystic Fibrosis Conference
2018 - present	Scientific Advisory Board member of the Italian Advanced Therapy Observatory

Honors and Awards

1991	Fogarty Fellowship
1991	AIRC-Italian Association in Cancer research

C. Contribution to Science

Complete List of Published Work:
https://pubmed.ncbi.nlm.nih.gov/?term=cereseto+a+%5Bau%5D&sort=date

1- Development of genome editing tools optimized for gene therapy applications

To expand the CRISPR-Cas toolbox for gene therapy applications, we performed a comprehensive screening of a large metagenomic databank from the human microbiome to identify new CRISPR-Cas systems. This search led to the identification of a diverse array of previously uncharacterized CRISPR-Cas effectors and RNA guided nucleases with properties favorable for gene therapy use, such as reduced molecular size and extended target capabilities. We enhanced our computational pipeline to prioritize CRISPR-Cas candidates with known sequence recognition (PAM) and high predicted activity in mammalian cells.

To enable the use of inactive Cas retrieved from the natural reservoir, we developed directed evolution platforms tailored for functional optimization in eukaryotic systems. Our central hypothesis is that genome editing tools originating from bacteria require evolution rounds in eukaryotes to function in mammalian cells. Our work demonstrates that through the evolution platform we obtain Cas variants highly specific and with robust genome editing activity.

Three selected publications:

a) CoCas9 is a compact nuclease from the human microbiome for efficient and precise genome editing.
Pedrazzoli E, Demozzi M, Visentin E, Ciciani M, Bonuzzi I, Pezzè L, Lucchetta L, Maule G, Amistadi S, Esposito F, Lupo M, Miccio A, Auricchio A, Casini A, Segata N, **Cereseto A.** Nat Commun. 2024 Apr 24;15(1):3478. doi: 10.1038/s41467-024-47800-9.

b) Eukaryotic-driven directed evolution of Cas9 nucleases.
Ruta GV, Ciciani M, Kheir E, Gentile MD, Amistadi S, Casini A, **Cereseto A.** Genome Biol. 2024 Mar 25;25(1):79. doi: 10.1186/s13059-024-03215-9. PMID: 38528620

c) *A highly specific SpCas9 variant is identified by in vivo screening in yeast*. Casini A, Olivieri M, Petris G, Montagna C, Reginato G, Maule G, Lorenzin F, Prandi D, Romanel A, Demichelis F, Inga A, **Cereseto A.** Nat Biotechnol. 2018 Mar;36(3):265-271. doi: 10.1038/nbt.4066. Epub 2018 Jan 29. PMID: 29431739

2- Delivery of CRISPR-Cas tools for precise editing

Our work focused on optimize delivery methods specifically tailored for genome editing applications. Unlike conventional gene therapy which relies on the permanent expression of the transduced gene, genome editing introduces a paradigm shift favoring transient expression while maintaining efficient cellular uptake. To this end we developed strategies for the delivery of ribonucleoprotein (CRISPR-RNP) complexes either through direct cellular entry or by loading them into engineered vesicles. Alternative to protein delivery the transgene is delivered through self-limiting equipped with switch-off regulatory controls enabling transient expression.

Three selected publications:

a) *An optimized SpCas9 high-fidelity variant for direct protein delivery*. Pedrazzoli E, Bianchi A, Umbach A, Amistadi S, Brusson M, Frati G, Ciciani M, Badowska KA, Arosio D, Miccio A, **Cereseto A***, Casini A*. Mol Ther. 2023 Jul 5;31(7):2257-2265. doi: 10.1016/j.ymthe.2023.03.007. Epub 2023 Mar 10. PMID: 36905119

b) *VSV-G-Enveloped Vesicles for Traceless Delivery of CRISPR-Cas9*. Montagna C, Petris G, Casini A, Maule G, Franceschini GM, Zanella I, Conti L, Arnoldi F, Burrone OR, Zentilin L, Zacchigna S, Giacca M, **Cereseto A.** Mol Ther Nucleic Acids. 2018 Sep 7;12:453-462. doi: 10.1016/j.omtn.2018.05.010. Epub 2018 Jul 11. PMID: 30195783

c) *Hit and go CAS9 delivered through a lentiviral based self-limiting circuit*. Petris G, Casini A, Montagna C, Lorenzin F, Prandi D, Romanel A, Zasso J, Conti L, Demichelis F, **Cereseto A.** Nat Commun. 2017 May 22;8:15334. doi: 10.1038/ncomms15334. PMID: 28530235

3- Genome editing for genetic diseases

Building on our expertise in genome editing, we developed targeted strategies to correct genetic mutations. These approaches were designed through a stepwise proces that prioritized the selection of the most suitable editing technology (mutation dependent), maximized repair efficiency and rigorous assessment of specificity using whole-genome analysis. Genetic corrections were further validated through functional assays to evaluate the restoration of biological pathways disrupted by the mutations. While our primary focus has been on cystic fibrosis and Cornelia de Lange Syndrome, we have also contributed to gene therapy efforts for other conditions, including sickle cell anemia, through collaborative projects.

Three selected publications:

a) *Functional restoration of a CFTR splicing mutation through RNA delivery of CRISPR adenine base editor.* Amistadi S, Maule G, Ciciani M, Ensinck MM, De Keersmaecker L, Ramalho AS, Guidone D, Buccirossi M, Galietta LJV, Carlon MS, **Cereseto A.** Mol Ther. 2023 Jun 7;31(6):1647-1660. doi: 10.1016/j.ymthe.2023.03.004. Epub 2023 Mar 9. PMID: 36895161

b) *Allele specific repair of splicing mutations in cystic fibrosis through AsCas12a genome editing.* Maule G, Casini A, Montagna C, Ramalho AS, De Boeck K, Debyser Z, Carlon MS, Petris G, **Cereseto A.** Nat Commun. 2019 Aug 7;10(1):3556. doi: 10.1038/s41467-019-11454-9. PMID: 31391465

c) *Generation of corrected hiPSC clones from a Cornelia de Lange Syndrome (CdLS) patient through CRISPR-Cas-based technology.* Umbach A, Maule G, Kheir E, Cutarelli A, Foglia M, Guarrera L, Fava LL, Conti L, Garattini E, Terao M, **Cereseto A.** Stem Cell Res Ther. 2022 Sep 2;13(1):440. doi: 10.1186/s13287-022-03135-0. PMID: 36056433

D. Additional Information: Patents and innovation activities

Over the past three years, I have focused on developing transferable technological innovations in the field of genome editing. These efforts have led to the submission of four patent applications, which are currently under review:

1. *Vesicles for traceless delivery of guide RNA molecules and/or guide RNA molecule/RNA-guided nuclease complex (es) and a production method thereof.* WO2020012335A1.
2. *Self-Limiting Cas9 circuitry for Enhanced Safety (SLiCES) PLASMID and lentiviral system thereof.* WO2018069474A1 (related to Petris et al. Nat Comm 2017).
3. *High-fidelity Cas9 variants and applications thereof*. WO2018149888A1 (related to Casini et al, Nat Biotechnol 2017). This patent is co-licenced with Intellia Therapeutics Inc.
4. *Cas12a guide RNA molecules and uses thereof.* PCT/IB2020/051089 (related to Maule et al, Nature Comm 2019).

In 2017 as PhD coordinator of the International PhD program in Biomolecular Sciences I launched the ***Bio-Industry track*** an initiative approved by the Italian Ministry of University and Education. This track was designed to train PhD students on R&D processes within biopharmaceutical industries, patent law, entrepreneurship, innovation and start-up development. The program was implemented in collaboration with the Department of Economics and enriched with the contribution of international experts.

In 2018 together with lab members I co-founded the academic start-up company ***Alia Therapeutics*** (https://www.aliatherapeutics.com/en/home/). The company's mission is to develop highly precise, on-target gene therapies based on CRISPR-Cas9 technology. ***Alia Therapeutics*** holds ownership of the patents listed above, and shares licensing rights with Intellia Therapeutics Inc (Cambridge, MA) for the recently licensing filed patent "*High Fidelity Cas9 variants and applications thereof".* Backed by significant investment from European VCs Alia Therapeutics is rapidly expanding its business and strengthening its position in the gene therapy innovation and entrepreneurship landscape.