PERSONAL INFORMATION

Maria Giulia Bacalini

Sex F | Date of birth 03/01/1983 | Nationality Italian

I am very enthusiastic of doing research, as it allows to combine my curious nature ("Questions, not answers, make science the ultimate adventure", Greene 2009), with the chance to have a positive impact on human health and society.

WORK EXPERIENCE

2015/2016

Adjunct Professor
66569 - Dna/Rna Dynamics (Module 2) (Teaching activity in English)
School: Science, University of Bologna,
Degree programme: Second cycle degree programmes (LM) in Bioinformatics

October 2014 - present

Research fellowship
University of Bologna, Department of Experimental, Diagnostic and Specialty Medicine – DIMES
DNA methylation status in breast cancer: a comparison between healthy and cancer tissues
Analysis of DNA methylation in physiological and pathological aging by genome-wide and target gene approaches.

- I have carried on previous studies on physiological and pathological aging.
- I am investigating DNA methylation alterations in breast cancer, and more in general in tumours, by combining experimental approaches and meta-analysis of existing data, with particular emphasis to the link between biological aging and cancer onset and progression.
- I have been involved in the management and in the experimental tasks of the FP7 European Projects IDEAL and NU-AGE; I am actively involved in the H2020 projects PROPAG-AGEING and PANINI.
- I have actively contributed to the writing of European and National research proposals.

January 2012 - present

Research fellowship
University of Bologna, Galvani Interdipartimental Center for Biophysics, Bioinformathics and Biocomplexity, Prof. Claudio Franceschi's Laboratory

Analysis of DNA methylation in physiological and pathological aging by genome-wide and target gene approaches.

- I have supervised the design and the realization of experiments to characterize the molecular basis of human aging and of human diseases, using different models (centenarians, subjects affected by Down syndrome, patients affected by breast cancer) and biological specimens (blood, cell cultures, tissues).
- I have used the Infinium HumanMethylation450 BeadChip and the Sequenom EpiTYPER platforms to study DNA methylation patterns
- I have developed an original bioinformatic and statistical pipeline for the analysis of data from the Infinium HumanMethylation450 BeadChip microarray.
- I have been involved in genetic studies in the field of human longevity.
- I have been involved in the management and in the experimental tasks of the FP7 European Projects MARK-AGE and IDEAL.
- I have actively contributed to the writing of European and National research proposals.

Business or sector Research

November 2012 – present

Co-founder at Personal Genomics

I am co-founder at Personal Genomics, a spin-off of University of Verona which provides personal genomics services

Business or sector Biotechnology

August 2012 – April 2013

Term employment contract

Alpha Test S.r.l.

Biology teacher

Business or sector Education

November 2010 – December 2011

Research fellowship

Sapienza University of Rome, Department of Celluar Biotechnologies and Haematology, Prof. Paola Caiafa's Laboratory

Quantitative analysis of DNA methylation by MALDI-TOF Mass Spectrometry.

I have developed an original experimental approach, based on the Sequenom EpiTYPER platform, to analyse the DNA methylation status of subtelomeric DNA sequences.

Business or sector Research

November 2007 – October 2010

PhD fellowship in Human Biology and Genetics

Sapienza University of Rome, Department of Celluar Biotechnologies and Haematology, Prof. Paola Caiafa's Laboratory. Supervisor: Prof. Anna Reale

Role of poly(ADP-ribosyl)ation reactions in the DNA damage response.

- During my PhD period I have analysed the role of poly(ADP-ribosyl)ation reactions in the DNA damage response, focusing on the role of the PARP-1 enzyme in stabilizing the transcription factor Che-1. To this end I took care both of the design and of the implementation of experiments, using numerous molecular and cellular biology techniques.
- I have analyzed the expression and the function of PARP-1 and Che-1 in samples of chronic lymphocytic leukemia.
- I have actively contributed to other research projects in the laboratory, concerning the mechanisms of poly(ADP-ribosyl)ation and DNA methylation reactions both in physiological and pathological settings.
- I have actively taken part to the management and the experimental tasks of the FP7 European Project MARK-AGE.

Business or sector Research

August 2009 - September 2009

Visiting Scientist

University of Konstanz, Germany. Molecular Toxicology Group, Prof. Alexander Burkle's Laboratory

Quantification of DNA damage and DNA repair by FADU (Fluorimetric Detection of Alkaline DNA Unwinding) assay

Business or sector Research

May 2007 - October 2007 Fellowship
EBRI (European Brain Research Institute), fondazione Rita Levi Montalcini, Prof. Antonino Cattaneo's Laboratory
Elaboration, annotation and mining of microarray data for a mouse model of Alzheimer disease
Business or sector Reserach

2006 Fellowship
Molecular Pathology Laboratory, International Centre for Genetic Engineering and Biotechnology (ICGEB), Trieste. Prof. Francisco Baralle's Laboratory
Role of splicing and of its alterations in pathogenesis of human diseases and their prevention by recombinant DNA strategies.
Business or sector Research

EDUCATION AND TRAINING

13 - 18 June 2010 **CSAMA10 Course "Computational Statistics for Genome Biology"**
Milano University and Padova University
Computational statistics for microarray, Next-generation Sequencing, RNA-Seq, Chip-Seq experiments

November 2007 - October 2010 **PhD in Human Biology and Genetics**
Sapienza University of Rome, Department of Celluar Biotechnologies and Haematology
Experimental thesis: "Poly(ADP-ribosyl)ation affects stabilization of Che-1 protein in response to DNA damage"
In addition to research activities, my PhD period has provided weekly participation to journal clubs, the presentation of data and of works of scientific interest, attendance to national and international conferences.

2004 - 2007 **Graduate degree in Molecular and Industrial Biotechnology (Class 8/S)**
University of Bologna
Experimental thesis titled "Role of guanosine ripetition in the splicing of cystathionine beta-synthase gene. Towards a splicing molecular code"
Graduated with honour, 110/110 cum Laudem

2001 - 2004 **Undergraduate degree in Biotechnology**
University of Bologna
Experimental thesis titled "Clinical relevance of caveolin-1, follistatin, cadherin-13 e ezrin in human osteosarcoma; analysis of their prognostic value by immunohistochemistry"
Graduated with honour, 110/110 cum Laudem

1996 - 2001 **High school – Maturità classica**
Liceo Classico "Annibal Caro" Fermo (FM)

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s)

UNDERSTANDING	SPEAKING	WRITING

	Listening	Reading	Spoken interaction	Spoken production	
English	B2 Independent User	B2 Independent User	B2 Independent User	B2 Independent User	B2 Independent User

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user
Common European Framework of Reference for Languages

Communication skills

- Excellent written and verbal communication skills.
- Speaking in public and to groups.

Organisational / managerial skills

- Able to manage human and material resources
- Goal-oriented and results-driven
- Able to prioritize and operate proactively
- Excellent propensity for teamwork gained both during the PhD program and the many group projects carried out during the degree course.
- Pragmatic approach to problem solving.

Job-related skills

- Creative and enthusiastic character.
- Adaptable to different working contexts.
- Strong work ethic.

Computer skills

Mac (OS X Tiger e Leopard), Windows, Office, Photoshop,

Driving licence

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ADDITIONAL INFORMATION

Technical skills

Human and mouse cell cultures; gene silencing and expression by transfection.

RNA extraction from different biological matrices
RNA analysis (RT-PCR, Quantitative Real Time PCR)
RNA-protein interaction assays (RNA pulll down, EMSA)
In vitro analysis of enzymatic activity and protein-protein interactions (GST-pull down, immunoprecipitation)

Immunofluorescence and immunohistochemistry

Proteins extraction and analysis (Western Blotting)
Recombinant protein expression in bacteria
Bacterial cultures and transformations

DNA extraction from different biological matrices
DNA analysis (restriction enzymes digestion, agarose and polyacrylamide gels), cloning, PCR, sequencing

Analysis of DNA methylation: bisulphite conversion, EpiTYPER MassArray assay, Illumina Infinium HumanMethylation450, MeDip-seq

Bio-informatic expertise: database mining (UCSC, NCBI, GEO, Ensembl, Swiss-Prot, alternative splicing databases as Fast-DB, Hollywood, ASDB), microarray data analysis (FeatureExtraction, GeneSpring), analysis of biological sequences, visualization of

protein structure (Rasmol, Swiss-Model), phylogenetic analysis, R and Bioconductor.

Knowledge of the main next-generation sequencing approaches for genomic and transcriptomic analysis.

Publications

Ciccarone F, Malavolta M, Calabrese R, Guastafierro T, **Bacalini MG**, Reale A, Franceschi C, Capri M, Hervonen A, Hurme M, Grubeck-Loebenstein B, Koller B, Bernhardt J, Schön C, Slagboom PE, Toussaint O, Sikora E, Gonos ES, Breusing N, Grune T, Jansen E, Dollé M, Moreno-Villanueva M, Sindlinger T, Bürkle A, Zampieri M, Caiafa P. Age-dependent expression of DNMT1 and DNMT3B in PBMCs from a large European population enrolled in the MARK-AGE study. Aging Cell. 2016 May 11. doi: 10.1111/acel.12485.

Giuliani C, Cilli E, **Bacalini MG**, Pirazzini C, Sazzini M, Gruppioni G, Franceschi C, Garagnani P, Luiselli D. Inferring chronological age from DNA methylation patterns of human teeth. Am J Phys Anthropol. 2016 Apr;159(4):585-95.

Horvath S, Pirazzini C, **Bacalini MG**, Gentilini D, Di Blasio AM, Delledonne M, Mari D, Arosio B, Monti D, Passarino G, De Rango F, D'Aquila P, Giuliani C, Marasco E, Collino S, Descombes P, Garagnani P, Franceschi C. Decreased epigenetic age of PBMCs from Italian semi-supercentenarians and their offspring. Aging (Albany NY). 2015 Dec;7(12):1159-70.

Giampieri E, Remondini D, **Bacalini MG**, Garagnani P, Pirazzini C, Yani SL, Giuliani C, Menichetti G, Zironi I, Sala C, Capri M, Franceschi C, Bürkle A, Castellani G. Statistical strategies and stochastic predictive models for the MARK-AGE data. Mech Ageing Dev. 2015 Nov;151:45-53.

Castellani GC, Menichetti G, Garagnani P, **Bacalini MG**, Pirazzini C, Franceschi C, Collino S, Sala C, Remondini D, Giampieri E, Mosca E, Bersanelli M, Vitali S, Valle IF, Liò P., Milanesi L. Systems medicine of inflammaging. Brief Bioinform. 2015 Aug 24. pii: bbv062. [Epub ahead of print] PubMed PMID: 26307062.

Gentilini D, Garagnani P, Pisoni S, **Bacalini MG**, Calzari L, Mari D, Vitale G, Franceschi C, Di Blasio AM. Stochastic epigenetic mutations (DNA methylation) increase exponentially in human aging and correlate with X chromosome inactivation skewing in females. Aging (Albany NY). 2015 Aug;7(8):568-78. PubMed PMID: 26342808; PubMed Central PMCID: PMC4586102.

de Kreutzenberg SV, Ceolotto G, Cattelan A, Pagnin E, Mazzucato M, Garagnani P, Borelli V, **Bacalini MG**, Franceschi C, Fadini GP, Avogaro A. Metformin improves putative longevity effectors in peripheral mononuclear cells from subjects with prediabetes. A randomized controlled trial. Nutr Metab Cardiovasc Dis. 2015 Jul;25(7):686-93. doi: 10.1016/j.numecd.2015.03.007. Epub 2015 Mar 24. PubMed PMID: 25921843.

Testa R, Vanhooren V, Bonfigli AR, Boemi M, Olivieri F, Ceriello A, Genovese S, Spazzafumo L, Borelli V, **Bacalini MG**, Salvioli S, Garagnani P, Dewaele S, Libert C, Franceschi C. N-glycomic changes in serum proteins in type 2 diabetes mellitus correlate with complications and with metabolic syndrome parameters. PLoS One. 2015 Mar 20;10(3):e0119983. doi: 10.1371/journal.pone.0119983. eCollection 2015. PubMed PMID: 25793407; PubMed Central PMCID: PMC4368037.

Bacalini MG, Boattini A, Gentilini D, Giampieri E, Pirazzini C, Giuliani C, Fontanesi E, Remondini D, Capri M, Del Rio A, Luiselli D, Vitale G, Mari D, Castellani G, Di Blasio AM, Salvioli S, Franceschi C, Garagnani P. A meta-analysis on age-associated changes in blood DNA methylation: results from an original analysis pipeline for Infinium 450k data. Aging (Albany NY). 2015

Feb;7(2):97-109. PubMed PMID: 25701668; PubMed Central PMCID: PMC4359692.

Bacalini MG, Gentilini D, Boattini A, Giampieri E, Pirazzini C, Giuliani C, Fontanesi E, Scurti M, Remondini D, Capri M, Cocchi G, Ghezzo A, Del Rio A, Luiselli D, Vitale G, Mari D, Castellani G, Fraga M, Di Blasio AM, Salvioli S, Franceschi C, Garagnani P. Identification of a DNA methylation signature in blood cells from persons with Down Syndrome. Aging (Albany NY). 2015 Feb;7(2):82-96. PubMed PMID: 25701644; PubMed Central PMCID: PMC4359691.

Horvath S, Garagnani P**, Bacalini MG**, Pirazzini C, Salvioli S, Gentilini D, Di Blasio AM, Giuliani C, Tung S, Vinters HV, Franceschi C. Accelerated epigenetic aging in Down syndrome. Aging Cell. 2015 Jun;14(3):491-5. doi: 10.1111/acel.12325. Epub 2015 Feb 9. PubMed PMID: 25678027; PubMed Central PMCID:
PMC4406678.

Giuliani C, **Bacalini MG**, Sazzini M, Pirazzini C, Franceschi C, Garagnani P, Luiselli D. The epigenetic side of human adaptation: hypotheses, evidences and theories. Ann Hum Biol. 2015 Jan;42(1):1-9. doi: 10.3109/03014460.2014.961960. Epub 2014 Nov 21. Review. PubMed PMID: 25413580.

Quercia S, Candela M, Giuliani C, Turroni S, Luiselli D, Rampelli S, Brigidi P, Franceschi C, **Bacalini MG**, Garagnani P, Pirazzini C. From lifetime to evolution: timescales of human gut microbiota adaptation. Front Microbiol. 2014 Nov 4;5:587. doi: 10.3389/fmicb.2014.00587. eCollection 2014. Review. PubMed PMID: 25408692; PubMed Central PMCID: PMC4219431.

Ciccarone F, Valentini E, **Bacalini MG**, Zampieri M, Calabrese R, Guastafierro T, Mariano G, Reale A, Franceschi C, Caiafa P. Poly(ADP-ribosyl)ation is involved in the epigenetic control of TET1 gene transcription. Oncotarget. 2014 Apr 17.

Bacalini MG, Pacilli A, Giuliani C, Penzo M, Trerè D, Pirazzini C, Salvioli S, Franceschi C, Montanaro L, Garagnani P. The nucleolar size is associated to the methylation status of ribosomal DNA in breast carcinomas. BMC Cancer. 2014 May 22;14:361.

Garagnani P, Pirazzini C, Giuliani C, Candela M, Brigidi P, Sevini F, Luiselli D, **Bacalini MG**, Salvioli S, Capri M, Monti D, Mari D, Collino S, Delledonne M, Descombes P, Franceschi C. The three genetics (nuclear DNA, mitochondrial DNA, and gut microbiome) of longevity in humans considered as metaorganisms. Biomed Res Int.;2014:560340.

Calabrese R, Valentini E, Ciccarone F, Guastafierro T, **Bacalini MG**, Ricigliano VA, Zampieri M, Annibali V, Mechelli R, Franceschi C, Salvetti M, Caiafa P. TET2 gene expression and 5-hydroxymethylcytosine level in multiple sclerosis peripheral blood cells. Biochim Biophys Acta. 2014 Jul;1842(7):1130-6.

Bacalini MG, Friso S, Olivieri F, Pirazzini C, Giuliani C, Capri M, Santoro A, Franceschi C, Garagnani P. Present and future of anti-ageing epigenetic diets. Mech Ageing Dev. 2014 Mar-Apr;136-137:101-15.

Capri M, Santoro A, Garagnani P, **Bacalini MG**, Pirazzini C, Olivieri F, Procopio A, Salvioli S, Franceschi C. Genes of human longevity: an endless quest? Curr Vasc Pharmacol. 2013 Dec 18

Garagnani P, Giuliani C, Pirazzini C, Olivieri F, **Bacalini MG**, Ostan R, Mari D, Passarino G, Monti D, Bonfigli AR, Boemi M, Ceriello A, Genovese S, Sevini F, Luiselli D, Tieri P, Capri M, Salvioli S, Vijg J, Suh Y, Delledonne M, Testa R, Franceschi C. Centenarians as super-controls to assess the biological relevance of genetic risk factors

for common age-related diseases: a proof of principle on type 2 diabetes. Aging. 2013 May;5: 373-85.

Salvioli S, Monti D, Lanzarini C, Conte M, Pirazzini C, **Bacalini MG**, Garagnani P, Giuliani C, Fontanesi E, Ostan R, Bucci L, Sevini F, Yani SL, Barbieri A, Lomartire L, Borelli V, Vianello D, Bellavista E, Martucci M, Cevenini E, Pini E, Scurti M, Biondi F, Santoro A, Capri M, Franceschi C. Immune system, cell senescence, aging and longevity--inflamm-aging reappraised. Curr Pharm Des. 2013;19(9):1675-9.

Guastafierro T, Catizone A, Calabrese R, Zampieri M, Martella O, **Bacalini MG**, Reale A, Di Girolamo M, Miccheli M, Farrar D, Klenova E, Ciccarone F, Caiafa P.
ADP-ribose polymer depletion leads to nuclear Ctcf re-localization and chromatin rearrangement. Biochem J. 2013 Feb 1;449(3):623-30

Ciccarone F, Klinger FG, Catizone A, Calabrese R, Zampieri M, **Bacalini MG**, De Felici M, Caiafa P. Poly(ADP-ribosyl)ation acts in the DNA demethylation of mouse primordial germ cells also with DNA damage-independent roles. PLoS One. 2012;7(10):e46927.

Garagnani P, **Bacalini MG**, Pirazzini C, Gori D, Giuliani C, Mari D, Di Blasio AM, Gentilini D, Vitale G, Collino S, Rezzi S, Castellani G, Capri M, Salvioli S, Franceschi C.
Methylation of ELOVL2 gene as a new epigenetic marker of age. Aging Cell. 2012 Dec;11(6):1132-4.

Pirazzini C, Giuliani C, **Bacalini MG***, Boattini A, Capri M, Fontanesi E, Marasco E, Mantovani V, Pierini M, Pini E, Luiselli D, Franceschi C, Garagnani P.
* corresponding author
Space/population and time/age in DNA methylation variability in humans: a study on IGF2/H19 locus in different Italian populations and in mono- and di-zygotic twins of different age. Aging (Albany NY). 2012 Jul;4(7):509-20.

Bacalini MG*, Tavolaro S.*, Peragine N., Marinelli M., Santangelo S., Del Giudice I., Mauro F.R., Di Maio V., Ricciardi M.R., Caiafa P., Chiaretti S., Foà R., Guarini A., Reale A.
*equal contribution
A subset of chronic lymphocytic leukemia (CLL) patients displays reduced levels of PARP1 expression coupled to a defective irradiation-induced apoptosis. Exp. Hematol. 2012 Mar;40(3):197-206

Zampieri M., Guastafierro T., Calabrese R., Ciccarone F., **Bacalini M.G**., Reale A., Perilli M., Passananti C., Caiafa P.
ADP-ribose polymers localized on Ctcf-Parp1-Dnmt1 complex prevent methylation of Ctcf target sites. Biochem J. 2011 Oct 11

Bacalini M.G., Di Lonardo D., Catizone A., Bruno T., Zampieri M., Guastafierro T., Ciccarone F., Calabrese R., Fanciulli M., Passananti C., Caiafa P., Reale A.
Poly(ADP-ribosyl)ation affects stabilization of Che-1 protein in response to DNA damage. DNA Repair (Amst) 2011, 10:380-9

Zampieri M., Ciccarone F., Guastafierro T., **Bacalini M.G**., Calabrese R., Moreno-Villanueva M., Reale A., Chevanne M., Bürkle A., Caiafa P.
Validation of suitable internal control genes for expression studies in aging. Mech Ageing Dev 2010, 131:89-95.

Zampieri M., Passananti C., Calabrese R., Perilli M., Corbi N., De Cave F., Guastafierro T., **Bacalini M.G**., Reale A., Amicosante G., Calabrese L., Zlatanova J. and Caiafa, P.
Parp1 localizes within the Dnmt1 promoter and protects its unmethylated state by its enzymatic activity, PLosOne 2009; 4(3)

Romano M., **Bacalini M.G.**, Verschoor E.J., Crovella S., Baralle F.E.
Origin and evolution of the c.844_845ins68/c.833T>C mutations within the cystathionine beta-synthase gene in great apes
FEBS Lett. 2008 Feb 6;582(3):423-6

Oral presentations

Personal Genomics and cancer diagnostics: the challenge of NGS data interpretation
Next Generation Sequencing for Targeted Personalized Therapy of Leukemia, 30/11-1/12/2012, Bologna

Subtelomeric methylation assay for human PBMC by EpiTyper
R2-MARK-AGE Meeting, 4-8/10/2010, Bucharest, Romania

Poly(ADP-ribosyl)ation affects stabilization of Che-1 protein in response to DNA damage.
XXIII Italian Meeting on ADP-Ribosylation Reaction, 23-24/09/2010, Rome, Italia

PARP-1 meets Che-1 in the response to DNA damage
XXI Italian Meeting on ADP-Ribosylation Reaction, 24-25/11/2008, Lanciano, Italia

Autorizzo il trattamento dei miei dati personali ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 "Codice in materia di protezione dei dati personali".

La sottoscritta Maria Giulia Bacalini, consepovele delle conseguenze penali in caso di dicharazione mendaci, sotto la sua personale responsabilità, dichiara di essere in possesso delle sopraindicate esperienze formative e professionali.