Nutrition: From Molecules to Health - 2024

Sept 10th – Dec 17th 2024
EPFL Room BC03

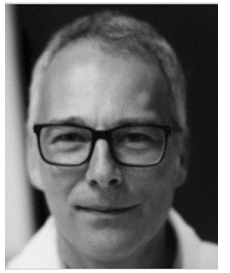
Lecturers (Multiple series of lectures linked to nutrition & health)

Patrick Descombes (Nestlé Research)
Jorg Hager (Nestlé Research)
Serge Rezzi (Swiss Nutrition and Health Foundation)

SWISS NUTRITION & HEALTH FOUNDATION

2021-	CEO of Swiss Nutrition and Health found.
2018-2021	Director of Swiss Vitamin Institute found.
2014-18	Molecular Nutrition group leader Nestlé Institute of Health Sciences (NIHS), Lausanne, Switzerland
2012-14	Principal investigator Nestlé Institute of Health Sciences (NIHS), Lausanne, Switzerland
2009-12	Metabonomics & Biomarkers group leader Nestlé Research Center, Lausanne, Switzerland
2005-09	Scientist, Project Manager Nestlé Research Center, Lausanne, Switzerland
2003-05	Scientist, European Commission, Joint Research Centre, Ispra, Italy

Genomics/Proteomics/Microbiome



Patrick Descombes

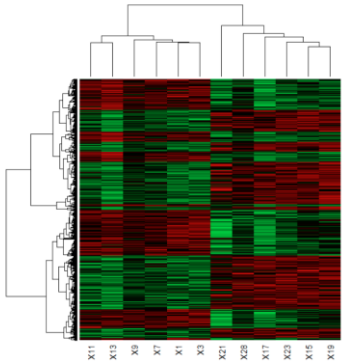
2011 – now: Head of Genomics Nestlé Resarch
2001-2011: manager Genomics Platform Uni Gva CH
1994-2001: 2 post-docs in cell-cycle (UK and GVA CH)
1993: PhD in molecular biology, Uni Gva CH

Genomics/proteomics technologies and applications for:

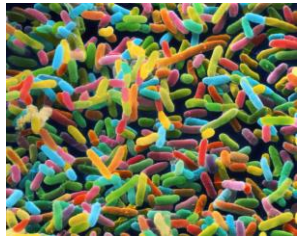
- genome analysis, epigenetics & transcriptome profiling
- proteome analysis

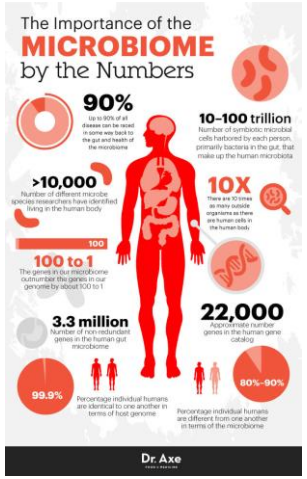
Outlook for bacteria & microbiome characterization re health

Instruments, technologies & applications

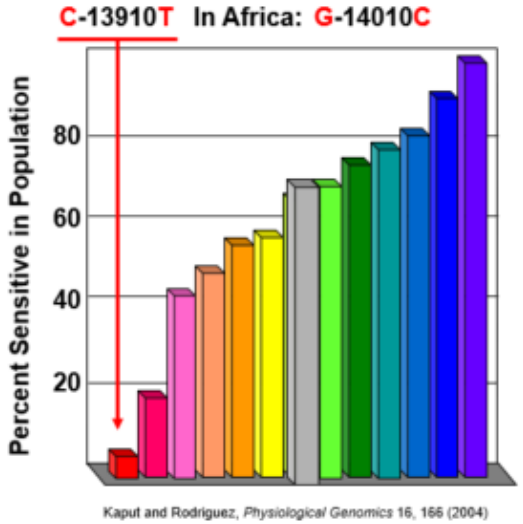


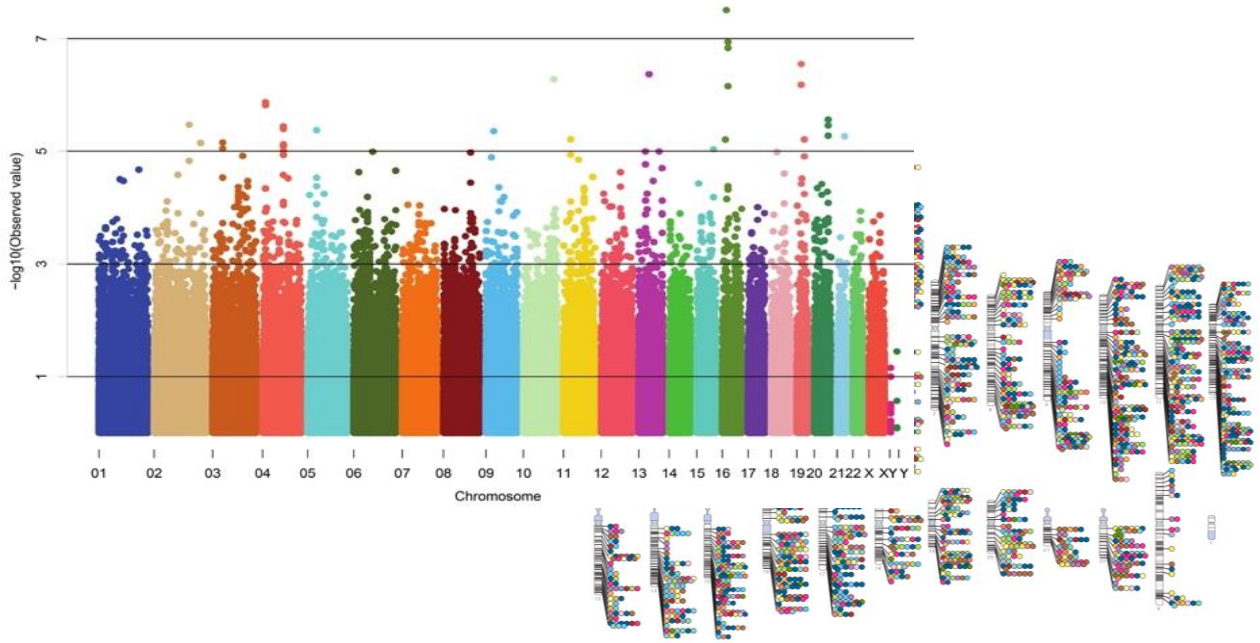
Analysis & interpretation





Bacteria & microbiome





- PhD in molecular genetics from the University of Bonn, Germany.
- Postdoctoral Research at:
  CEPH, Paris
  Pasteur Institute, Lille
  Sequana Therapeutics San Diego, CA
- Head of Genetics of Cardio-Metabolic diseases, CEA Genomics Institute, Evry, France,
- CSO, IntegraGen SA
- Expert in Nutrigenomics, NIHS, Lausanne

1. Introduction into the notion of nutrigenomics & Nutrigenetics.

2. Nutrigenomics-
   The principles of epigenetic inheritance.
   Interaction between nutrients and gene expression

3. Nutrigenetics-
   Principles of genetic association analyses
   Genetic architecture and how it relates to genetic variation.
   Genome wide association studies- Methods, study designs, caveats and interpretaion

4. Nutrigenetics examples and applications

Tuesdays
9:00-11:00: lecture + 15 min break
11:00-13:00: exercises, paper presentations, support for minigrant discussions, questions

Evaluation:

One presentation from a selection of articles in the field of nutrition assigned to each student.

A mini grant proposal in nutritional research will be written and submitted

Nutrition: From Molecules to Health – 2024

Date	Teacher	Topic course	Topic exercises
10-Sep	Patrick Descombes, Jorg Hager & Serge Rezzi	Intro global (all) & Biomarkers for nutrition (Jörg)	Minigrant
17-Sep	Patrick Descombes	Methodologies 1: Omics Genomics-epigenetics	Case study
24-Sep	Jorg Hager	Methodologies 2: Genetics analytical concepts (LD, QTL, GWAS..)	Case study/exercises databases
1-Oct	Patrick Descombes	Methodologies 3: Omics microbiome & proteomics	Case study
8-Oct	Jorg Hager	Nutrigenomics / epigenetics	Case study
15-Oct	Serge Rezzi	Methodologies 4: Omics Metabolomics & Lipidomics	Case study
22-Oct	Holidays		
29-Oct	Patrick Descombes	Microbiome Intro interventions 1	Paper presentation
5-Nov	Patrick Descombes	Microbiome interventions 2	Paper presentation
12-Nov	Serge Rezzi	Methodologies 5: Ionomics, microbial metabolome, nutrikinetics	Paper presentation
19-Nov	Jorg Hager	Methodologies 6: Clinical Trials in nutrition	Paper presentation
26-Nov	Serge Rezzi	Nutritional status & phenotyping	Paper presentation
3-Dec	Serge Rezzi	Nutritional metabolomics and clinical applications	Case study
10-Dec	Jorg Hager, Serge Rezzi & Patrick Descombes	Precision nutrition round table	Paper presentation
17-Dec	Jorg Hager, Serge Rezzi & Patrick Descombes	Open questions & NR lab visit	

Student presentation of articles in the nutritional space

- An integral component of learning is the communication of knowledge through **oral and written communication.**

- Presentation of a published article proposed by the lecturers to each student. Length of the presentation is 15 min (followed by 5 min Q&A).
- Lecturers will assess your presentation and consolidate final grades.

- Papers will be assigned by a random draw

- Science Magazine reviewed tips on powerpoint presentations. See:
- http://www.sciencemag.org/careers/2016/01/using-powerpoint-shinestage?utm_campaign=email-news-latest&et_rid=16750433&et_cid=207226

Mini Grant Proposal

- Prepare a maximum **10-page** mini grant proposal for a research project related to nutrition and health.

- Model systems can be human, laboratory animal, cell culture, or in vitro assay

- Each student will ask a fellow student to edit their document and incorporate
- edits into their work.

- An example report/proposal prepared by a student in a previous year can be found in Moodle.

- Instructions on how to structure the mini grant will be discussed during the exercise sessions.

Format Mini Grant Proposal

- **Name**
- **Date**
- **Project Title**
- **Student reviewer**

- **Scientific abstract**
- <250 words

- **Layman's abstract (should be understandable by non-scientist)**
- <350 words

- **Introduction/Background, Current Knowledge incl. Literature**

- What is the topic and what is known?
- <2 pages with references

Format Mini Grant Proposal (continued)

- **Hypothesis or Specific aims & rationale for experimental design**

- What is the question, model system, rationale (1 page). Figures should be used for experimental design

- **Methods including acknowledgement of approvals**

- How will the study be done (1 page)?

- **Expected outcomes**

- What are the expected results and who will use them (1 page)?

- **Perspective**

- 500 words

Format Mini Grant Proposal (continued)

- **Resources – (how many person will be working on the project, hard-/software, consumables, (pre-clinical research)**
- 0.5 page

- **Timeline for study**
- Figure highlighting the duration of individual steps of the project.

Your grant proposal has to be shared with the student reviewer for feed-back.

The proposal is submitted by **January 15th** latest to us for evaluation.

We advise to start the writing of the core of proposal after the "methodologies" sessions (as of November 7th) but try to select the topic before and read for the introduction

- **Basis of evaluation (grade)**

- Mini Grant Proposal (66.666666666%)
- (structure, scientific rationale, written presentation skills)

- Presentation of a published article (33.33333%)
- (insight, understanding and questions, oral presentation skills)

- The final grade is provided at the end of the semester in IS Academia

Questions ?