
BIOGRAPHICAL SKETCH

NAME: Zavattari, Patrizia

eRA COMMONS USER NAME: pzavattari

POSITION TITLE: Full Professor of Cellular and Experimental Biology

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
University of Pisa, Italy	B.Sci	06/1994	Biology
University of Milan, Italy		02/1996	Biologist - Internship Genetics of autoimmune diseases
Généthon, Centre de recherche et d'applications sur les thérapies géniques, France		11/1996 (1 year)	Research fellowship - Molecular Biology - Celiac disease
University of Turin, Italy		10/1997 (1 year)	Research fellowship - Molecular biology/genetics - Multiple sclerosis
Oxford Wellcome Trust (Oxford University), United Kingdom		09/1998 (1 year)	Research fellowship - Molecular biology - Type I diabetes
Cambridge Institute of Medical Research (Cambridge University), United Kingdom		05/1999 (1/2 year)	Research fellowship - Molecular biology -
University of Cagliari, Italy	Ph.D.	12/2003	Pediatric therapy and developmental pharmacology - Human Genetics

A. Personal Statement

I am Full Professor of Cellular and Experimental Biology at the University of Cagliari, **teaching in the Faculty of Biology and Pharmacy and in the Faculty of Medicine and Surgery**. I am the Head of a **Molecular Biology, Genomics, Epigenomics and Cellular Models Laboratory (MoBGEC)**. My current research interests mainly focused on the genetic and epigenetic mechanisms related to complex diseases such as cancer, autism spectrum disorders, obesity and viral infections, in particular searching for genomic and epigenomic alterations. I took part and coordinated research projects granted by local foundations, regional and national public institutions. Since 2014, I have been the reference researcher for the platform of genomics, NGS and microarray, at CeSAR (https://www.unica.it/unica/it/ateneo_s03_ss07.page?contentId=STR19179), University Service Center for Research, University of Cagliari, for conducting genomics, epigenomics and transcriptomics studies. At the beginning of my professional career, I carried out research projects both abroad (Paris, Oxford, Cambridge, Philadelphia) and in Italy (Pisa, Milan, Novara), in the context of the genetic of complex traits (mainly whole genome association studies), especially autoimmune diseases (i.e. type 1 diabetes, multiple sclerosis, celiac disease, etc.) and autism. In 2002, I was winner of a national selection for a Career Dulbecco Telethon. I am reviewer for various scientific journals, such as Aging-US, Cancer Immunology Research, Cancers, Cell Biochemistry & Function, Cell Biology and Toxicology, Cell Death and Disease, Chemosphere, Children, Dovepress, Epigenetics, Epigenomics, Environment International, Environmental Geochemistry and Health, FASEB Journal, Foods, Frontiers in Bioscience-Landmark, Frontiers in Endocrinology, Frontiers in Oncology,

Genes Chromosomes & Cancer, International Journal of Molecular Sciences, Journal of Cellular and Molecular Medicine, Journal of Endocrinological Investigation, Molecular Brain, Nutrients, Metabolism & Cardiovascular Diseases, Molecular Therapy - Nucleic Acids, Nutrients, Oncotarget, Plos ONE and since 2011, I am Review Editor of Frontiers (Open Access Journals). I am co-author of about sixty publications in peer-reviewed international index journals, with over 2,900 citations to date.

As head of the hosting lab, I have so far supervised about 50 undergraduates, PhD students and post-doctoral fellows, during the course of their thesis projects, in disciplines related to molecular biology, medical genetics, clinical pharmacology. I am currently teaching in the **Degree Courses of Pharmacy, Chemistry and Pharmaceutical Technology, Toxicological Sciences and Quality Control, Medicine and Surgery**, where I teach a total of about 350 students per year. I am also a member of the restricted teaching staff of the **PhD school in "Molecular and Translational Medicine"**, giving lessons and personally following a new PhD student approximately every year. I am also teaching in the health area **specialization schools in "Clinical Pharmacology and Toxicology" and in "Medical Oncology"**.

About a third of the students I supervised during their thesis, continued in the field of basic or clinical research at various institutions, including some very prestigious ones such as Oregon Health and Sciences University, United States, Friedrich Miescher Institute (FMI) for Biomedical Research in Basel, University of Texas at Austin, Uppsala Universitet, Sweden, German Cancer Research Center (DKFZ), Heidelberg.

B. Positions and Honors

Positions and Employment

2004-2004	Visiting Scientist , Alfred I. duPont Hospital for Children, Bethesda, Wilmington, USA
1999-2009	Assistant Professor , University of Cagliari, Italy
2008-2010	Scientist – Research, Local Health Authority of Cagliari, Italy
2010-2014	Researcher , University of Cagliari, Italy
2014-2020	Scientific Referent for the platform of genomics , NGS and microarray, Genomics, Transcriptomics and Epigenomics, CeSAR (Centro Servizi di Ateneo per la Ricerca)
2014-2023	Associate Professor of Cellular and Experimental Biology , Department of Biomedical Sciences, University of Cagliari, Italy
2021-2024	Vice President of the Faculty of Biology and Pharmacy, University of Cagliari, Italy
2023-	Full Professor of Cellular and Experimental Biology , Department of Biomedical Sciences, University of Cagliari, Italy
2024-	Coordinator of the Degree Course in Toxicological Sciences and Quality Control, University of Cagliari, Italy

Other Experience and Professional Memberships

2010-	Member of the Educational Guidance Committee of the Faculty of Biology and Pharmacy, University of Cagliari, Italy
2010-	Member of the Italian Society of General and Molecular Biology and Genetics (AIBG)
2011-	Review Editor for Frontiers in Oncology
2013-	Member of the Italian Society of Cancerology (SIC)
2013-	Member of the European Association for Cancer Research (EACR)
2016-	Referent for quality assurance of the Biomedical Sciences Department, part of the University Quality Management, University of Cagliari, Italy
2017-	Member of the SIOP-LGG (Society for Paediatric Oncology-Low Grade Gliomas) Preclinical Working Group
2017-	Member of Editorial Board of Journal of Clinical Diabetes
2019-	President of the didactic commission for the degree course in Nursing, Faculty of Medicine and Surgery, University of Cagliari, Italy
2023-	Member of the Epigenetics Society

Honors

2002	Winner of a national selection for a Career Dulbecco Telethon
2012	Award Autonomous Region of Sardinia relating to PRIN calls
2019	Award Autonomous Region of Sardinia relating to RAS Law 7/2007 tenders
2022	Recognition in several newspapers for the discovery of a tumor biomarker for bile duct cancer

C. Contribution to Science

1. In my professional career I carried out research projects both abroad (**Paris, Oxford, Cambridge, Philadelphia**) and in Italy (**Pisa, Milan, Novara**), in the context of **genetic complex traits** (mainly whole genome association studies), especially **autoimmune diseases** (i.e. type 1 diabetes, multiple sclerosis, celiac disease).

Main publications in the topic:

a. **Zavattari P**, Deidda E, Whalen M, Lampis R, Mulargia A, Loddo M, Eaves I, Mastio G, Todd JA, Cucca F. Major factors influencing linkage disequilibrium by analysis of different chromosome regions in distinct populations: demography, chromosome recombination frequency and selection.

Hum Mol Genet. 2000 Dec 12;9(20):2947-57.

b. **Zavattari P**, Lampis R, Motzo C, Loddo M, Mulargia A, Whalen M, Maioli M, Angius E, Todd JA, Cucca F. Conditional linkage disequilibrium analysis of a complex disease superlocus, IDDM1 in the HLA region, reveals the presence of independent modifying gene effects influencing the type 1 diabetes risk encoded by the major HLA-DQB1, -DRB1 disease loci.

Hum Mol Genet. 2001 Apr 1;10(8):881-9. doi: 10.1093/hmg/10.8.881. PMID: 11285254.

b. **Zavattari P**, Deidda E, Pitzalis M, Zoa B, Moi L, Lampis R, Contu D, Motzo C, Frongia P, Angius E, Maioli M, Todd JA, Cucca F. No association between variation of the FOXP3 gene and common type 1 diabetes in the Sardinian population.

Diabetes. 2004 Jul;53(7):1911-4.

d. Vang T, Congia M, Macis MD, Musumeci L, Orrú V, **Zavattari P**, Nika K, Tautz L, Taskén K, Cucca F, Mustelin T, Bottini N. Autoimmune-associated lymphoid tyrosine phosphatase is a gain-of-function variant.

Nat Genet. 2005 Dec;37(12):1317-9. Epub 2005 Nov 6.

e. Sanna S, Pitzalis M, Zoledziewska M, Zara I, Sidore C, Murru R, Whalen MB, Busonero F, Maschio A, Costa G, Melis MC, Deidda F, Poddie F, Morelli L, Farina G, Li Y, Dei M, Lai S, Mulas A, Cuccuru G, Porcu E, Liang L, **Zavattari P**, Moi L, Deriu E, Urru MF, Bajorek M, Satta MA, Cocco E, Ferrigno P, Sotgiu S, Pugliatti M, Traccis S, Angius A, Melis M, Rosati G, Abecasis GR, Uda M, Marrosu MG, Schlessinger D, Cucca F. Variants within the immunoregulatory CBLB gene are associated with multiple sclerosis.

Nat Genet. 2010 Jun;42(6):495-7. doi: 10.1038/ng.584. Epub 2010 May 9.

2. My professional path led me in recent years to radically change my lines of research, however, becoming autonomous and covering currently a professorship at the **University of Cagliari**. Applying the experience gained in the field of complex genetic diseases, particularly autoimmune diseases, today to the **molecular oncology**, I immediately got really interesting results that I have published. My current research interests are mainly focused on molecular oncology, in particular searching for **genomic and epigenomic** alterations of solid tumors, such as colorectal cancer, biliary tract cancer, gastric cancer, gliomas, hepatocellular carcinoma, and chronic lymphocytic leukemia.

Main publications in the topic:

a. **Zavattari P***, Perra A, Menegon S, Kowalik MA, Petrelli A, Angioni MM, Follenzi A, Quagliata L, Ledda-Columbano GM, Terracciano L, Giordano S, Columbano A. Nrf2, but not β -catenin, mutation represents an early event in rat hepatocarcinogenesis.

Hepatology. 2015 Sep;62(3):851-62. doi: 10.1002/hep.27790. Epub 2015 Apr 22.

b. Fadda A, Gentilini D, Moi L, Barault L, Leoni VP, Sulas P, Zorcolo L, Restivo A, Cabras F, Fortunato F, Zavattari C, Varesco L, Gismondi V, De Miglio MR, Scanu AM, Colombi F, Lombardi P, Sarotto I, Loi E, Leone F, Giordano S, Di Nicolantonio F, Columbano A, **Zavattari P**. Colorectal cancer early methylation alterations affect the crosstalk between cell and surrounding environment, tracing a biomarker signature specific for this tumor.

Int J Cancer. 2018 Aug 15;143(4):907-920. doi: 10.1002/ijc.31380. Epub 2018 Apr 6.

c. Barault L, Amatu A, Siravegna G, Ponzetti A, Moran S, Cassingena A, Mussolin B, Falcomatà C, Binder AM, Cristiano C, Oddo D, Guarrera S, Cancelliere C, Bustreo S, Bencardino K, Maden S, Vanzati A, **Zavattari P**, Matullo G, Truini M, Grady WM, Racca P, Michels KB, Siena S, Esteller M, Bardelli A, Sartore-Bianchi A, Di Nicolantonio F. Discovery of methylated circulating DNA biomarkers for comprehensive non-invasive monitoring of treatment response in metastatic colorectal cancer.

Gut. 2018 Nov;67(11):1995-2005. doi: 10.1136/gutjnl-2016-313372. Epub 2017 Oct 5.

PNRR 2022-2025
(Over 300 M€ of which over 1.5 M€ to UNICA)
National Center for Gene Therapy and Drugs based on RNA Technology
Study of circulating microRNAs as therapeutic targets for the liposomal delivery of ASO and siRNA for the control of iron accumulation in subjects with transfusion-dependent beta thalassemia
Role: Head of the Research Unit

Proof of Concept (PoC) 2023-2024
(80 K€)
“MARKEr eplgeneTici per Screening tUmorali pREcoci non invasivi (MAKE IT SURE)
Proof of Concept for the valorization of existing patents
Role: PI

PRIN PNRR 2023-2025
(225 K€)
Autism spectrum disorders on in Vitro, in vivo and aRtificial InTelligence
modElS (The FAVORITE project)
In vitro and in vivo characterization of genes associated with autism spectrum disorders.
Role: PI

Completed Research Support

PROT. 1129733/21 Zavattari (PI) 2021-2022
Study of the functional role of *CAPG*, a candidate gene for the study of autistic disorder
The goal of this project is to analyse *CAPG* promoter DNA methylation and haplotypes in patients with autism spectrum disorder and controls
Role: PI

RICERCA_1C-177 Zavattari (PI) 2018-2020
Electronic platform for the diagnostic and prognostic detection of tumor markers
The goal of this project was to develop an electronic platform to detect methylation-based tumour markers
Role: PI

AIM1872170-1 Zavattari (PI) 2019-2022
Genomic editing, Induced Pluripotent Stem Cells (iPSC) and organoids towards personalized medicine
The goal of this project was to perform genomic editing experiments in iPSC and organoids
Role: PI

Prot. U1528.2019 / AI.1422.BE Zavattari (PI) 2019-2020
GENOMIC, TRANSCRIPTOMIC AND PROTEOMIC SCREENING ON A WIDE COHORT OF PATIENTS WITH AUTISTIC SPECTRUM DISORDER: EVALUATION OF THE *CAPG* GENE EXPRESSION
The goal of this project was to analyse *CAPG* at genomic, transcriptomic and proteomic level in patients with autism spectrum disorder and controls
Role: PI

RASSR11387 Rongioletti (PI) 2019-2020
Identification of epigenetic biomarkers associated with the diagnosis and prognosis of skin melanoma: from clinical observation to DNA methylation
The goal of this project was to detect DNA methylation alterations in skin melanoma patients as useful biomarkers for diagnosis and better prognosis
Role: Head of the Genomics and Epigenomics Research Unit

CRP-79303 Zavattari (PI) 2015-2018
Methylome alteration as a possible tumor marker of colorectal cancer
The goal of this project was to identify new and very efficient tumour biomarkers as tools for early cancer diagnosis
Role: PI

F72F16003120002 Columbano (PI) 2016-2018

Role of the TR/T3 axis on the development of hepatocellular carcinoma
This project aimed at investigating the role of methylation alterations in hepatic tumour
Role: Head of the Genomics and Epigenomics Research Unit

Columbano (PI) 2015-2018

Role of the TR/T3 axis on the development of hepatocellular carcinoma
This project aimed at investigating the role of TR/T3 axis on the development of hepatocellular carcinoma
Role: Head of the Genomics and Epigenomics Research Unit

2010585JMZ Zavattari (PI) 2013-2014

Methylome study of paediatric low-grade gliomas
Study of methylation differences in low-grade gliomas of different brain localizations and different age of onset
Role: PI

Prot. 738/2012-0246 Zavattari (PI) 2012-2013

Alterations of methylation in colon cancer: from the genomic approach to the research of biomarkers towards an early diagnosis
One-year project that allowed to start studying the first 24 samples of patients with CRC to identify alterations in the methylome.
Role: PI

2010 Zavattari (PI) 2010-2011

Identification of molecular defects underlying plurimalformative syndromes in the Sardinian population
The goal of the project was to detect molecular alterations in patients with plurimalformative syndromes
Role: PI

Doneddu (PI) 2009-2010

Genetic study on autism
The aim was to identify genetic variants shared between affected siblings with autism
Role: Head of the Genomics Research Unit

Cucca (PI) 2007-2008

Dissection of genetic factors and understanding of the mechanisms responsible for autoimmune diabetes
The aim of this project was to identify novel type I diabetes predisposing loci and to clarify the functional mechanism involved in the etiology of the disease
Role: Post-doc associate research scientist

Cucca (PI) 2005-2006

Research of the genetic factors responsible for susceptibility to autoimmune diabetes and understanding of their functional consequences
The aim was to clarify the functional role of HLA class II molecules in predisposing to type I diabetes
Role: Post-doc associate research scientist

Cucca (PI) 2004-2005

Definition of the etiopathogenetic basis of Type 1 Diabetes as an essential step for its prevention.
The aim was to understand the genetic basis of Type 1 Diabetes with a particular focus of HLA predisposing role
Role: Post-doc associate research scientist

GJT030477 Cucca (PI) 2003-2004

A search for Type 1 diabetes genes in Sardinia.
The aim was to understand the genetic basis of Type 1 Diabetes
Role: Post-doc associate research scientist

1-2002-111 Cucca (PI) 2002-2003

Dissection of the genetic bases of Type 1 Diabetes in the isolated founder population of Sardinia.
The aim was to understand the genetic basis of Type 1 Diabetes
Role: Associate research scientist

E1109 Cucca (PI) 1999-2001

Linkage Disequilibrium mapping of a Type 1 Diabetes (T1DM) gene on chromosome Xp22-p11.

The aim was to understand the genetic basis of Type 1 Diabetes with a particular focus on Xp22-p11 locus
Role: Associate research scientist

Publications

A complete list of my publications can be found at:

<https://pubmed.ncbi.nlm.nih.gov/?term=Zavattari%20P&sort=date&page=5>

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