PAI NI KUNDRA

Biotechnology, Food Science, Nutrition, Vitamins, Metabolomics



PERSONAL STATEMENT

Highly motivated Ph.D. graduate from ETH Zurich with expertise in microbial metabolism and advanced analytical techniques. Skilled in developing and optimizing methods for metabolite quantification in complex biological samples using UHPLC-UV/MS. Experienced in analyzing intricate metabolic pathways and interpreting diverse datasets. Eager to apply analytical skills and interdisciplinary background to lipidomics research, particularly in the context of metabolic disorders. Committed to expanding expertise in understanding metabolism. Proven ability to lead research projects, mentor junior scientists, and collaborate effectively in multidisciplinary environments.



KEY COMPETENCIES

- · Possess in-depth knowledge across various scientific disciplines, including food science, microbiology, nutrition, gastroenterology, probiotics, biotechnology and biology.
- · Proficient in translating complex scientific concepts into clear, engaging content, as well as translating scientific findings into actionable next steps.
- · Proficient in designing, implementing, and executing research projects, encompassing laboratory techniques, statistics and bioinformatics.
- Proven ability to collaborate effectively with internal and external teams.



EDUCATION

ETH Zurich 2018 Zurich, Switzerland Doctorate (Ph.D., Dr. sc.) 2023 Supervisor: Prof. Dr. Christophe Lacroix **McGill University** 2016 Masters of Science (M.Sc.) Montréal, Canada 2018 Supervisor: Prof. Jennifer Ronholm **CGPA:** 3.87/4 **Guru Nanak Dev University** 2011 Amritsar, India Bachelor of Food Science and Technology 2015 Advisor: Prof. Bhartendu Singla



WORK AND RESEARCH EXPERIENCE

Sep 2018 Jun 2023

Scientific Assistant ETH Zurich

CGPA: 8.7/ 10 (Gold medalist)

• Supervisor: Prof. Dr. Christophe Lacroix

Zurich, Switzerland

- · Completed a multi-year research project investigating the modulatory potential of dietary and gut-microbially produced vitamin B9 and B12 on the complex gut microbiota, as well as on single next generation probiotic gut microbes.
- · Led the planning and execution of laboratory experiments, developed experimental and analytical methods (UHPLC-UV/MS), and analyzed metagenomic and other data types.
- · Completed project deliverables by preparing research findings for publication in scientific journals.
- · Presented research findings at scientific conferences, effectively communicating complex scientific concepts to diverse audiences.
- · Mentored Bachelor's and Master's students throughout their thesis projects, and facilitated a semester laboratory course, enhancing hands-on learning experiences.



AWARDS AND MEDALS

Gold medal (Bachelor Studies) University topper 2015

Poster presentation award Second prize. Green tea ice cream Presented at science exhibition 2015

COMPUTATIONAL SKILLS

Bioinformatics skills: metagenomic data analysis Programming: R, Bash Version control: git Project management: GitHub

LANGUAGES

English (Native, C1) German (Written A2, spoken B1) Hindi (Native) Punjabi (Native)

CONTACT INFO

■ palnikundra@gmail.com **4** +41 77 993 58 99

MORE INFO

© 0000-0002-8999-6451 **in** palnikundra

Palni Kundra R⁶ Palni_Kundra

pkundra

May-Sep 2017

Graduate research project

McGill University

Montréal, Canada

- Supervisor: Prof. Jennifer Ronholm
- Conducted whole-genome SNP-based analysis to identify changes under laboratory conditions in major foodborne pathogens responsible for global outbreaks.
- Provided support for preparing the manuscript for publication.

Jan-Feb 2015

Student research assistant

Guru Nanak Dev University

Amritsar, India

- · Supervisor: Prof. Pankaj Gupta
- Developed an innovative food product Green tea ice cream.
- · Performed sensory and organoleptic evaluation.
- · Presented the product at scientific conference.

Jul 2014

Student research assistant

Guru Nanak Dev University

Amritsar, India

Mar 2015

· Supervisor: Prof. Bhartendu Singla

• Developed various innovative soy-based food products to enhance gluten-free product.

May-Jun 2013

Research internship

Indian Council of Agricultural Research

Q Ludhiana, India

- · Supervisor: Dr. Pranita Jaiswal
- Applied a non-destructive quality control approach to a develop spectrophotometeric method for the detection of Soy-milk adulteration in cow milk.
- · Performed spectrophotometer analysis.

Jun 2013 & Jul 2014

Industrial internship

Markfed Canneries

Jalandhar, India

• Performed microbiological testing and applied quality control assurance techniques.

Jun-Jul 2013

Industrial internship

Verka Milk plant

Jalandhar, India

• Performed microbiological testing and applied quality control assurance techniques.



SCIENTIFIC PUBLICATIONS

Peer-reviewed Publications

Palni Kundra, Annelies Geirnaert, Benoit Pugin, Serafina Plüss, Susanna Kariluoto, Christophe Lacroix, Anna Greppi. Effect of microbially-produced vitamin B9 on the growth and metabolism of human gut microbes. **2024**. accepted for publication *BMC microbiology*.

Palni Kundra, Anna Greppi, Monica Duppenthaler, Serafina Plüss, Benoit Pugin, Christophe Lacroix, Annelies Geirnaert. Vitamin B12 analogues from gut microbes and diet differentially impact commensal propionate producers of the human gut. **2024**. *Frontiers in Nutrition*. **3**: 10.3389/fnut.2024.1360199

Palni Kundra, Annelies Geirnaert, Benoit Pugin, Paola Morales Martinez, Christophe Lacroix, Anna Greppi. Healthy adult gut microbiota sustains its own vitamin B12 requirement in an in vitro batch fermentation model. 2022. Frontiers in Nutrition. 2: 10.3389/fnut.2022.1070155

Palni Kundra, Carole Rachmühl, Christophe Lacroix, Annelies Geirnaert. Role of dietary micronutrients on gut microbial dysbiosis and modulation in inflammatory bowel disease. 2021. *Molecular Nutrition & Food Research*. ©: 10.1002/mnfr.201901271

Nicholas Petronella, **Palni Kundra**, Olivia Auclair, Karine Hébert, Mary Rao, Kyle Kingsley, Katrien De Bruyne, Swapan Banerjee, Alexander Gill, Franco Pagotto, Sandeep Tamber, Jennifer Ronholm. Changes detected in the genome sequences of Escherichia coli, Listeria monocytogenes, Vibrio parahaemolyticus, and Salmonella enterica after serial subculturing. **2019**. *Canadian Journal of Microbiology*. **3**: 10.1139/cjm-2019-0235



Jun 2023

Doctor of Sciences

Palni Kundra, 2023. Dr. sc. Thesis. The effect of exogenous and endogenous vitamin B9 and B12 on microbial growth and metabolism in the human gut. @: 10.3929/ethz-b-000641198

Jan 2018

Master of Science

Palni Kundra, 2018. M.Sc. Research project. Single Nucleotide Polymorphisms in major food-borne pathogens.



RENTORING ...

Master projects at ETH Zurich

Monica Duppenthaler Vitamin B9 and B12 driven trophic interactions in the human gut. Master in Food Science. Jul 2021 - Jan 2022 (Thesis)

Janik Mutter Vitamin B9 production and cross feeding among human gut microbial strains. Master in Biology. Mar 2021 - Jul 2021 (Research project)

Bachelor thesis projects at ETH Zurich

Sabina Galli B-vitamin bio-factory in the gut: In-vitro vitamin B9 production and utilization by human gut microbes. Bachelor in Food Science. Jul 2022 - Oct 2022

Sara De Crescenzo In-vitro Vitamin B12 Production by Human Gut Bacteria. Bachelor in Food Science. Jul 2021 - Oct 2021

Giuliano Menegon B-vitamin sharing: In-silico and in-vitro study to determine B9 and B12 cross-feeding between human gut microbial strains. Bachelor in Food Science. Jun 2020 - Nov 2020

Lucie Kuhn Give them vitamins: Impact of B9 and B12 on the acetate and butyrate production on human gut microbes. Bachelor in Food Science. Nov 2019 - Feb 2020

Blandine Genet Give them vitamins: Impact of B9 and B12 on the butyrate and propionate production on human gut microbes. Bachelor in Food Science. Jun 2019 - Sep 2019

♣ TEACHING

2019 2022

Sep 2021

Jul 2021

Feb 2015

752-5004-00L: Food Biotechnology Laboratory Course

♥ Zurich, Switzerland

Main responsible for cheese practical (2019 & 2020) and sour dough bread practical (2021 & 2022).



ORAL AND POSTER PRESENTATIONS

Human Gut Microbial Strains Produce Vitamin B12

Denmark 6th International Vitamin Conference

In-Vitro Vitamin B12 Production by Human Gut Microbial Strains

ANAEROBE 2021: THE MICROBIOTA AND BEYOND Online

Development of soy-based product and their organoleptic evaluation Advances in agricultural Science & biotechnology, DAV College Jalandhar

India

"Green tea ice cream" Science exhibition, DAV College Jalandhar

Oral & Poster

Semester course

Poster

Poster

Jan 2015

India

♣ WORKSHOPS/ COURSES (NOT ON TRANSCRIPTS) **PMDA Summer School** 2023 Basel, Switzerland Roche Predictive modelling and data analytics summer school to solve problems in drug discovery and development. Project Management for research – for doctoral students 2022 ♀ Zurich, Switzerland ETH Zurich Project risk management, project management. Scientific poster design 2021 ♀ Zurich, Switzerland University of Zurich content structure, typography do's and don'ts, design principles, design grids, design tools, image editing, perception, color theory. Energy and stress management: How to perform in the storm 2021 University of Zurich Zurich. Switzerland Energy management, understand obstacles and overcome them, achieve targeted change. Time and self management for PhD Candidates 2021 ETH Zurich ♥ Zurich, Switzerland Assess habits, values, goals, energy, and time management techniques. Leadership skills for PhD Candidates 2021 Zurich. Switzerland University of Zurich Management, leadership, needs analysis, behavior, destructive leadership, and case studies. **Statistics for Experimental Research** 2020 ♀ Zurich, Switzerland ETH Zurich Experimental designs, statistical analyses using R, report analyses and results in a scientifically appropriate manner. Mass spectrometry-based metabolomics - from theory to practice 2018 Zurich, Switzerland Functional Genomics Center of University and ETH Zurich Metabolomics overview, and data analysis and interpretation. Introduction to genomic analysis 2017 Compute Canada & University of British Columbia (Online) Canada UNIX programming, alignment, Variant calling and annotation, data visualization, and RNA-Seq including statistical analysis. 36th Post-harvest technology - short course 2014 University of California, Davis Davis, USA Advanced Crops handling and harvesting systems.

Palni Kundra, Dr. sc. Ringstrasse 15 CH- 8107 Buchs (ZH) Switzerland

E-mail: palnikundra@gmail.com

Phone: +41779935899

Prof. Dr. Mojgan Masoodi, Inselspital Bern, University Hospital University Institute of clinical chemistry CH-3010 Bern Switzerland

September 17, 2024

Dear Prof. Dr. Masoodi,

In this cover letter, I want to express my strong interest in the Postdoctoral Position in Lipidomics advertised on the Job-Portal of Inselgruppe. I am a Ph.D. graduate from the Laboratory of Food Biotechnology at ETH Zurich and I am excited by the opportunity to apply my expertise in microbial metabolism and analytical detection techniques to the field of lipid metabolism and metabolic disorders.

My doctoral research, titled "The Effect of Exogenous and Endogenous Vitamin B9 and B12 on Microbial Growth and Metabolism in the Human Gut," has provided me with a strong foundation in metabolic interactions and analytical method development directly applicable to your research focus. I believe I would be an excellent candidate for this position for the following reasons:

- 1) Extensive experience with advanced analytical techniques and method development: During my doctoral research, I developed and optimized analytical methods for vitamin quantification in diverse complex biological samples, including adult human feces, fecal fermentation samples, and various microbial strains (both probiotic and human gut-resident bacteria). This work involved novel analytes, demonstrating my ability to conduct cuttingedge research. I have hands-on experience with HPLC-RI, UHPLC-DAD, and UHPLC-UV/FL for analyzing these complex biological samples. My expertise is evidenced in my publications, which showed that adult human gut microbiota produces vitamin B12 and demonstrated how B12 analogues produced by several gut microbial strains affect carbohydrate metabolism in the human gut. For instance, my work on "Vitamin B12 analogues from gut microbes and diet differentially impact commensal propionate producers of the human gut" (Frontiers in Nutrition, 2024) showcases my expertise in studying how micronutrients influence microbial metabolism, which could be analogous to studying how oxidative stress affects lipid metabolism. This extensive experience in method development, analysis of complex biological samples, and impactful research communication will be invaluable for developing new LC-MS/MS methods to identify and quantify oxidized lipids, as required for this position.
- 2) **Metabolic analysis and adaptability:** My doctoral research has given me a deep understanding of microbial metabolism, with a focus on B-vitamins, carbohydrate, and protein metabolism. While my direct experience with lipid metabolism in the context of

metabolic disorders is limited, my strong foundation in metabolic pathways and cellular processes provides a solid basis for quickly adapting to new areas of metabolic research. My experience in studying complex metabolic interactions in microbial communities has developed my ability to understand intricate biochemical processes, a skill that I am confident will transfer well to the study of lipid metabolism. I am enthusiastic about expanding my expertise into this critical area of research and am committed to rapidly acquiring the specific knowledge needed to contribute effectively to your team's work on metabolic disorders.

- 3) **Data analysis and interpretation:** Throughout my research, I have gained proficiency in analyzing complex datasets from various analytical techniques and metagenomic sequencing. This skill set will be crucial for interpreting lipidomics data.
- 4) **Interdisciplinary research:** My work bridged microbiology, biochemistry, and nutrition, demonstrating my ability to work across disciplines a key attribute for your multi-disciplinary research project.

The opportunity to apply my skills to the field of lipidomics, especially in the context of metabolic disorders and working with real-world patient data, is truly exciting. I am confident that my background in analytical techniques and metabolic research, coupled with my enthusiasm for learning and collaborative nature, makes me a strong candidate for this position. My experience in handling complex biological samples and developing novel analytical methods will allow me to contribute effectively to your research goals while expanding my expertise in this critical area of study.

Thank you for your consideration. I am excited about the prospect of contributing to your research and am available at your convenience for further discussion.

Sincerely,

Palni Kundra

DIE EIDGENÖSSISCHE **TECHNISCHE** HOCHSCHULE ZÜRICH





Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich

verleiht

Palni Kundra

Master of Science, McGill University geboren am 30. November 1991

den Titel

DOKTORIN DER WISSENSCHAFTEN

aufgrund der Doktorarbeit

THE EFFECT OF EXOGENOUS AND ENDOGENOUS VITAMIN B9 AND B12 ON MICROBIAL GROWTH AND METABOLISM IN THE HUMAN GUT

Leiter der Doktorarbeit: Prof. em. Dr. Christophe Lacroix

und der mündlichen Prüfung vom 21. Juni 2023

Zürich, 27. November 2023

Der Rektor

Die Vorsteherin des Departements Gesundheitswissenschaften und Technologie

Prof. Dr. Günther Dissertori

Prof. Dr. Laura Nyström



McGILL UNIVERSITY MONTREAL

TO ALL TO WHOM THESE PRESENTS MAY COME, GREETING: WE, THE GOVERNORS, PRINCIPAL, AND FELLOWS OF McGILL UNIVERSITY TESTIFY THAT

Palni Kundra

HAVING DILIGENTLY COMPLETED THE REQUIRED COURSE OF STUDY AND PERFORMED
THE PRESCRIBED EXERCISES HAS BEEN ADMITTED TO THE DEGREE OF

MASTER OF SCIENCE

WITH ALL THE HONOURS, PRIVILEGES, AND PREROGATIVES PERTAINING TO THAT DEGREE, IN WITNESS WHEREOF WE HAVE AFFIXED OUR SIGNATURES AND HAVE CAUSED THE SEAL OF THE UNIVERSITY TO BE ATTACHED HERETO. GIVEN IN CONVOCATION THIS 6TH DAY OF JUNE IN THE YEAR 2018.

Malbautogla

REGISTRAR



Ritaul A. New

Suzanu Patier

CHANCELLOR

PRINCIPAL



गुंग हों हवे दें प्रतिस्वमिर्ट





ਬੈਚੂਲਰ ਆਫ ਫੂਡ ਸਾਇੰਸ ਐਂਡ ਟੈਕਨੌਲੌਜੀ (ਆਨਰਜ਼)

92015036408

ਕਿਰਨ ਕਿਸ਼ੋਰ ਕੁੰਦਰਾ

ਰਜਿਸਟਰਡ ਨੰ: 2011.ਜੇ/ਏ.37

Regd. No. : 2011, J/A.37

ਪਮਾਣਿਤ ਕੀਤਾ ਜਾਂਦਾ ਹੈ ਕਿ

ਪਲਨੀ ਕੁੰਦਰਾ

ਡੀ.ਏ.ਵੀ.ਕਾਲਜ, ਜਲੰਧਰ ਪਹਿਲੀ (ਵਿਸ਼ੇਸ਼ਤਾ ਸਹਿਤ)

ਪੱਤਰ/ਪੱਤਰੀ ਸ਼ੀ

ਡਿਵੀਜ਼ਨ ਵਿਚ ਪਾਸ ਕਰਕੇ

ਦਿਵਿਆ ਕੰਦਰਾ ਅਤੇ ਸ਼ੀਮਤੀ ਤੋਂ ਨਿਸ਼ਚਿਤ ਕੋਰਸ ਦਾ ਅਧਿਐਨ ਕਰਨ ਉਪਰੰਤ

ਅਪੈਲ, 2015

ਵਿਚ ਹੋਈ ਲੋੜੀਂਦੀ ਪ੍ਰੀਖਿਆ

ਦੀ ਡਿਗਰੀ ਪ੍ਰਾਪਤ ਕੀਤੀ ਹੈ ।

ਬੈਚੂਲਰ ਆਫ ਫੂਡ ਸਾਇੰਸ ਐਂਡ ਟੈਕਨੌਲੋਜੀ (ਆਨਰਜ਼) Guru Nanak Dev University?

	BACHELOR	PALNI KUNDRA	& TECHAPLOGE son/daughter of Mr.	KIRAN KISHORE KUNDRA
and Mrs.	DIVYA KUNDRA	and of the D. A. V. COLLEGE, JALAN	IDHAR	
		and passed the requisite Examination, held in	APRIL, 2015	has been admitted to the Degree of
BACHELO	OR OF FOOD SCIENCE & T	ECHNOLOGY (HONOURS) and been	placed in First	Division (with Distinction).
		ਯੂਨੀਵਰਸਿਟੀ ਸੀਲ ਅਧੀਨ ਪ੍ਰਮਾਣਿਤ ਕੀ		
		Sinen under the seal of the Unit	iersity.	

ਪੋਫੈਸਰ ਇੰਚਾਰਜ (ਪ੍ਰੀਖਿਆਵਾਂ)

Professor Incharge (Exams.)

June 17, 2015 ਅੰਮਿਤਸਰ Amritsar

Registrar

Vice-Chancellor

Chancellor





Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich

Functional Genomics Center Zurich

Universität Zürich / ETH Zürich Functional Genomics Center Zurich Winterthurerstrasse 190 CH-8057 Zürich Telefon +41 44 635 39 21 Telefax +41 44 635 39 22 www.fgcz.ch ngs.courses@fgcz.ethz.ch proteomics@fgcz.ethz.ch

CONFIRMATION OF ATTENDANCE

Palni Kundra

successfully completed the course

'Mass spectrometry-based metabolomics – from theory to practice'

The participant:

- Attended all introductory lectures, practical tutorials and lab sessions
- Got acquainted with several LC-MS technologies and applications
- Learned the principles and operations of MS platforms
- Learned how to carry out the entire process of mass spectrometry-based metabolomics, including data analysis and interpretation of the results.

Content of the course:

Lectures

- · Introduction to metabolism and metabolomics
- Introduction to LC-MS technologies and different applications
- · Introduction to MS data analysis in untargeted and targeted mode
- Introduction to sample preparation and experimental design

Tutorials

- Principles of quality control (QC)
- Technical QC of mass spectrometry results using specific software
- Data analysis and metabolite identification with hands-on exercises for untargeted mass spectrometry data
- Data analysis and quantification with hands-on exercises for targeted mass spectrometry data

Practical lab sessions

- Sample preparation workflow, including:
 - Sample extraction
 - Sample reconstitution
 - Sample acquisition
- Nano LC/MS setup and standard QC on Thermo Q-Exactive and QqQ Quantiva

Organizer: Serena Di Palma, Endre Laczko

Instructors: Serena Di Palma, Endre Laczko, Stefan Schauer, Sebastian Streb

Credit points:

Dates: 5 November - 8 November 2018

Location: University of Zurich

Zürich, 13.11.2018

Dr. Serena Di Palma

Serve No Pele



Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich Institute of Food, Nutrition and Health Department of Health Sciences and Technology

ETH Zurich

Prof. Dr. Christophe Lacroix

Head, Laboratory of Food Biotechnology

ETH Zentrum LFV C 20

Schmelzbergstrasse 7

CH-8092 Zürich, Switzerland

Phone +41 44 632 48 67 Fax +41 44-632 14 03 christophe.lacroix@hest.ethz.ch www.fbt.ethz.ch

Zurich, 20 July 2023 LC

Letter of reference

Palni Kundra, born on November 30, 1991 and a citizen of Indien, was 100.00 % employed by ETH Zurich as doctoral student from September 1, 2018 until June 30, 2023. About 30,000 people from more than 120 countries study, carry out research and work at ETH Zurich.

Ms Palni Kundra's duties and responsibilities in this capacity primarily comprised:

- working on her own thesis in the specialist field of Food Biotechnology on the subject of modulation effects of B-vitamins on the human gut microbiota
- publishing her research results in the form of papers, conference papers, articles for books
- publishing her research results in the form of papers in recognised specialist journals
- presenting papers at academic conferences
- supervising students writing semester papers and/or Master theses
- guiding Bachelor students during exercise and practical sessions
- supervising Master students during practical work in the laboratory/institute/field

Palni Kundra possessed proven expertise and extensive experience in her area of responsibility. She successfully applied herself to new duties and used the acquired knowledge with good results. The effort she put into her work was in proportion to the achieved outcome, and she met the requirements. With her rational and precise approach to her work, she always delivered a good performance. Her good command of languages was of great value for the communication in her work environment.

Palni Kundra showed initiative and complete commitment. Under challenging conditions, she remained calm and assured, adapting to changing circumstances with ease. Perceptive in evaluating the scope and impact of her actions, she was careful when weighing up the related risks and opportunities. In the decision-making process she exercised autonomy blended with a great deal of expertise. When arranging the deployment of staff, she was good at doing so according to need and objective. It was important to her to align her outlook and her actions with the goals of Food Biotechnology.

Letter of reference

Palni Kundra immediately conveyed key information to the relevant recipients, and chose the appropriate moment to involve management when the situation demanded it. In terms of verbal and writing skills, she displayed tremendous adroitness when tailoring her communications to her addressees. Moreover, she was adept at presenting her own ideas in a convincing manner. She took on board other opinions and constructive criticism; she listened to what was said and was tuned in to the needs of her conversational partners. She supported and encouraged collaboration within the team and was highly adept at reconciling differing views. Management, staff and students alike appreciated her greatly and held her in high esteem.

Palni Kundra left us on expiry of her fixed-term employment contract. We thank her for her contribution and wish her every success going forward.

Christophe Lacroix

CLacroix

Cynthia Kümin

List of Referees:

• Prof. em. Dr. Ing. Christophe Lacroix (PhD thesis Supervisor and Thesis committee)

Full professor and group leader at Food Biotechnology group Department of Health Science and Technology ETH Zurich

Email: christophe.lacroix@hest.ethz.ch

• Dr. Annelies Geirnaert (Co-supervisor and Thesis Committee)

Senior Scientist at Food Biotechnology group Department of Health Science and Technology ETH Zurich

Email: annelies.geirnaert@hest.ethz.ch
LinkedIn: linkedin.com/in/anneliesgeirnaert

• Dr. Anna Greppi (Co-supervisor and Thesis Committee)

Senior Scientist at Food Systems Biotechnology Department of Health Science and Technology ETH Zurich

Email: anna.greppi@hest.ethz.ch