

Curriculum Vitae

PERSONAL INFORMATION

Name/Surname Laura Bordoni

EDUCATION

PhD in “Life and Health Sciences” - Molecular Biology and cellular Biotechnology. School of Pharmacy and Health Products, University of Camerino. Thesis: “How gene-environment interactions can influence health: a nutrigenetic and nutrigenomic approach”. [December 2014-December 2017]

Master Degree in Food Science and Human Nutrition (LM-61) - Faculty of Medicine, University of Perugia. [December 2013]

Final grade: 110/110 cum Laude (first class)

Thesis: “Epigenetic role of polyunsaturated fatty acids in carcinogenesis”.

Bachelor Degree in Biological Sciences, curriculum analytical biology (L-13) - Polytechnic University of Marche. [March 2010]

Final grade: 110/110 cum Laude (first class)

Thesis: “Diet and CVD, a nutrigenetic approach”

High school diploma - Liceo Scientifico “Corridoni – Campana”, Osimo. [June 2007]

Final grade: 100/100

OTHER POST-GRADUATE COURSES AND CERTIFICATIONS

▪ **Post-graduate Master** (2nd level) in “Omics data analysis”. University of Padua [November 2022 – ongoing] [auditor].

▪ **Post-graduate diploma** (Corso di perfezionamento) in “Systematic Revision and Meta-analysis for evidence-based guidelines production with Cochrane method”. University of Verona [April-July 2016]

▪ **Post-graduate master** (1st level) in Didactic of scientific disciplines, UniPegaso [June 2019]

▪ **National license as professional biologist** (*national exam - Esame di stato per iscrizione all’Albo dei Biologi sez.A*) [June 2014]

INTERNATIONAL SHORT COURSES

▪ Hands-on 16S rRNA gene amplicon analysis. ZIEL - Institute for Food & Health Technical University of Munich. April 2021.

▪ Bioinformatics workshop: Introduction to NGS data analysis. (Barcelona, Josep Carreras Leukaemia Research Institute. March 2019) COST CM1406

▪ Third European summer school in Nutrigenomics (University of Camerino, September 2018)

▪ Short course on “Nutrigenetics, nutrigenomics and precision nutrition” (University of North Carolina at Chapel Hill, USA. May 2017)

▪ Second European summer school in Nutrigenomics (University of Camerino, September 2016)

▪ Chromatin, epigenome and drug discovery training school - COST CM1406 (II University of Napoli, April 2016)

▪ European summer School in Nutrigenomics (University of Camerino, September 2014)

NATIONAL SHORT COURSES

- Summer school on Scientific Communication, Unicam, 2019
- Course on Europroject management (Europa Cube- Innovation Business School, Perugia. April-October 2013).

PRIZES AND AWARDS

[requested criteria for ASN
"Abilitazione 2a fascia BIO/10"]

2021 – Fellowship of the Italian Society of Biochemistry and Molecular Biology for the participation to FEBS congress 2021

2021 – *NuGO Grant* for the course “Hands-on 16S rRNA gene amplicon analysis” attendance. Awarded based on excellence CV and a proposed project reviewed by an international committee

2020 - *Honorary fellow* in Molecular Biology and in Nutrigenomics (“cultore della materia”), School of Pharmacy, University of Camerino.

2019 – *NuGO Exchange Grant*. Travel grant awarded by NuGo association after review of a proposed project by an international committee.

2018 – *Poster prize* at NuGO Conference 2018, Newcastle, UK, for the Poster “Mechanisms behind pyrethroid toxicity: involvement of epigenetic impairment in a progressive model of neurodegeneration induced by neonatal pesticide exposure”. Bordoni L, Nasuti C, Galeazzi R, Laudadio E, Massaccesi Luca, López-Rodas G and Gabbianelli R.

2018 – *SAS Award 2017*, granted by University of Camerino to the best PhD students demonstrating outstanding research performance.

2017 - University of North Carolina, *Nutrition Research Unite Scholarship* for the course “Nutrigenetics, nutrigenomics and precision nutrition” attendance.

2016 - University of Camerino *Doctoral candidates research grants (DCR)* – Founded project “ Nutrigenomic role of bioactive compound extracted from legumes: New Insights on Lignans” at the doctoral competition for research grant designed to support excellent doctoral candidates at the career stage at which they are starting their own independent research [peer review by external international referees]

2014 - *5x1000 Award for Master Thesis* with significant attention to innovative disciplinary issue. University of Study of Perugia.

2014 - *University of Camerino Scholarship* for the attendance to the first “Summer School on Nutrigenomics”.

Financed PROJECTS (scientific membership)

- FAR (2019) “Anti-obesity effect of selected and new ginsenosides from roots of Panax ginseng”. Founded by University of Camerino. PI: Gianni Sagratini.
- Project FAR (2016) AEVOO: Authentication of Extra Virgin Olive Oil (Unit membership)
- “Nutrigenomic role of bioactive compound extracted from legumes: New Insights on Lignans” (2016) Founded by School of Advanced Study, University of Camerino.
- Project “Anti-inflammatory role of Nigella Sativa oil in a model of inflamed adipose tissue” (2018). Founded by Vaccarini Srl. PI: Rosita Gabbianelli.
- IBERSAN (2015): Protective effect of GSH on down regulation of Nurr1 in the Parkinson’s like disease animal model. PI: Rosita Gabbianelli
- PRIN (2014) “Studio dei determinanti della resistenza secondaria e primaria di HIV-1 ai farmaci antiretrovirali per il controllo della trasmissione a livello di popolazione” (Protocol: 2012L783TW_007) Founded by MIUR. PI: Stefano Menzo.

**Requested fundings
(grants applications)**

Research grant applications submitted as Principal Investigator (PI):

- Fondazione Ekthagastiftelsen “Causal Effects of Intestinal TMA-producing Bacteria on Cardiovascular Health: From Big Data to Precision Nutrition and Personalized Prevention”.
- L’Oreal For Women in Science 2021. Title of the research proposal: “Causal Effects of Intestinal TMA-producing Bacteria on Cardiovascular Health: From Big Data to Precision Nutrition and Personalized Prevention”
- Nutricia Foundation: Does diet modulate CVD risk through regulating TMAO levels? New insights from peripheral biomarkers of mitochondrial health.
- ESPEN “Does diet play a role on CVD onset through TMAO? Further insight from peripheral biomarkers of mitochondrial health”.
- Michael J Fox Spring 2020 Targeted RFA Use of Parkinson’s Disease Biosamples. “From dysbiosis to mitochondrial epigenetics: the microbiome-mitochondrial axis as an early biomarker of PD” (first step successful)

Research grant application submitted as a scientific member:

- Cassa di risparmio Fabriano: “Nutrigenomica e salute: la trimetilammina e i biomarkers mitocondriali come nuove frontiere per la prevenzione e la stratificazione del rischio cardiovascolare”. PI: Rosita Gabbianelli.
- PRIN 2021. “Role of Mediterranean diet non-provitamin A carotenoids in the regulation of the epicardial adipose tissue (EAT) pro-atherogenic properties: a fat-depot specific approach to reduce coronary atherosclerosis” PI: Francesco Visioli.
- PRIN 2021.EXTREMAL: EXTREMe phenotypes for Aging and Longevity. PI: Valerio Napolioni.
- Cooperazione scientifica e tecnologica italia e israele (“track scientifico 2021”) “development and investigation of quinoa (chenopodium quinoa) as a highly nutritional climate resilient crop in the mediterranean basin” PI.Rosita Gabbianelli.

VISITING SCIENTIST

October-November 2019: Visiting scientist at Human Nutrition Research Center, Newcastle University. Training on mtDNA isolation and NGS technology.

June-July 2016 – Visiting scientist at Chromatin Laboratory, Faculty of Medicine, University of Valencia, Spain. Training on Chromatin Immunoprecipitation for histone modifications assessment.

**WORK AND TRAINING
EXPERIENCES**

October 2018 – up to date: Post-doctoral Research Fellow (assegnista di ricerca) at Unit of Molecular Biology, School of Pharmacy and Health Products, University of Camerino

April 2018–Up to date: Untenured Adjunct Professor for the Epigenetics Course (2 CFU, Master degree in Biological science) and the Applied Nutrition Course (3 CFU, Bachelor degree, Fitness and Health products) at University of Camerino.

June 2018–September 2018: Volunteer attendee at Unit of Molecular Biology, School of Pharmacy and Health Products, University of Camerino

March 2018–June 2018: Research fellow (borsista) at Unit of Molecular Biology, School of Pharmacy and Health Products, University of Camerino

December 2017 – February 2018: Volunteer attendee at Biochemistry and Molecular Biology department, School of Pharmacy and Health Products, University of Camerino.

December 2014 – November 2017: PhD candidate in “Life and Health Sciences” at University of Camerino. Research topic: “How genome-environment interactions can

influence health status: focus on nutrigenetics and nutrigenomics”.

June 2014 – November 2014. Research fellow (assegnista di ricerca) at Department of Biomedical Sciences and Public Health, Faculty of Medicine, Polytechnic University of Marche. Molecular study of determinants of HIV resistance to anti-retrovirals, developing plasmid vectors for HIV genome cloning. PRIN project: “Study of determinants of secondary and primary resistance to antiretrovirals to support control strategies of hiv-1 transmission”.

Aprile - Maggio 2014. Volunteer attendee at molecular biology and genetics of Advanced technologies for ageing, INRCA-IRCCS Ancona. Study of miRNA and mobile elements (Alu, LINE) in hypoxic tumoral cells through RT-PCR.

LANGUAGES

Native language: Italian.

Other languages

UNDERSTANDING

SPEAKING

WRITING

Listening

Reading

Spoken interaction

Spoken production

English

(TOEFL iBT certified 106 = IELTS 7.5) C1 ADVANCED C1 ADVANCED C1 ADVANCED C1 ADVANCED C1 ADVANCED

French

(DELF certified)

B1 BEGINNER B1 BEGINNER B1 BEGINNER B1 BEGINNER B1 BEGINNER

SCIENTIFIC PRODUCTION

Summary:

[Fullfilled 3 over 3 indexes as requested criteria for ASN “Abilitazione 2a fascia BIO/10”]

Publications in Wos: 28; Publication in Scopus: 26;
Scopus H-Index=11, Scopus Total Citations 292;

WoS Index=11; Wos Total Citations 284;

First author/corresponding author 24 out of 28 publications (WoS);

Book chapters, N=1 (+2 in press).

Conference abstract/presentation, N=33.

Google Scholar H-Index=12, i10-Index=15, Google Scholar Total Citations 402.

IF tot= 131.02; IF mean= 5.04;

Web of Science ResearcherID: T-7092-2017

Scopus Author Identifier: 57192102997

Contributes in scientific journals:

- | | IF |
|---|-----------------------------|
| ▪ Mitochondrial DNA and epigenetics: Investigating interactions with the one-carbon metabolism in obesity. Bordoni L , Petracci I, Mlodzik-Czyzewska M, Malinowska AM, Szwengiel A, Sadowski M, Gabbianelli R and Chmurzynska A. <i>Oxidative Medicine and Cellular Longevity</i> , 2022. In press. DOI: https://doi.org/10.1155/2021/9171684 . | 6.54
Q1 bio10 |
| ▪ Nutrigenomics of dietary lipids. Bordoni L , Petracci I, Zhao F, Min W, Pierella E, Silveira Assmann T, Martinez JA, Gabbianelli R. <i>Antioxidants</i> , 10(7), 994; 2021. https://doi.org/10.3390/antiox10070994 | 6.31
Q2 bio10 |
| ▪ Mitochondrial DNA copy number and trimethylamine levels in the blood: new insights on cardiovascular disease biomarkers. Bordoni L , Petracci I, Pelikant-Malecka I, Radulska A, Piangerelli M, Galeazzi R, Samulak JJ, Sawicka A, Lewicki L, Kalinowski L, Olek RA. <i>FASEB J</i> . https://doi.org/10.1096/fj.202100056R | 5.19
Q1 bio10 |
| ▪ Trimethylamine N-oxide and the reverse cholesterol transport in cardiovascular disease: a cross-sectional study. Bordoni L , Samulak JJ, | 4.38
Q1
miscellaneous |

- Sawicka AK, Pelikant-Malecka I, Radulska A, Lewicki L, Kalinowski L, Gabbianelli R, Olek RA. *Sci Rep.* 2020;10(1):18675. doi: 10.1038/s41598-020-75633-1.
- NURR1 Alterations in Perinatal Stress: A First Step towards Late-Onset Diseases? A Narrative Review. **Bordoni L**, Petracci I, Calleja-Agius J, Lalor Joan G and Gabbianelli R. *Biomedicines* 2020, 8(12), 584; <https://doi.org/10.3390/biomedicines8120584> 6.08 Q1 bio10
 - The neglected nutrigenomics of milk: what is the role of inter-species transfer of small non-coding RNAs? **Bordoni L**, Gabbianelli R. *Food Bioscience* 2021; 35(7) e21694; 100796. <https://doi.org/10.1016/j.fbio.2020.100796>; 4.24 Q2 bio10
 - Mitochondrial DNA and Neurodegeneration: Any Role for Dietary Antioxidants? **Bordoni L**, Gabbianelli R. *Antioxidants* 2020, 9(8), 764; <https://doi.org/10.3390/antiox9080764>. 6.31 Q2 bio10
 - Nutrigenetics—personalized nutrition in obesity and cardiovascular diseases. Barrea L*, Annunziata G*, **Bordoni L***, Muscogiuri G, Colao A, Savastano S & on behalf of OPERA Group. *Int J Obes Supp.* 2020, 10, 1–13. doi: 10.1038/s41367-020-0014-4. *equal contribution
 - Gender-related differences in trimethylamine and oxidative blood biomarkers in cardiovascular disease patients. **Bordoni L**, Fedeli D, Piangerelli M, Pelikant-Malecka I, Radulska A, Samulak J, Sawicka A, Lewicki L, Kalinowski L, Olek RA, Gabbianelli R. *Biomedicines*, 2020,8,238. doi: 10.3390/biomedicines8080238. 6.08 Q1 bio10
 - Nutri-epigenetics and gut microbiota: how birth care, bonding and breastfeeding can influence and be influenced? Gabbianelli R, **Bordoni L**, Morano S, Calleja-Agius J, Lalor JG*. *Int. J. Mol. Sci.* 2020, 21, 5032. 5.92 Q2 bio11
 - The Role of Nutri(epi)genomics in Achieving the Body's Full Potential in Physical Activity. Petracci I, Gabbianelli R, **Bordoni L**. *Antioxidants*, 2020. DOI: 10.3390/antiox9060498 6.31 Q2 bio10
 - A Pilot Study on the Effects of L-Carnitine and Trimethylamine-N-Oxide on Platelet Mitochondrial DNA Methylation and CVD Biomarkers in Aged Women. **Bordoni L**, Sawicka AK, Szarmach A, Winklewski PJ, Olek RA, Gabbianelli R. *Int J Mol Sci.* 2020 doi: 10.3390/ijms21031047. 5.92
 - Mitochondrial DNA methylation and copy number predict body composition in a young female population. **Bordoni L.**, Smerilli V., Nasuti C., Gabbianelli R. *J Transl Med.* 2019;17(1):399. doi: 10.1186/s12967-019-02150-9. 5.53 Q1 bio10
 - Extra Virgin Olive Oil and Nigella sativa Oil Produced in Central Italy: A Comparison of the Nutrigenomic Effects of Two Mediterranean Oils in a Low-Grade Inflammation Model. **Bordoni L**, Fedeli D, Fiorini D, Gabbianelli R. *Antioxidants (Basel)*. 2019 Dec 24;9(1). pii: E20. doi: 10.3390/antiox9010020 6.31 Q2 bio10
 - Positive effect of an electrolyzed hydrogen rich reduced water on gut permeability, fecal microbiota and liver in an animal model of Parkinson's disease. **Bordoni L**, Gabbianelli R, Fedeli D, Fiorini D, Bergheim I, Nasuti C. *Plos One*, 2019, 14(10):e0223238. doi: 10.1371/journal.pone.0223238. 3.24 Q1 bio10
 - Anti-Inflammatory, Anti-Arthritic and Anti-Nociceptive Activities of Nigella sativa Oil in a Rat Model of Arthritis. Nasuti C, Fedeli D, **Bordoni L**, Piangerelli M, Servili M, Selvaggini R and Gabbianelli R. *Antioxidants* 2019, 8(9), 342; <https://doi.org/10.3390/antiox8090342> 6.31 Q2 bio10
 - Early impairment of epigenetic pattern in neurodegeneration: additional mechanisms behind pyrethroid toxicity. **Bordoni L**, Nasuti C, Fedeli D, Galeazzi R, Laudadio E, Massaccesi L, López-Rodas G, Gabbianelli R. *Exp Gerontol.* 2019 ;124:110629. doi: 10.1016/j.exger.2019.06.002. 4.03 Q2 bio10
 - *HTR2C* gene variant and salivary cortisol levels after endurance physical activity: a pilot study. **Bordoni L**, Fedeli D, Piangerelli M, Gabbianelli R. *Lifestyle Genom.* 5:1-5. doi: 10.1159/000499842. 2.08 Q2 food science
 - Primers on nutrigenetics and nutri(epi)genomics: origins and development of precision nutrition. **Bordoni L**, Gabbianelli G. 2019 *Biochimie* 160, 156- 4.08 Q1 bio10

- 171https://doi.org/10.1016/j.biochi.2019.03.006
- Epigenetic memory of early-life parental perturbation: dopamine decrease and DNA methylation changes in offspring. **Bordoni L**, Nasuti C, Di Stefano A, Marinelli L and Gabbianelli R. *Oxidative Medicine and Cellular Longevity* 2019. <https://doi.org/10.1155/2019/1472623> 6.54
Q1 bio10
 - Antioxidant and Anti-Inflammatory Properties of Nigella sativa Oil in Human Pre-Adipocytes. **Bordoni L**, Fedeli D, Nasuti C, Maggi F, Papa F, Wabitsch M, De Caterina R and Gabbianelli G. *Antioxidants* 2019, 8, 51; doi:10.3390/antiox8020051 6.31
Q2 bio10
 - Zic1 mRNA is transiently upregulated in subcutaneous fat of acutely cold-exposed mice. Perugini J*, **Bordoni L***, Venema W, Acciarini S, Cinti S, Gabbianelli R, Giordano A. *J Cell Physiol.* 2018;1–6. DOI: 10.1002/jcp.27301. *equal contribution 6.38
Q1 bio12
Clinical biochemistry
 - Permethrin pesticide induces NURR1 up-regulation in dopaminergic cell line: Is the pro-oxidant effect involved in toxicant-neuronal damage? **Bordoni L**, Fedeli D, Nasuti C, Capitani M, Fiorini D, Gabbianelli R. *Comp Biochem Physiol C Toxicol Pharmacol.* 2017;201:51-57. doi: 10.1016/j.cbpc.2017.09.006. 3.23
Q2 bio10
 - Angiotensin-Converting Enzyme (ACE) Ins/Del polymorphism and body composition: the intermediary role of hydration status. **Bordoni L**, Napolioni V, Marchegiani F, Amadio E and Gabbianelli R. *J Nutrigenet Nutrigenomics.* 2017;10(1-2):1-8. doi: 10.1159/000458154. 2.08
Q2 food science
 - Nutritional Epigenetics: A New Level of Complexity About Impact of Diet on Health. **Bordoni L**. *EC Nutrition* 7.5 (2017): 185-186.
 - Obesity-related genetic polymorphisms and adiposity indices in a young Italian population. **Bordoni L**, Marchegiani F, Piangerelli M, Napolioni V, Gabbianelli R. *IUBMB Life.* 2017 Jan 16. doi: 10.1002/iub.1596. 3.88
Q2 bio10
Q1 clin bioch
 - In Vivo and in Silico Studies to Identify Mechanisms Associated with Nurr1 Modulation Following Early Life Exposure to Permethrin in Rats. Fedeli D, Montani M, **Bordoni L**, Laudadio E, Galeazzi R, Gabbianelli R. *Neuroscience.* 2017 ;340:411-423. doi: 10.1016/j.neuroscience.2016.10.071 3.59
 - Intergenerational Effect of Early Life Exposure to Permethrin: Changes in Global DNA Methylation and in Nurr1 Gene Expression. **Bordoni L**, Nasuti C, Mirto M, Caradonna F, Gabbianelli R. *Toxics* 2015, 3: 451-461; doi: 10.3390/toxics3040451 4.15

Papers under submission to international journals:

- Mitochondrial DNA in omental adipose tissue in extreme obesity: from copy number to D-Loop methylation. **Bordoni L.**, Perugini J., Di Mercurio E., Petracci I., Lezoche G., Guerrieri M., Giordano A., Gabbianelli G. Under submission to Scientific reports.
- Diet, try methylamine metabolism and mitochondrial DNA: an observational study. **Bordoni L**, Malinowska AM, Petracci I, Szwengiel A, Gabbianelli R and Chmurzynska A. Submitted to *Molecular Nutrition and Food Research*.
- Epigenetic clock and lifestyle-associated factors: healthy versus western dietary patterns. **Bordoni L**, Petracci I, Malinowska AM, Szwengiel A, Chmurzynska A and Gabbianelli. In preparation.
- Cow milk composition in fatty acids and miRNAs in subclinical inflammation. Petracci I, Fedeli D, Gabbianelli R, **Bordoni L**. In preparation.

Communications at congresses published in scientific journals:

- Proceedings of the 4th European Summer School on Nutrigenomics (ESSN 2021), June 21-25, 2021. <https://doi.org/10.1159/000517609>
- *Cibo e nutraceutici: parola chiave “caratterizzazione”*. Camerino, 2019. Platelet mitochondrial DNA methylation and micronutrient supplementation for CVD prevention.

Bordoni, Laura; Olek, Robert; Sawicka, Angelika; Szarmach, Arkadiusz; Winklewski, Pawel; Gabbianelli, Rosita. ISBN: 9788867680405.

- 11th Congress of the International Society of Nutrigenetics/Nutrigenomics (ISNN) : Abstracts. J Nutrigenetic Nutrigenomics. 2017;10(3-4):93-125. doi: 10.1159/000480052.
- 2nd European Summer School on Nutrigenomics. September 5-9, 2016, Camerino, Italy: Abstracts. J Nutrigenet Nutrigenomics. 2016;9(2-4):127-149. doi: 10.1159/000448866
- 10th Congress of the International Society of Nutrigenetics/Nutrigenomics (ISNN). Abstracts. J Nutrigenet Nutrigenomics. 2016;9(2-4):151-210. doi:10.1159/000448491
- Effect of Nigella sativa oil in a rat model of adjuvant-induced arthritis Nasuti, Cinzia Carla; Bordoni, Laura; Fedeli, Donatella; Gabbianelli, Rosita. Proceedings. 11,1,16. 2019
- Improved intestinal permeability and increased fecal butyrate content in an animal model of Parkinson's disease treated with an electrolyzed-reducing water. *Cibo e nutraceutici: direzione salute*. 3° Convegno a cura delle Piattaforme Tematiche di Ateneo su "Alimenti e Nutrizione" e "Salute Umana e Animale". Camerino, 2018. 2, 51-52. ISBN: 978-88-6768-034-4.

Book Chapters (upon invitation):

- "Trimethylamine-N-oxide (TMAO) as a biomarker: features and applications". **Bordoni L.** Biomarkers in Disease: Methods, Discoveries and Applications. Springer Nature. Edited by Preedy V. *Accepted*. Publication Date: to be defined.
- "Mitochondrion at the Crossroads Between Nutrients and Epigenome". **Bordoni L.** Molecular Nutrition and Mitochondria. Elsevier. ISBN: 604976. Edited by Ostojic, S. *Submitted*. Publication Date: 31-Jul-22
- "Nutrigenomics and food pesticides". **Bordoni L.** and Gabbianelli R. Nutrigenetics and Nutrigenomics. Elsevier. 2019. Edited by: De Caterina R., Martinez J.A., and Kohlmeier M. Elsevier S&T. ISBN-10 : 0128045728

Oral communications (upon invitation/selected oral talk):

- NUGO week 2021 (virtual edition). 07/09/2021. Diet, trimethylamine metabolism and mitochondrial DNA: an observational study.
- Italian Society of Biochemistry and Molecular Biology (SIB) congress 2021 (virtual edition). 23-24/09/2021. Mitochondrial DNA in obesity: Any association with one carbon cycle intermediates?
- 5° Convegno a cura delle Piattaforme Tematiche di Ateneo su "Alimenti e Nutrizione" e "Sanità Umana e Animale". University of Camerino. 13/07/2021. Dietary metabolites and CVD biomarkers: what about trimethylamine and its oxidative product?
- Società Italiana di Nutrizione Umana (SINU) National Congress, 9-10/04/2021. "Nuovi biomarkers per malattie cardiovascolari: quale ruolo per l'ossido di trimetilammina?"
- NugoWeek 2019. University of Bern, Switzerland, 9-13/09/2019. Platelet mitochondrial DNA methylation and CVD risk: what is the role of trimethylamine-N-oxide and carnitine supplementation during physical activity?
- Congress "Cibo e nutraceutici: parola chiave "caratterizzazione", University of Camerino, 9/7/2019. "Platelet mitochondrial DNA methylation and micronutrient supplementation for CVD prevention".
- III European Summer School on Nutrigenomics, University of Camerino, 2018. "Permethrin exposure and neurodegeneration: which mechanism behind the damage?"
- Foodomics congress, University of Bologna, Cesena, 12/01/2018. "Nutriepigenomics and epigenetic inheritance: insights on food pesticides and neurodegeneration".
- II European Summer School on Nutrigenomics, University of Camerino, september 2016. "A systematic review on the Paleo diet and its effects on metabolic health: Keyson for an applied evidence based nutrition".

Communications at congresses (posters):

- Congresso nazionale SIB 2021: Mitochondrial DNA in obesity: Any association with one carbon cycle intermediates? **Bordoni L**, Mlodzik-Czyzewska M, Sadowski M, Chmurzynska A and Gabbianelli R.
- 4th European summer school in Nutrigenomics. Virtual edition. University of Camerino. Walnut-Derived Peptide in a Model of Low-Grade Inflammation: Any Nutrigenomic Effect? Zhao F, **Bordoni L**, Min W, Gabbianelli R.
- 4th European summer school in Nutrigenomics. Virtual edition. University of Camerino. MiRNA in Raw Cow Milk: Any Contribution to the Nutritional Quality? Petracci I, Fedeli D, Gabbianelli R, **Bordoni L**.
- FEBS congress, 3-8 July 2021. Lubjana (virtual edition).Molecular biomarkers of cardiovascular risk: Any role for the gut derivative Trimethylamine N-oxide? **L. Bordoni**, I. Petracci, I. Pelikant-Maleckal, A. Radulska, M. Piangerelli, J.J. Samulak, L. Lewicki, L. Kalinowski, R. Gabbianelli *, R.A. Olek *.
- NIH Precision Nutrition Workshop (USA), 2021 January (virtual edition). Trimethylamine N-oxide and cardiovascular disease: can genetic differences in the reverse cholesterol transport mediate this association? **Bordoni L**, Samulak J; Sawicka AK; Pelikant-Malecka A; Radulska A; Lewicki L; Kalinowski L; Gabbianelli R; Olek R.
- NutRedOx Cost Action CA16112 Congress, Lisboa, October 2020. Platelet mitochondrial DNA methylation in L-carnitine supplemented aged women. **Bordoni, L.**; Sawicka, A. K.; Szarmach, A.; Winklewski, P. J.; Olek, R. A.; Gabbianelli, R.
- International society of Nutrigenetics and Nutrigenomics (ISNN) congress 2019, Cambridge (UK). Lignans phytocomplexes extracted from legumes act as anti-inflammatory agents in a model of adipocytes metaflammation: antioxidant properties and nutriepigenomic effects. Gabbianelli R, Sagratini G, Merelli E, Wabitsch M, Piangerelli M, Giusti F, **Bordoni L**.
- Nugo week 2018, Newcastle, UK: Mechanisms behind pyrethroid toxicity: involvement of epigenetic impairment in a progressive model of neurodegeneration induced by neonatal pesticide exposure. **Bordoni L**, Nasuti C, Galeazzi R, Laudadio E, Massaccesi Luca, López-Rodas G and Gabbianelli R.
- Summer school on Nutrigenomics 2018, University of Camerino, Italy. Can Nigella sativa Oil Control Inflammation in Human Pre-Adipocytes? **Bordoni L**, Fedeli D, Maggi F, Papa F, Sawicka A, Olek R, De Caterina R, Wabitsch M, Gabbianelli R
- Congresso Alimenti e Nutraceutici: qualità e salute del consumatore. Università di Camerino, 2018. Improvement of intestinal permeability and fecal butyrate content in an animal model of Parkinson's disease treated with an electrolyzed-reduced water. **Bordoni L**, Nasuti C, Fedeli D, Fiorini D, Gabbianelli R.
- Congress "The many faces of epigenetics", Oxford, 2017. New insights on molecular and epigenetic mechanisms of adipose browning in early cold exposure: focus on Zic1 expression regulation. **Bordoni L***, Perugini J*, Acciarini S, Giordano A, Gabbianelli R and Cinti S.
- Congresso Alimenti e Nutraceutici, Camerino, Italy: qualità e salute del consumatore. Università di Camerino, 2017. Epigenetics of pesticide-induced neurodegeneration. Gabbianelli R, **Bordoni L.**, Fedeli D., Nasuti C.
- Cibo e nutraceutici: direzione salute, Camerino, 2018. Nutrigenomica come strategia di prevenzione nella neurodegenerazione. **Bordoni,L**; Fedeli, D; Fiorini, D; Gabbianelli, R; Nasuti, C. Cibo e nutraceutici: direzione salute, 2,51-52.
- Redox control of major age-related diseases, Gdansk University of Technology- Cost Action CA16112, 54, 26. 2018. Antioxidants protect overexpression of Nurr1 in stressed dopaminergic cells. **Bordoni, L**; Fedeli, D; Nasuti, C; Gabbianelli, R.
- NutRedOx COST Action CA16112 WGs Meeting. 2018, Palma de Maiorca. 1,33.Towards a Redox Healthy Aging. Preventive strategies to counterbalance food pesticide effect on epigenome and gut microbiota. Gabbianelli, Rosita; **Bordoni, L**; Fedeli, D; Nasuti, C.
- Congress of the International society of Nutrigenetics and Nutrigenomics (ISNN), Los

- Angeles, 2017. Early-life exposure to permethrin food contaminant inducing neurodegeneration: is it matter of epigenetics? **Bordoni L**, Nasuti C, Fedeli D, and Gabbianelli R.
- Congress of the International society of Nutrigenetics and Nutrigenomics (ISNN), Los Angeles, 2017. Chemical stress induces up-regulation of Nurr1: role of antioxidants. **Bordoni L**, Fedeli D, Nasuti C, Fiorini D, Quassinti L, Bramucci M and Gabbianelli R
 - Congress of the International society of Nutrigenetics and Nutrigenomics (ISNN), Tel Aviv, 2016. Angiotensin-Converting Enzyme (ACE) I/D polymorphism influences body composition through the hydration status in a young Italian population. **Bordoni L**, Marchegiani F, Napolioni V, Gabbianelli R.
 - Congress of the International society of Nutrigenetics and Nutrigenomics (ISNN), Tel Aviv, 2016. Impact of Food Pesticides on the Gut Microbiota. Gabbianelli R, Fedeli D, **Bordoni L**, Fiorini, Ivan Dus D, Nasuti C.
 - Chromatin and the environment, Spetse, Greece (EMBO course) 2016. Can Early Life Exposure to Permethrin lead to intergenerational effects? Gabbianelli R, **Bordoni L**, Nasuti C, Mirto M, Cruciata I, Caradonna F.
 - 2° International congress of food science and technologies, Valencia, 2016. Tocotrienol's protective effect on neuronal damage induced by permethrin in PC12 cells. Bordoni L, Capitani M, Nasuti C, Manfredini S, Gabbianelli R. Poster Presentation
 - Congresso alimenti funzionali e nutraceutici per la salute, Camerino, 2016. Neuroprotection of electrolyzed reduced water: in vitro study on PC12 cell line. Fedeli D, Nasuti C, **Bordoni L**, Montani M, Dus I, Gabbianelli R.
 - 2nd European Summer School on Nutrigenomics, University of Camerino, 2016. Effect of Electrolyzed Reduced Water in an Animal Model of Parkinson-Like Disease. Nasuti, C; Fedeli, D; **Bordoni, L**; Montani, M; Dus, I; Gabbianelli, R. Journal of nutrigenetics and nutrigenomics 2016, 9,1,16.
 - Congress of the International society of Nutrigenetics and Nutrigenomics (ISNN), Chapel Hill 2015. Protective effect of glutathione on damage induced by permethrin in a neuronal model of PC12 cells. **Bordoni L**, Capitani M, Nasuti C, Gabbianelli R.

TEACHING ACTIVITIES

Formal attribution of teaching assignments to recognized **Italian institutions**:

- Untenured adjunct professor for the course "Alimentazione del fitness – Nutrizione applicata" (Docente a contratto), ISF, School of pharmacy, University of Camerino, a.a.2017/2018, 2018/2019, 2019/2020, 2020/2021.
- Untenured adjunct professor for the course "Epigenetics", delivered in English language, (Docente a contratto), Biological Science, School of Bioscience and veterinary medicine, University of Camerino, a.a.2017/2018, 2018/2019, 2019/2020, 2020/2021.
- Teacher for the Post-graduate Course in "Nutrizione molecolare: dalla nutrigenomica alla nutrizione funzionale", University of Camerino, a.a. 2021-2022.

[requested criteria for ASN
"Abilitazione 2a fascia BIO/10"]

Formal attribution of teaching assignments to recognized **foreign institutions**:

- Untenured adjunct professor for the course "Molecular Biology" (Docente a contratto) (6 CFU), Faculty of Biotechnology, Jilin Agricultural University, Republic of China. a.a.2021/2022.

[requested criteria for ASN
"Abilitazione 2a fascia BIO/10"]

Teaching assignments **within doctoral courses**:

- Untenured adjunct professor for the course "Epigenetics", delivered in English language, School of Advanced Studies, University of Camerino, a.a. 2018/2019, 2019/2020, 2020/2021.

Supervision of experimental activities:

- Co-tutor for doctoral thesis of 2 PhD students Irene Petracchi (2020-2023, ongoing), supervision of PhD student Fanrui Zhao (2020-2023, ongoing).
- Tutor or supervisor for experimental thesis of 6 Master degree students: Gaia de

Simone (2022, ongoing), Irene Orzella (2021, ongoing), Rucci Chiara (2020, ongoing), Smerilli Vanessa (“Mitochondrial epigenetics and obesity: a new biomarker from buccal swabs?” - 2019), Quadrini Elena (“Evaluation of nutrigenomic properties of EVO and Nigella oils in a low-grade inflammation model” - 2019), Vitello Stefania (2016).

- Tutor for experimental thesis of 2 Bachelor degree students: Caperna Fabio (“Cortisolo salivare e attività fisica: focus sul ruolo del polimorfismo rs6318 HTR2C” - 2017), Ionescu Daniela (“Relazione tra BMI e Polimorfismo ACE nei soggetti atleti con età compresa dai 6 a 18 anni” - 2015).

ADDITIONAL ACADEMIC

ROLES (Editorial board, reviewer board, organization of national and international events as part of the scientific committee)

[requested criteria for ASN “Abilitazione 2a fascia BIO/10”]

Member of the **Scientific committee** for academic events:

- Member of the scientific committee of the post-graduate course in “Aspetti molecolari della nutrizione: dalla nutrigenomica alla nutrizione funzionale”. School of Pharmacy. University of Camerino (a.a.2021/2022).
- Member of the scientific committee for the 4th European Summer School on Nutrigenomics (21-26 June 2021)

Editorial activities:

- Guest editor for Frontiers in Bioscience-Landmark. Special issue: “Oxidative Stress and Inflammation: Recent Developments and Emerging Trends” (January 2022).
- Invited guest editor for Frontiers in Genetics and Frontier in Nutrition, section Nutrigenomics. Special issue: “Molecular nutrition as a preventive tool in non-communicable diseases: mechanistic insights and risk biomarkers” (September 2021)
- Invited guest editor for Frontiers in Physiology and Frontiers in Nutrition. Special issue: “The Role of dietary fatty acids in metabolic health” (September 2021)
- Invited Guest editor for Antioxidant, Special Issue: “Nutrigenomics and Antioxidant Components of Diet” (April 2020).
- Member of the Editorial board “EC Nutrition” (from October 2016)

- Member of the Reviewer Board of Frontiers in Genetics and Frontiers in Nutrition, section Nutrigenomics.
- Member of the Reviewer Board of “Nutrients”(from 2020)
- Invited reviewer for several international scientific journals: Clinical Epigenetics (BMC); Frontiers in Genetics; Frontiers in Nutrition; International Union of Biochemistry and Molecular Biology (IUBMB Life), Nutrients, BMJ Open Diabetes Research & Care, Molecular Biology Reports (MOLE), BMJ Open Diabetes Research & Care, Molecular Genetics and Metabolism Reports (Elsevier); Molecular Genetics and Metabolism Reports (Elsevier); Journal of the American College of Nutrition (Tandf Online); Applied physiology, nutrition and metabolism (Nrc researchpress) and others..

- Member of the **local organizing committee** of the “II Summer School on Nutrigenomics” (University of Camerino, September 2016), “III Summer School on Nutrigenomics” (University of Camerino, June 2018)

NATIONAL AND INTERNATIONAL SCIENTIFIC COLLABORATIONS

[requested criteria for ASN “Abilitazione 2a fascia BIO/10”]

- Human Nutrition and Dietetics Institute, Molecular Metabolism Laboratory, Poznan University, Poland. Prof. Agata Chmurnzyska.
- Human Nutrition Research Centre, University of Newcastle, Newcastle Upon Tyne, UK. Prof. John Mathers.
- Gdansk University of Physical Education and Sport/Poznan University, faculty of Physical Education, Poland. Prof. Robert Olek.
- Biochemistry and molecular biology department, Chromatin laboratory, Faculty of Medicine, University of Valencia, Spain. Prof. Gerardo Lopez-Rodas.
- Experimental and clinical medicine department, Center of Obesity, Polytechnic University of Marche, Ancona, Italy. Prof. Saverio Cinti, prof. Antonio Giordano and Dr. Jessica Perugini.

- Experimental and clinical medicine department, Center of Obesity, Polytechnic University of Marche, Ancona, Italy. Prof. Saverio Cinti, Prof. Antonio Giordano and Dr. Jessica Perugini.
- Life and Environmental Science, Polytechnic University of Marche, Ancona, Italy. Prof. Roberta Galeazzi.
- Biochemistry and pharmaceutical science and technologies department (STEBICEF, Cellular Biology Unit), University of Palermo, Italy. Prof. Fabio Caradonna.
- Advanced Technology Center for Aging Research, Scientific Technological Area, INRCA-IRCCS, Ancona, Italy. Dr. Francesca Marchegiani, Dr. Maurizio Cardelli.

SEMINARS

(upon invitation)

Hold academic seminars (upon invitation):

- “Platelet mitochondrial DNA methylation and CVD risk: which role for trimethylamine-N-oxide and carnitine supplementation?” Human Nutrition Research Center; Newcastle University, Newcastle Upon Tyne, UK. 28/10/2019
- “Nutrigenetics from theory to practice: strengths and pitfalls”. 19/4/2017. Course on “Alimentazione del fitness”. School of Pharmacy and Health products, University of Camerino.
- “Nutrition and scientific literature: how to recognize good scientific evidences”. 20/4/2017 Course “Alimentazione del fitness”. School of Pharmacy and Health products, University of Camerino.
- “Epigenetics and environment: focus on diet”. 1/06/2017 Course “Epigenetics”. School of bioscience and veterinary medicine, University of Camerino.
- “DNA methylation profiling”. 6/6/2017 Course “Epigenetics “. School of bioscience and veterinary medicine, University of Camerino.
- “Chromatin remodelling and histone modification profiling”. 8/06/2017 Course on “Epigenetics “. School of bioscience and veterinary medicine, University of Camerino.

DISSEMINATION ACTIVITIES

Seminars to general audience:

- Talk title: “La nutrigenetica: diversità biologica e risposta individuale agli alimenti”. Event: “Come programmare la salute del bambino nei primi 1000 giorni di vita”, Unicam in partnership with “Assessorato alle politiche per l’istruzione, Comune di Jesi” Jesi (virtual event). 27/11/2020.
- Talk title: “Nutrizione personalizzata: guida al corretto utilizzo della nutrigenetica”. Dissemination event “Beyond food: prevenzione e salute nella nutrigenomica” auditorium INRCA, Ancona, 23/03/2018.

KNOWLEDGE TRANSFER and collaborations with companies

[requested criteria for ASN “Abilitazione 2a fascia BIO/10”]

Participation to the implementation of Keyson Software (Keyson s.r.l.) as member of the scientific staff (<https://keyson.it/staff-scientifico>), with specific regards to the nutrigenetic section.

SCIENTIFIC MEMBERSHIP to recognized institutions/associations

[requested criteria for ASN “Abilitazione 2a fascia BIO/10”]

- SIB (Società Italiana di Biochimica e Biologia Molecolare) 2021-2022
- SINU (Società Italiana di Nutrizione Umana) 2021
- ESPEN (The European Society of Clinical Nutrition and Metabolism) 2020
- COST ACTION EpichemiBio (2017-2020) Action CM1406
- COST ACTION Nutredox (2018-2021) Action CA16112

DESCRIPTIVE SUMMARY OF THE RESEARCH ACTIVITY

After a brief period spent in the virology unit of Ospedali Riuniti (Ancona), studying molecular determinants of HIV resistance to anti-retrovirals, developing plasmid vectors for HIV genome cloning and learning the basics of molecular biology, I have focused my research on the fields of **epigenetics**, **nutrigenetics** and **nutrigenomics**.

During the PhD course (Eureka, co-founded by Keyson s.r.l), I have investigated genetic determinants of human obesity in a young Italian population and the interactions of

specific genetic variants with the hydration status (Bordoni et al, IUBMB 2017; Bordoni et al, Lifestyle genomics, 2017). An additional study about differential response to stress in carrier of a selected polymorphism in the cortisol receptor gene in a population of Italian cyclists before and after a competition has been conducted (Bordoni et al, Lifestyle genomics 2018). Results showed that the genetic make-up contributes to the differential responses to life-style associated factors, thus opening the possibility to a personalized approach for health promotion.

In the meanwhile, I have participated to a research project investigating molecular features of a progressive model of Parkinson's disease, testing how dietary factors can affect the development and progression of this pathology in rats. Published research showed that early perturbation of the neural development due to the exposure in a selected window of susceptibility to a low dose, near to NOAEL, of permethrin (a pesticide commonly found in food and environment), is mediated by gene expression and epigenetic alterations that can be transmitted to the unexposed offspring through an intergenerational effect (Bordoni et al., Toxics 2015; Fedeli et al., Neuroscience 2017; Bordoni et al, Oxidative medicine and cellular longevity 2019; Bordoni et al., Experimental gerontology 2019). Diet-related factors can help to counteract the phenomenon (Bordoni et al, Comparative Biochem Physiol C 2017; Bordoni et al., Plos One 2019).

Thanks to a mobility period spent in Valencia, I had a training on the chromatin immunoprecipitation technique, focused on the study of histone modifications, that I have applied in the ongoing research in Unicam (Bordoni et al, Exp Geront 2019; Perugini et al, J Cell Physiol 2018). In collaboration with Università Politecnica delle Marche, I have investigated epigenetic features associated to the regulation of gene expression of Zic1 during adipose tissue browning in a mouse model (Perugini et al, J Cell Physiol 2018). Moreover, using *in vitro* models, I have contributed to show molecular effects of food (i.e., olive oil, Nigella sativa oil) and bioactive compounds (i.e., thymoquinone) on gene expression regulation against low-grade inflammation (Bordoni et al, Antioxidants 2019; Bordoni et al, Antioxidants 2019b; Nasuti et al, Antioxidants 2019). In the same *in vitro* model I am currently investigating the effect of ginsenosides and nut extracts in partnership with the Jilin Agricultural University (China). Within the area of nutrigenomic research, I've also investigated the microRNA content in milk used for dietary purpose, correlating the presence of inflamMiR with antioxidant and lipid profile of the samples (results under submission; Bordoni et al, Food bioscience 2021).

In the last 3 years, I have focused my research on molecular phenotyping of human cohorts assessing **nutritional and epigenetic marks (DNA methylation)** in both nuclear and mitochondrial DNA areas. Mitochondrial DNA copy number and methylation measured in saliva in a cohort of Italian children was associated to their body composition (Bordoni et al. J Transl Med 2020). In partnership with Gdansk University, I have investigated mitochondrial DNA in a small cohort of women supplemented with carnitine (Int J Mol Science 2020); furthermore, I've investigated biomarkers of cardiovascular diseases in a cohort of 560 human subjects (controls vs coronary artery diseases) in order to understand if suggested intermediary metabolites of animal-derived food (i.e., TMA, TMAO) were associated to the presence of the diseases and testing molecular biomarkers linked to this condition (i.e., mitochondrial DNA copy number and methylation) (Bordoni et al, FASEB J 2021; Bordoni et al., Plos One 2020; Bordoni et al, Biomedicine 2020). Results showed that mitochondrial DNA copy number but not TMA/TMAO could predict the cardiovascular health status in the analyzed population. Then, in partnership with the Poznan University, I have investigated nuclear and mitochondrial DNA in two observational cohorts of 200 subject each, comparing subject with different body composition (i.e., obese vs controls) or different dietary regimens (i.e., healthy diet vs western diet), with the aim to understand if these biomarkers could be modulated by dietary associated parameters and thus could be useful to monitor the effect of diet on cardiovascular health. Results have been recently published (Bordoni et al, Ox.Med.Cell.Long, 2022) or submitted (Mol.Nutr.Food Research, submitted;). In order

to enlighten mechanistic aspects of the associations previously identified, I am currently analyzing epigenetic marks in the nuclear and mitochondrial DNA in omental samples collected from severely obese humans (partnership with Università Politecnica delle Marche, results under submission).

In order to move towards an omic approach, I've spent a short mobility period at the Human Nutrition Research center at Newcastle University for a training on mitochondrial DNA isolation and library preparation for Next Generation Sequencing. I've attended a training school organized by the COST action EpichemBio at the J.C.Leukaemia Research Institute in Barcelona about NGS data analysis and a short course on NGS for microbiome analysis organized by the Technical University of Munich. Moreover, I am currently attending as auditor a master on Omics data analysis (University of Padua) with the aim, within the upcoming years, to implement in the laboratory untargeted epigenomic studies applied to the research field of molecular epidemiology.

Thanks to the different research topics investigated (with a focused but also **interdisciplinary approach** in the fields of biochemistry/epigenetics, BIO/10; molecular biology, BIO/11; nutrition, MED/49; genetics BIO/18), I have acquired different skills as well as studied in depth the multifaceted discipline of nutri(epi)genomics from different point of views.

Furthermore, I had the opportunity to collaborate with **international partners** from European Universities and present the results at national and international congresses of high relevance in the field of nutrigenomics (i.e., ISNN Los Angeles, ISNN Tel Aviv, NUGO Newcastle, NUGO Bern, ISNN Cambridge, COST Action Nutredox Oxford, SIB and SINU congresses). International collaborations with European associations also have led to the publication of review/position papers of international relevance (Bordoni et al, Antioxidants 2021; Bordoni et al, Biomedicines 2020; Gabbianelli et al Int J Mol Sci 2020).

As declared in the publications, my contribution in most of the research papers was not barely executive but also conceptual.

Brief summary of JOB-RELATED SKILLS

Advanced knowledge of the main molecular biology/biochemistry techniques, especially those applied in the field of **epigenetics**: evaluation of DNA methylation through restriction enzymes, bisulfite-pyrosequencing, LUMA pyrosequencing, RT-PCR, methylation sensitive-HRM, ELISA immunoassays; evaluation of histone modifications through chromatin immunoprecipitation (ChIP); genotyping by Taqman, Sanger sequencing. Proficient in basic laboratory technique commonly used in this research field: electrophoresis in agarose or acrylamide, PCR, enzymatic digestions, plasmid vector construction, cloning, sequencing. Basic knowledge of western blot and *in vitro* cell culture models.

Advanced knowledge in the fields of **dietetics, human nutrition** and **precision nutrition** acquired during the academic education, post-graduate courses attended and implemented during teaching activities.

Good competence in the research field of **molecular epidemiology** aimed to the identification of new molecular biomarkers linked to lifestyle-associated health determinants. Good command of methods for statistical data analysis in molecular epidemiology using SPSS, R and its extensions, Gpower, Arlequin, as well as RevMan software used for systematic review and meta-analysis.

COMMUNICATION, ORGANIZATIONAL SKILLS, Curricular and extracurricular experiences

Good communication skills, planning and problem solving ability gained through academic education.

Strong determination to reach prefixed objectives, integrity and preciseness, acquired during the academic education but also extra-curricular activities such as agonistic sport practice (volleyball, B2 national championship) for more than 10 years.

Camerino, 14/01/2021

