

# Mediterranean Diet, Functional Foods and Bioactive Compounds: Science and Practice

30th International Conference of FFC - 18th International Symposium of ASFFBC

September 23-25, 2022, Department of Food Science and Nutrition, University of the Aegean, Myrina, Lemnos, Greece



## Fasting, CR and fasting- mimetics: Epigenetics, microbiota and personalisation

*Haslberger & Alexander*

University Vienna, Dep. f. Nutrition

Genetics, Microbiota and Epigenetics

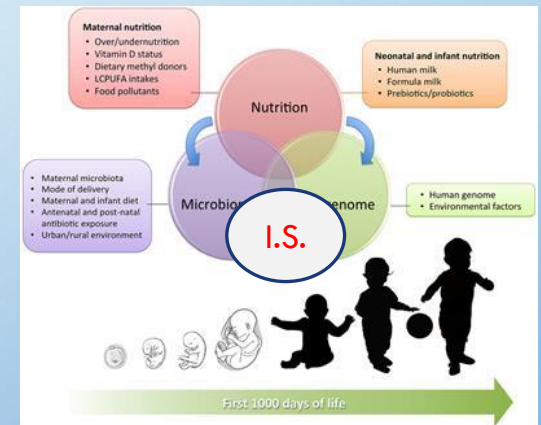
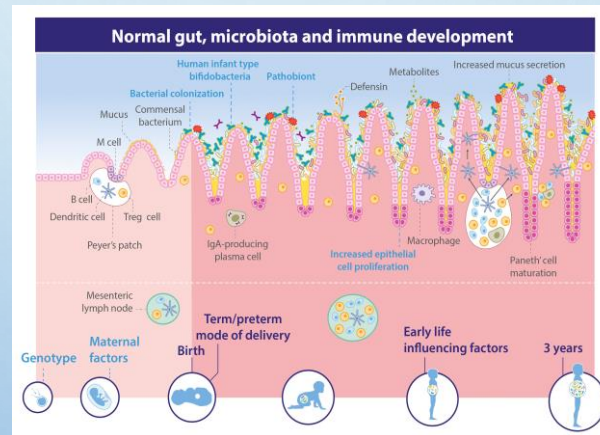
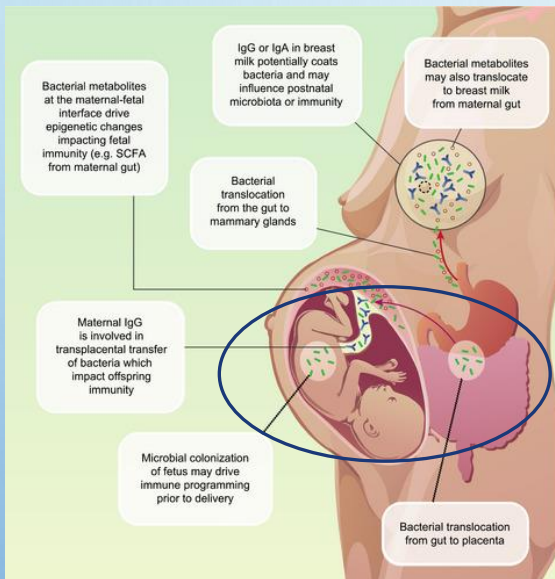
Fasting

Fasting mimetics,

Personalisation

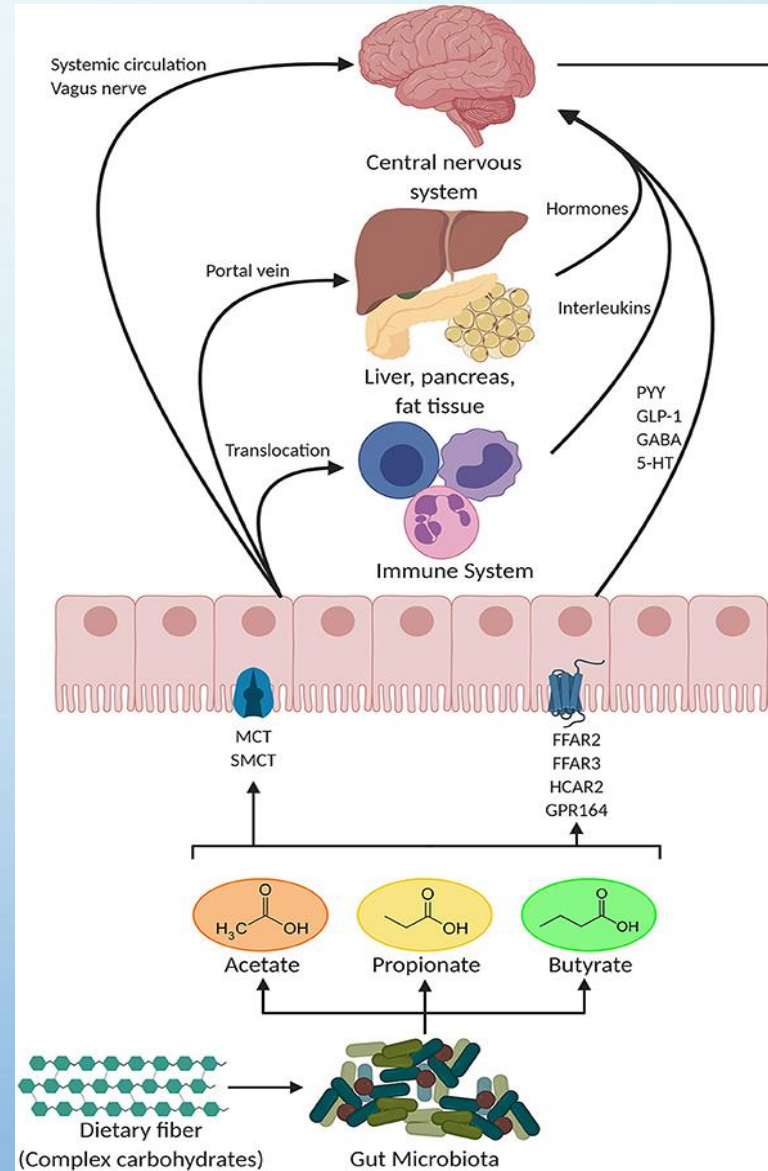
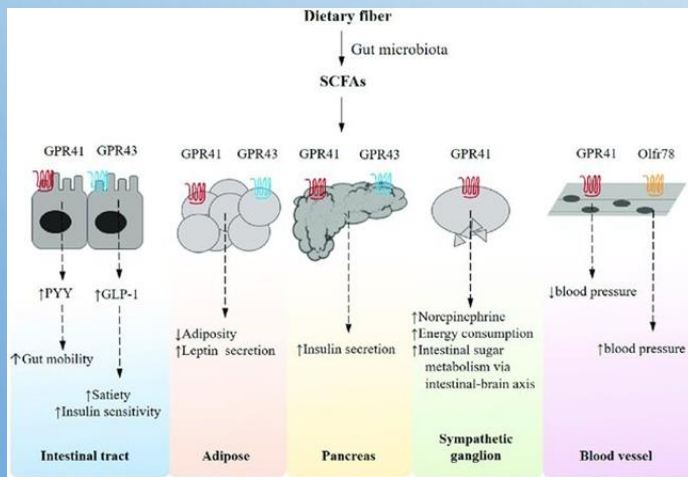


# DEVELOPMENT OF MICROBIOTA, I.S., AND THE EPIGENETIC SYSTEM, FIRST 1 000 DAYS OF LIFE



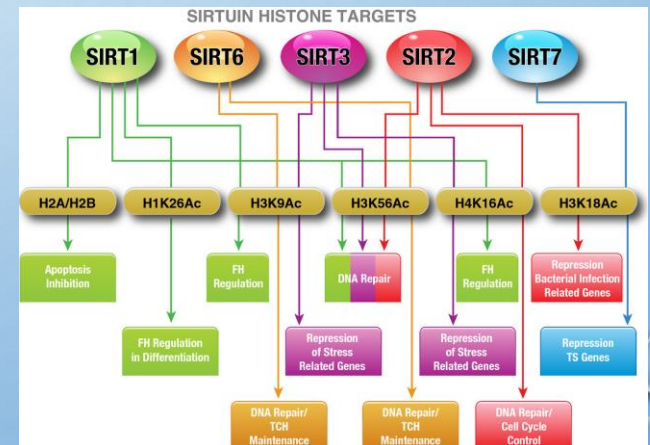
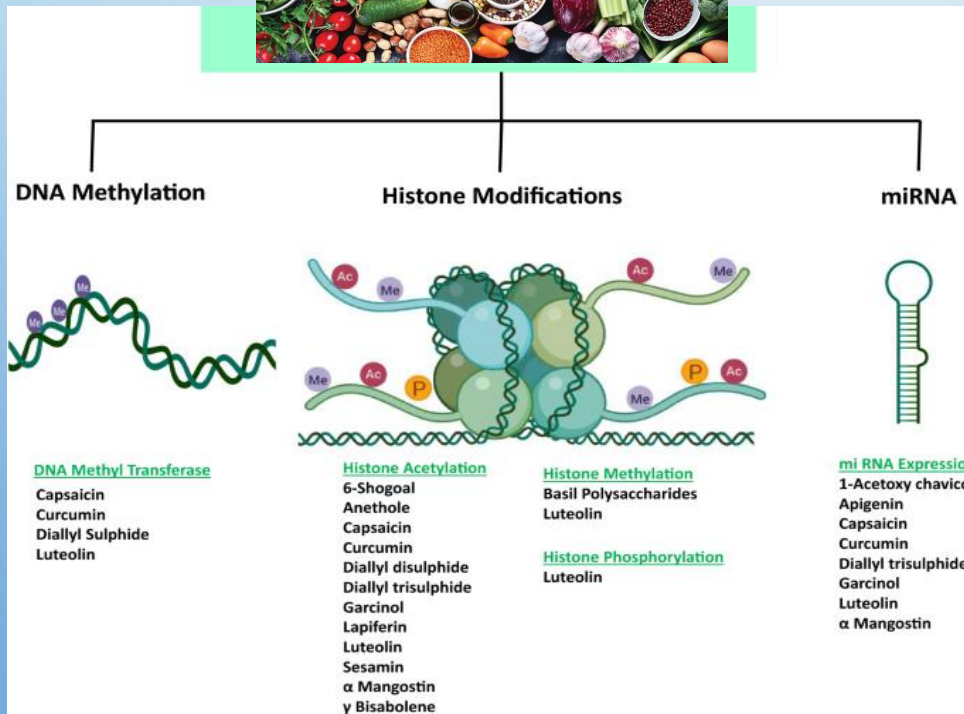
Development prenatal, Interaction with I.S., epigenetic maternal factors, Diversity:delivery, breastfeeding, imprinting in 1 000 days of life

# DIET- GUT- MICROBIOTA I.S.,- CNS, EPIGENETIC AXIS

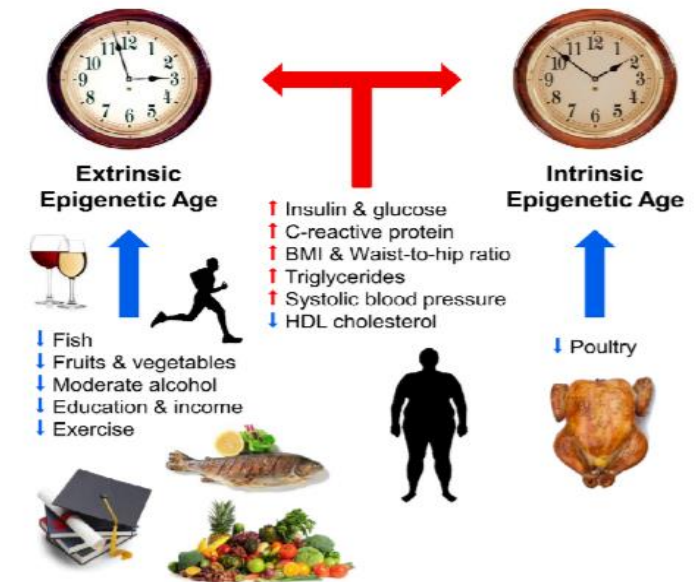
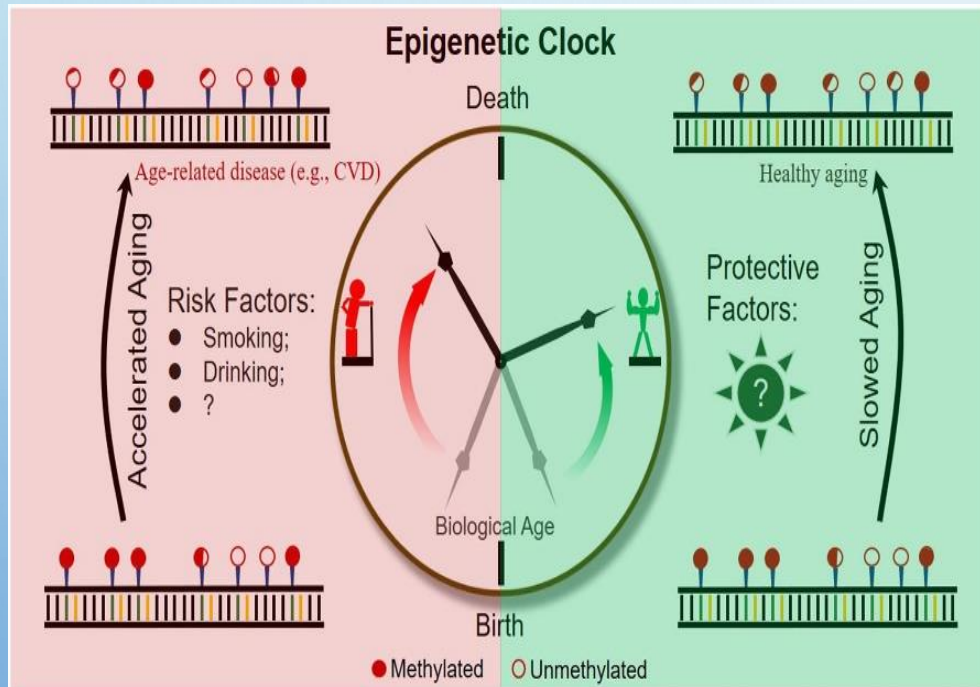




# DIETARY INGREDIENTS AND MICROBIOTA-DERIVED METABOLITES (SCFAS) ADDRESS ALL ELEMENTS OF THE EPIGENETIC SYSTEM, ESP. SIRTUINS

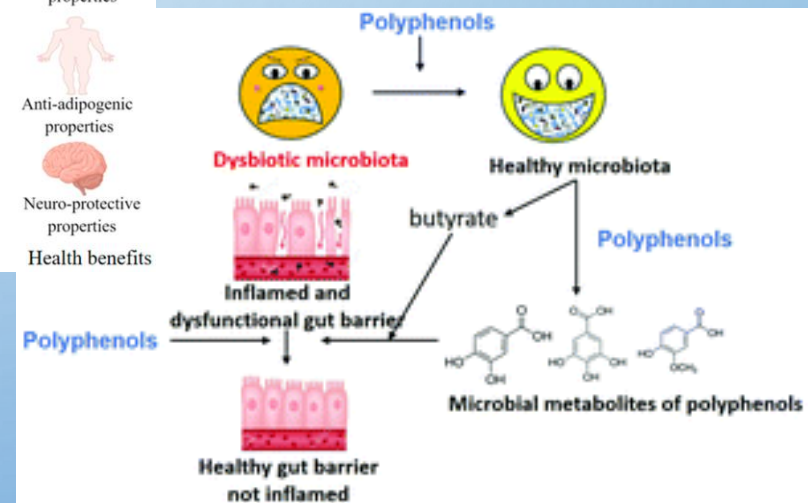
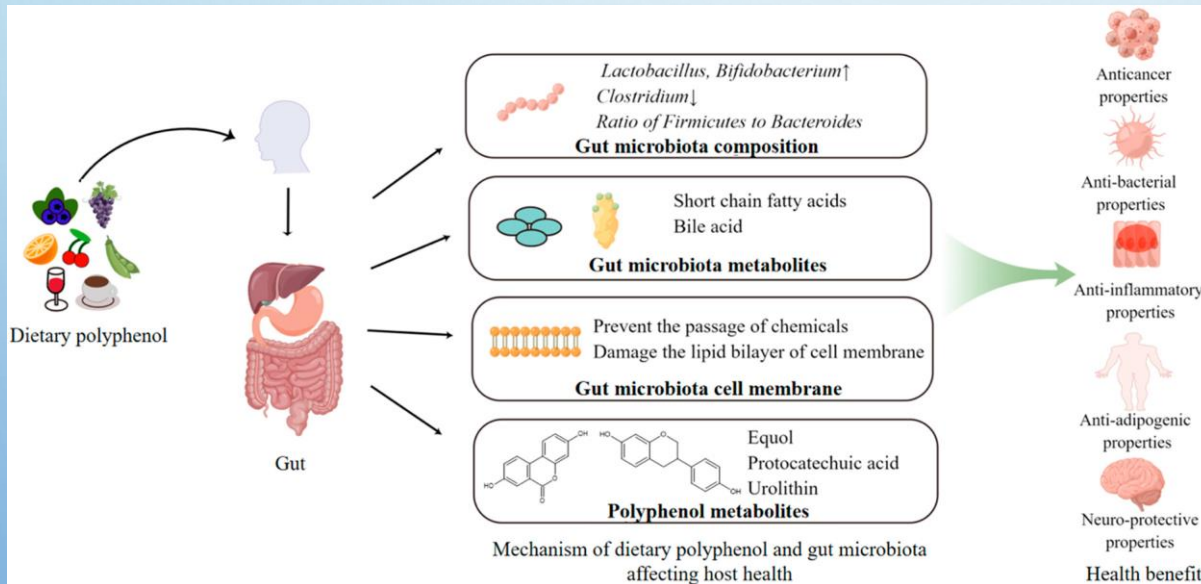


# AGING, DIETS, AND THE EPIGENETIC CLOCK, CPG- DNA METHYLATION;



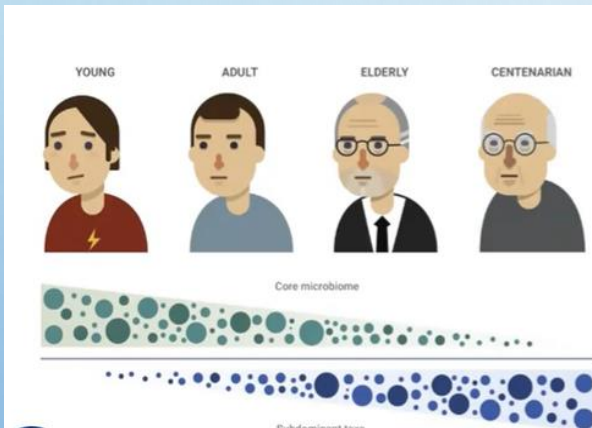
**Figure 4. Pictorial summary of our main findings.** The blue and red arrows depict anti-aging and pro-aging effects in blood respectively. The two clocks symbolize the extrinsic epigenetic clock (enhanced version of the Hannum estimate) and the intrinsic epigenetic clock (Horvath 2013) which are dependent and independent of blood cell counts, respectively.

# DIETS, POLYPHENOLS AND MICROBIOTA

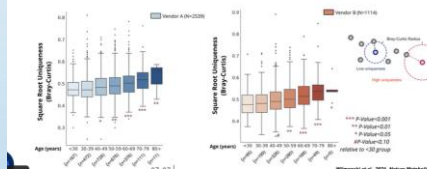




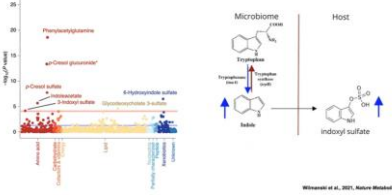
# AGING, BACTERIAL DIVERSITY AND HEALTH



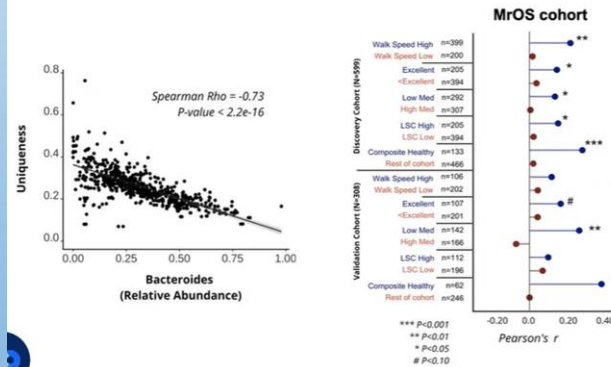
uniqueness: a clear signature of aging in the gut



uniqueness reflected in blood metabolites



uniqueness pattern is associated with reduction in core taxa and with health state



Wilmanski et al., 2021, Nature Metabolism

Contents lists available at ScienceDirect

**Experimental Gerontology**

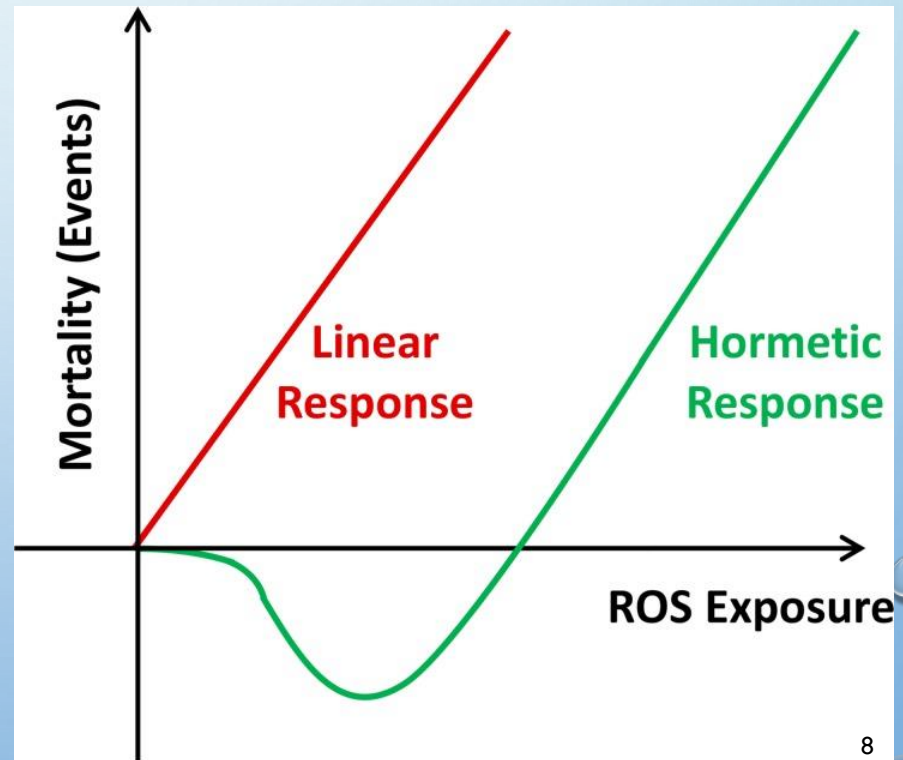
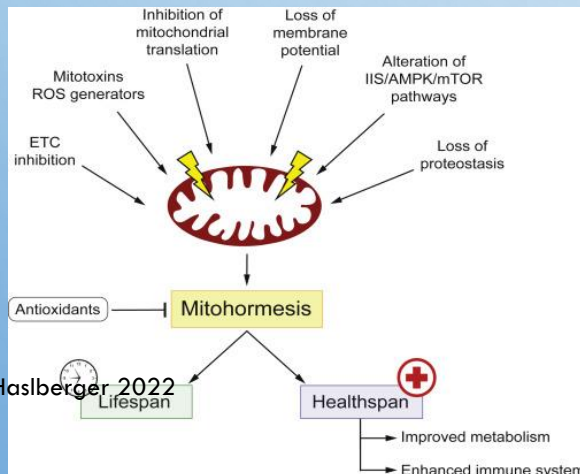
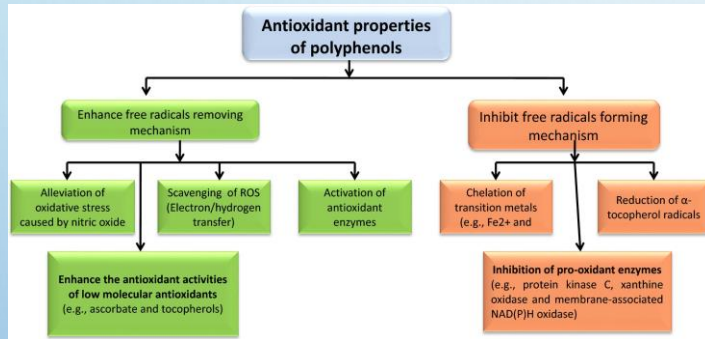
journal homepage: [www.elsevier.com/locate/expgero](http://www.elsevier.com/locate/expgero)

Combined PCR-DGGE fingerprinting and quantitative-PCR indicates shifts in fecal population sizes and diversity of *Bacteroides*, bifidobacteria and *Clostridium* cluster IV in institutionalized elderly

Jutta Zwieler<sup>a</sup>, Kathrin Liszt<sup>a</sup>, Michael Handschur<sup>a</sup>, Cornelia Lassl<sup>a</sup>, Alexander Lapin<sup>b</sup>, Alexander G. Haslberger<sup>a,\*</sup>

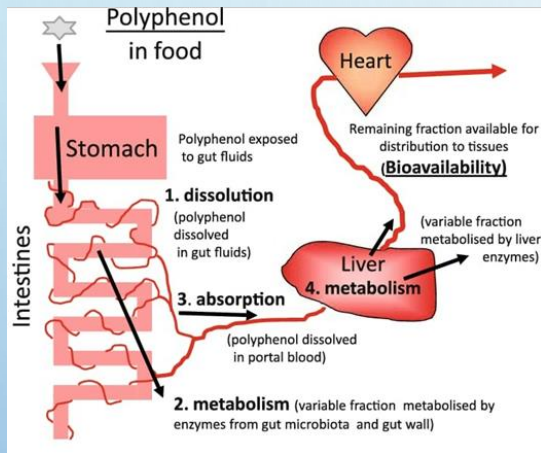
<sup>a</sup> Department of Nutritional Sciences, University of Vienna, Austria  
<sup>b</sup> Sozialmedizinisches Zentrum Saphiental, 1070 Wien, Auhofgasse 19, Austria

# POLYPHENOLS: ANTI-OXYDATIVE, ROS BUT SOME ROS NEEDED MITOHORMESIS !



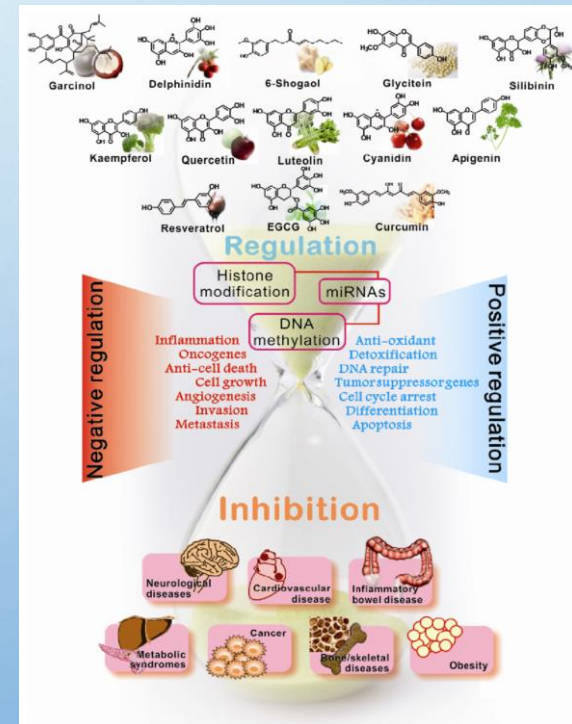
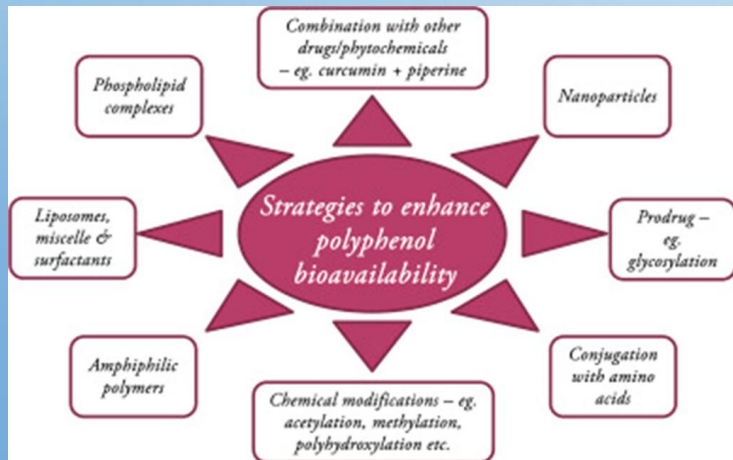


# PLANT ADDITIVES : STABILTY, BIOACTIVITY ANTI-OXYDATIV : MICROBIOTA- EPIGENETICS



Enhancing:

Plant extracts  
Nutraceuticals  
Additives  
Functional foods  
Novel foods, EU  
Dietary foods  
Medicinal foods  
Pharmaceuticals

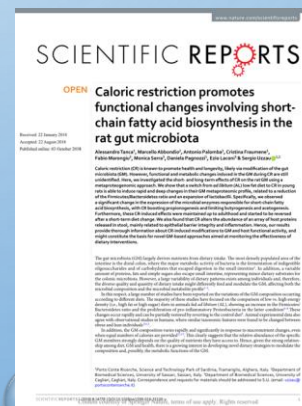
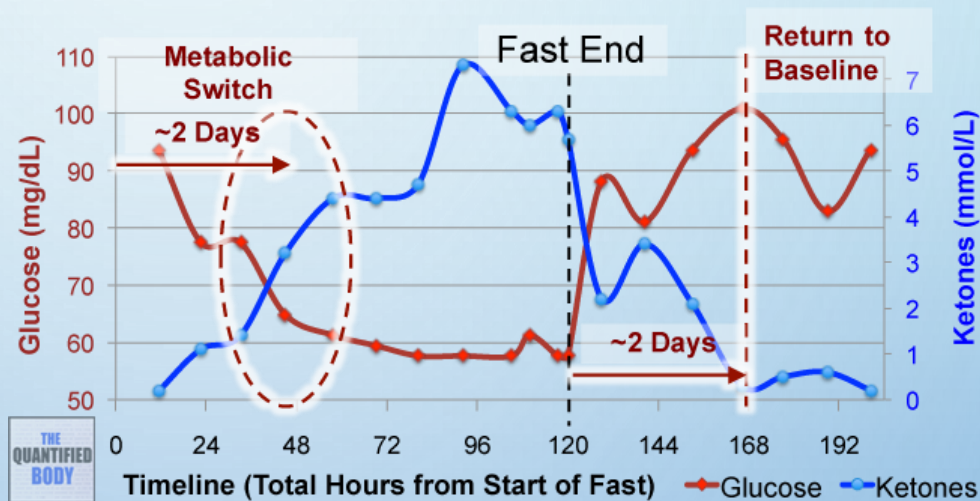


???

# FASTING: EPIGENETIC HIGHLY ACTIVE BUTYRATE, BHB

## FASTING BENEFITS

- increase focus
- Weight Loss
- heal digestion problem
- reduce inflammation
- increase insulin sensitivity
- growth hormone up
- boost immune system
- slowdown aging



# C.R, FASTING: DIET IN MOUNT ATHOS MOUNTAIN TEA IS PART OF MEDITERANEAN DIET

## Diet of the monks of Mount Athos

January 23, 2021



The monks lead a modest life from a food point of view, not to mention processed foods, meals are taken quietly, which is why the church faces on Mount Athos have a life expectancy ten years longer than the ordinary Greek. This lifestyle is the subject of a book that teaches you how to live, not just how to lose weight.

According to nutrition experts, the Mediterranean diet and fasting days, to the same extent, contribute to weight loss.

Orthodox monks on Mount Athos eat almost exclusively unprocessed, low-fat foods. In addition, on fasting days, monks drastically reduce their caloric intake, he writes Daily Mail.

## Sideritis

A screenshot of a website article from Cosmos Philly. The header shows the site name and navigation menus for Community, Churches, Organizations, Societies, Sports, and Blogs. The article title is "Greek Mountain Tea as a part of the healthful Mediterranean diet" and it is dated May 24, 2015.

**cosmos philly**  
Greek-American News from Philadelphia

COMMUNITY ▾ CHURCHES ▾ ORGANIZATIONS ▾ SOCIETIES ▾ CA  
SPORTS ▾ BLOGS ▾

FOOD

### Greek Mountain Tea as a part of the healthful Mediterranean diet

Posted by Cosmos Philly on May 24, 2015 [Comment](#)



<https://www.limnos-shop.gr> > product · [Translate this page](#) ⋮

**ΤΣΑΙ BOYNOY 10 TEABAGS - Limnos-shop.gr**

Organic Greek mountain tea from Lemnos. Taste – Warm, lemony, mild and sweet taste. Constituents – Greek mountain tea. 10 servings per pouch ...





# MOUNTAIN TEA IN BLUEZONE IKARIA ALZHEIMER,



**BLUE ZONES®** ARTICLES RECIPES COMMUNITIES SPEAKING LIFE ACTIVATE PRESS

## Ikaria, Greece *The island where people forget to die.*

This tiny island's long history has been as rocky as its topography. The outcropping in the Aegean Sea has been the target of invasions by Persians, Romans and Turks, forcing its residents inland from the coasts. The result: An isolated culture rich in tradition, family values – and longevity.



Today, Ikarians are almost entirely free of dementia and some of the chronic diseases that plague Americans; one in three make it to their 90s. A combination of factors explain it, including geography, culture, diet, lifestyle and outlook.

NIH U.S. National Library of Medicine  
**ClinicalTrials.gov**

Find Studies ▾ About Studies ▾ Submit Studies ▾ Resources ▾ About Site ▾ PRS Login

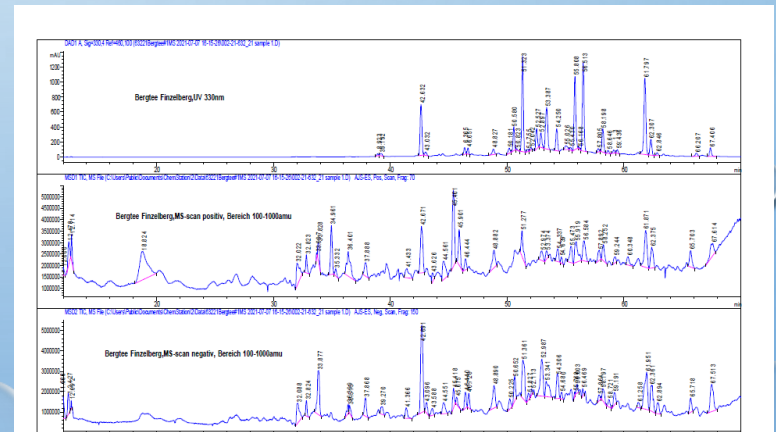
Home > Search Results > Study Record Detail  Save this study

### Management of Mild Cognitive Impairment Patients With Greek Mountain Tea - TEAMENTIA (TEAMENTIA)

ClinicalTrials.gov Identifier: NCT04435509

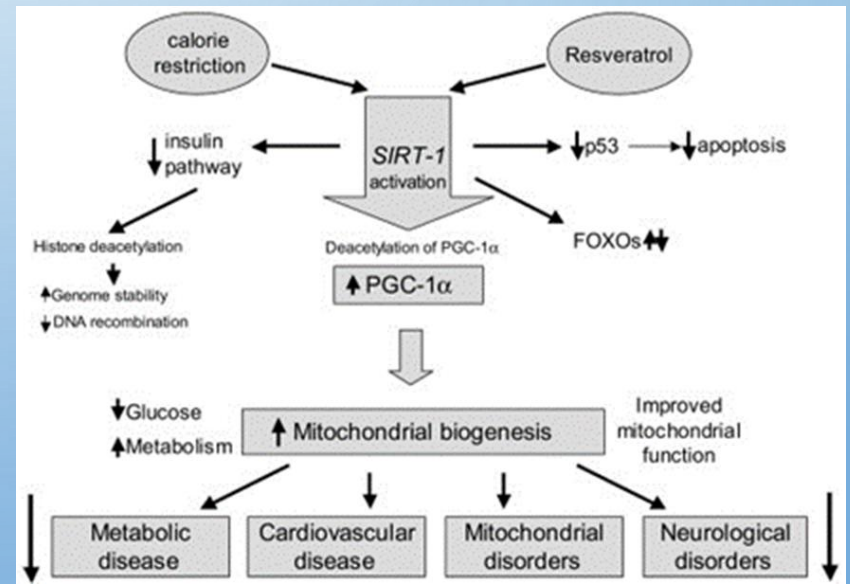
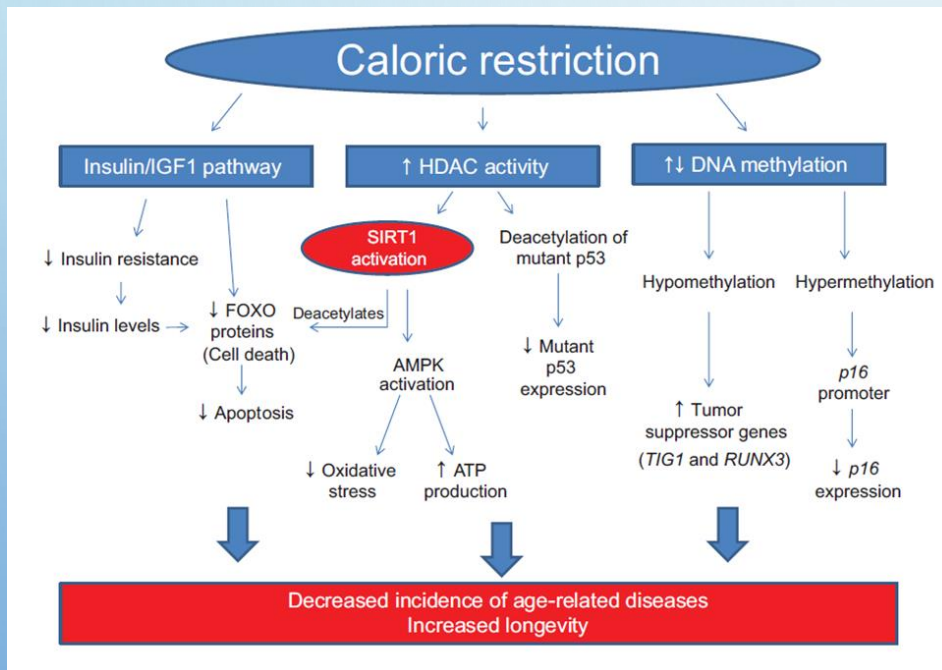
The safety and scientific validity of this study is the responsibility of the study sponsor and investigators.  
▲ Listing a study does not mean it has been evaluated

Recruitment Status : Unknown  
Verified June 2020 by Magda Tsolaki, Aristotle University

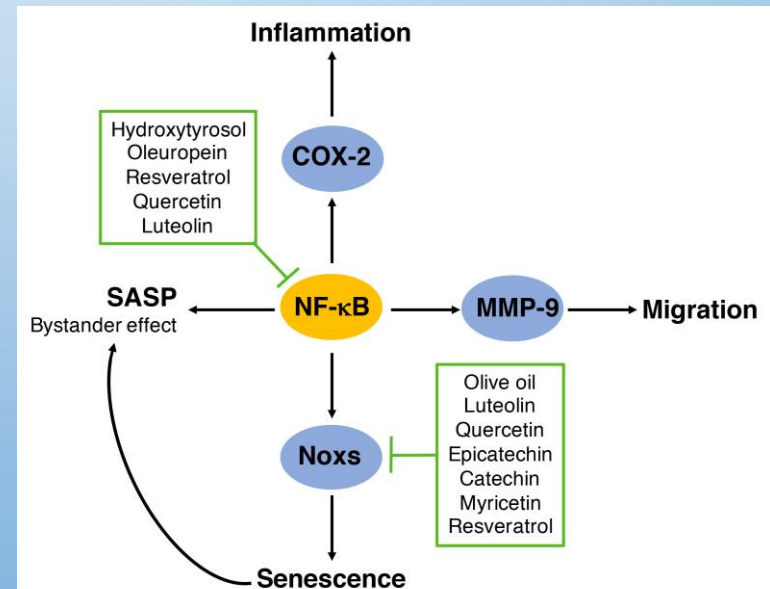
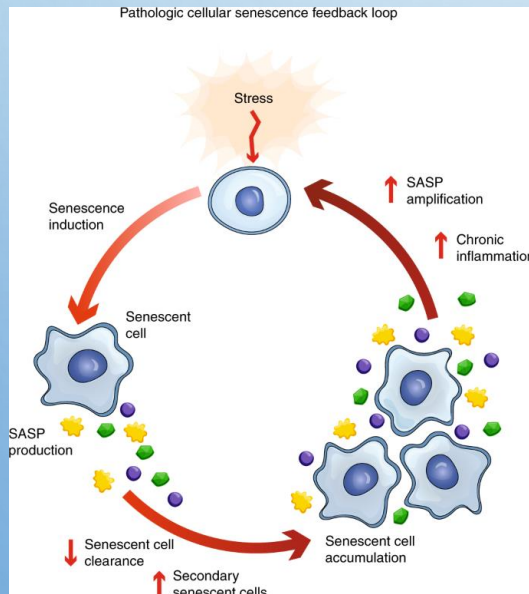
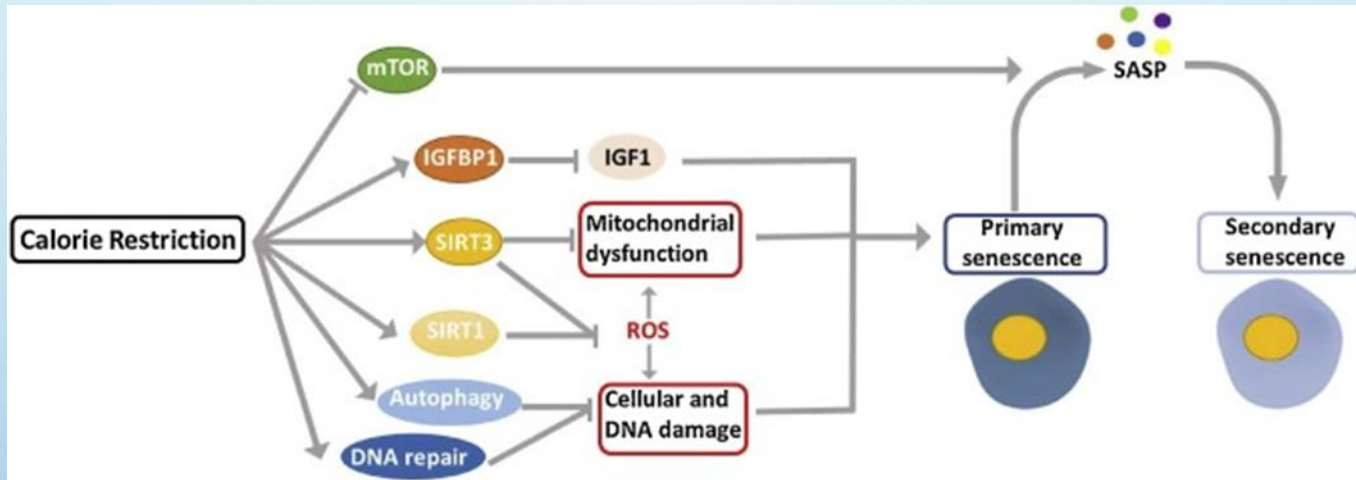


Ferulic acid

# COMMON PATHWAYS OF CR, FASTING, AND MANY POLYPHENOLS EPIGENETIC ACTIVITY, ESP. SIRT PATHWAY



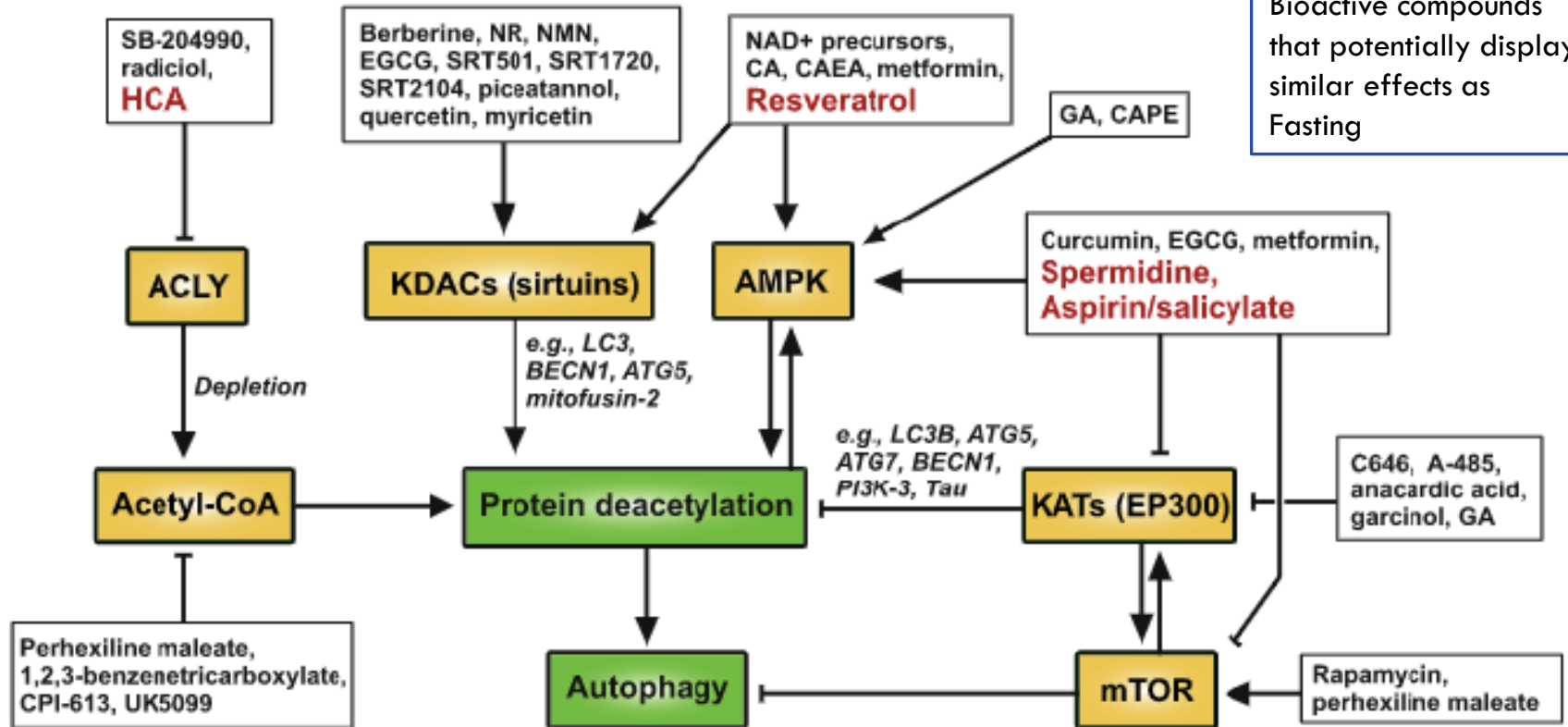
# FASTING, POLYPHENOLS, SENESCENCE





# FASTING MIMETICS: FROM ADDITIVES TO PHARMACEUTICS ( MABS,CART T) COMBINATIONS USEFULL?

Bioactive compounds that potentially display similar effects as Fasting



# CASE STUDY: COMPARING FASTING AND A FASTING MIMETIC SIRT-FOOD SHOT: MICROBIOTA, EPIGENETICS



Buchinger Fasting < 120  
kcal/day  
n: 22 in Pernegg Monastery

Feces , blood spots, before and  
After the end, first sold feces

Illumina sequencing, Line 1 methylation bisulfite qPCR, HR-MCA,  
RNA, MiRNA RT QPCRi



STOFF	WIRKSTOFF	MENGE / 25ML	Wirkstoff
Blueberry Extract	Anthocyanins/ Anthocyanidin..	40 mg	14mg 10mg
Broccoli Extract	Sulpharapane, Glucoraphin..	30 mg	
Apfel extract	Phlorentin, Quercetin..	50 mg	
Citrus extract	Naringin..	40 mg	
Nikotinamid	Nikotinamid ribosid	24 mg	
Zinkgluconat	Zink	7.5 mg	

Wasser, Stevia, Erythrit

Active (N. 131) Placebo (n: 30)  
Intervention 3 months

Feces, Blood spots before, after 1,3 month

# STUDY SENOLYTICS, SENESCENCE MARKERS IN BRDU TREATED PRE-ADIPOCYTES, ADIPOCYTES, 3T3

Hindawi  
Oxidative Medicine and Cellular Longevity  
Volume 2020, Article ID 4793125, 13 pages  
<https://doi.org/10.1155/2020/4793125>



## Research Article

### Epigallocatechin Gallate Effectively Affects Senescence and Anti-SASP via *SIRT3* in 3T3-L1 Preadipocytes in Comparison with Other Bioactive Substances

Stephanie Lilja,<sup>1</sup> Julia Oldenburg,<sup>1</sup> Angelika Pointner,<sup>1</sup> Laura Dewald,<sup>1</sup> Mariam Lerch,<sup>1</sup> Berit Hippe,<sup>2</sup> Olivier Switzeny,<sup>2</sup> and Alexander Haslberger<sup>1</sup>

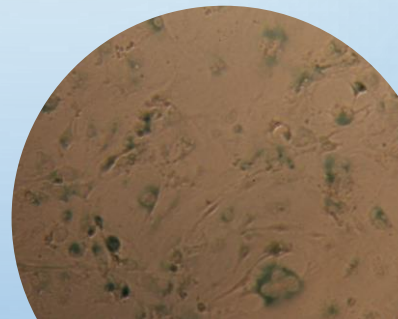
[Stem Cells](#). Author manuscript; available in PMC 2015 Aug 19.

Published in final edited form as:

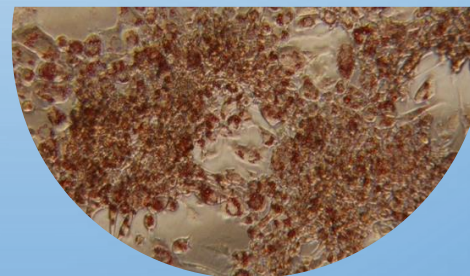
[Stem Cells](#). 2008 Dec; 26(12): 3218–3227.

Published online 2008 Sep 18. doi: [10.1634/stemcells.2008-0299](https://doi.org/10.1634/stemcells.2008-0299)

## Bromodeoxyuridine Induces Senescence



B-Gal, senescence



Adipocytes, fat droplets



# IN VITRO CONFIRMATION THAT SELECTED COMPOUNDS ARE ACTIVE IN PREADIPOCYTES, 3T3. MARKERS FOR SENESCENCE, AUTOPHAGY, EXPRESSION SIRT 3. BEST EGCG

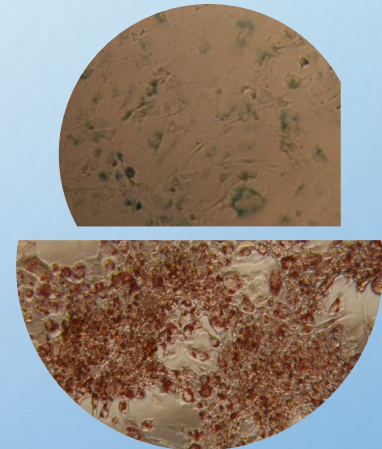
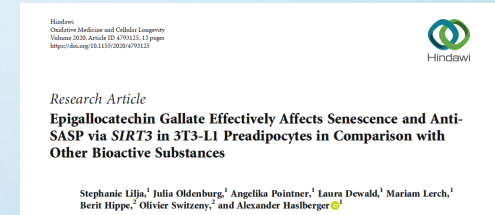
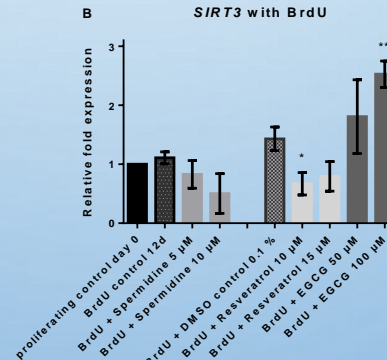
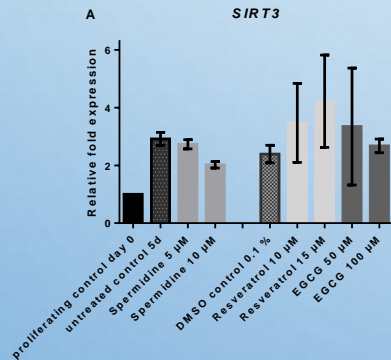
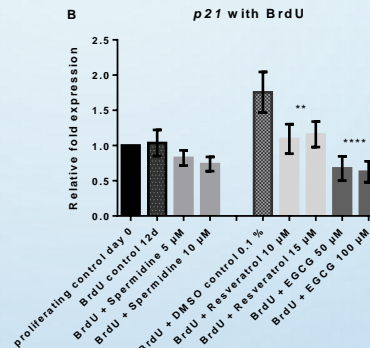
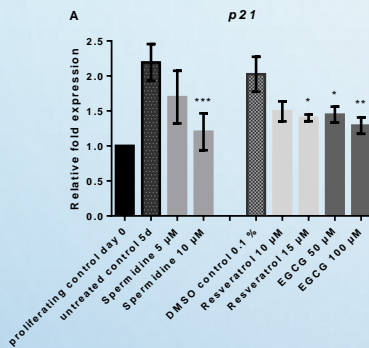
EGCG Uji-XP™

Anthocyanins-Bluezones®

Ayurvedic Spermidine Bluezones®

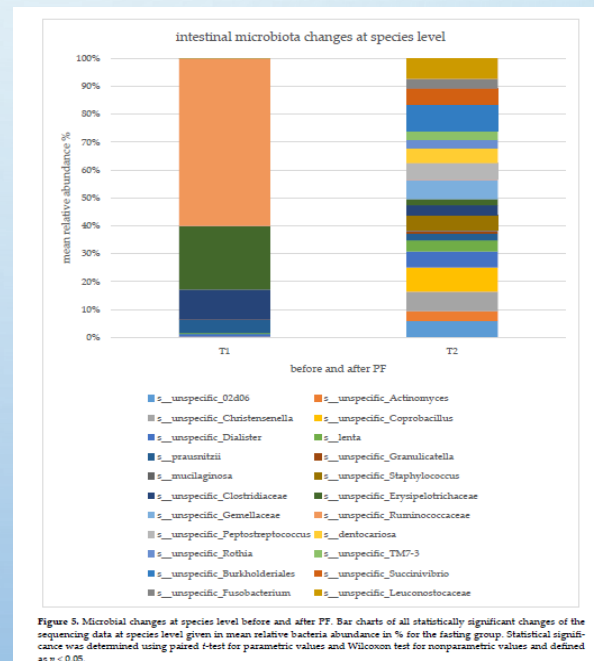
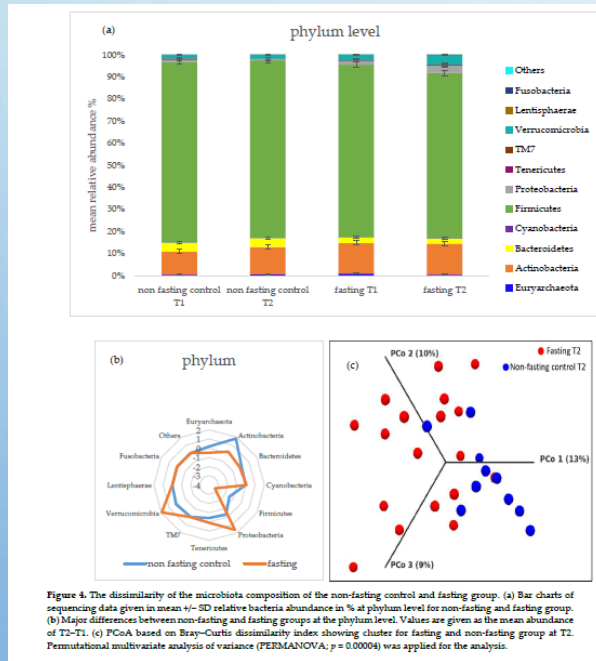
BLUEZONES™ RESVERATROL

Phloretin, BHB, Butyrate (Merck)

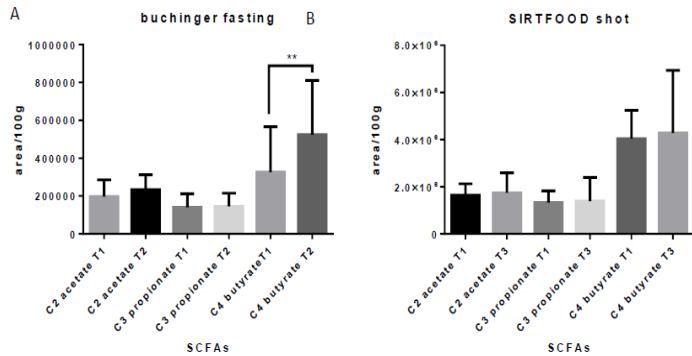


Pre, Adipocytes, fat droplets  
 B-Gal, senescence

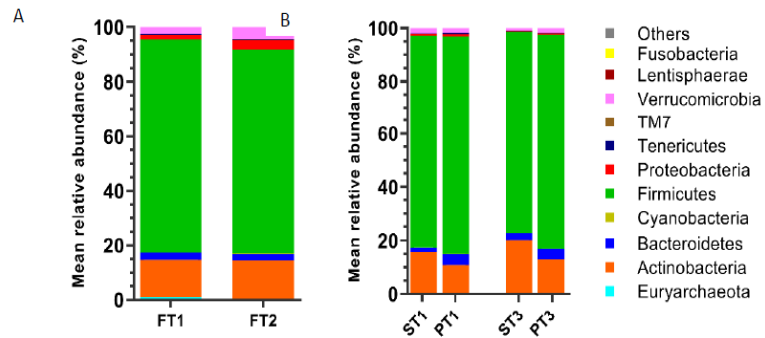
# BUCHINGER FASTING RESULTED IN A RISE IN THE DISTRIBUTION OF PROTEOBACTERIA, INCREASED MICROBIOTA DIVERSITY AND A SIGNIFICANT INCREASE IN CHRISTENSENELLA



# 3M SIRT INDUCING DRINK INCREASED ACTINOBACTERIA. FIRMICUTES/BACTEROIDETES RATIO DECREASED AND CORRELATED WITH BMI. ONLY FASTING INCREASED BUTYRATE SIGNIFICANTLY



**Figure 7:** Amount of SCFAs produced given as area/100g stool for buchinger fasting (A) and SIRTFOOD shot (B) interventions. Statistical significance between timepoint 1 (T1) and end (T2 or T3) of the intervention was determined using paired t-test for parametric values and Wilcoxon test for nonparametric values.



**Figure 6:** Abundance microbiota by phyla for fasting group (A), SIRTFOOD shot (ST1 vs ST3) (B) and placebo group (PT1 vs PT3) (B). Results are expressed in percentage of the mean of relative abundance for the different phyla. Statistical significance between timepoint 1 (T1) and end (T2 or T3) of the intervention was determined using paired t-test for parametric values and Wilcoxon test for nonparametric values.



# POSITIVE CORRELATION OF THE ABUNDANCE OF BUTYRATE-PRODUCING BACTEROIDETES WITH MIR125, SIRT-1 EXPRESSION, TELOMERE LENGTH

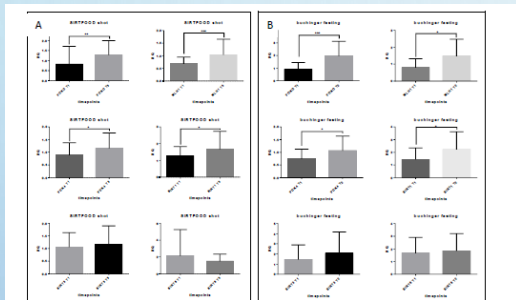


Figure 4: RQ selected mRNA gene expression (FOXP2, MLH1, PDH4, SIRT1, SIRT3, SIRT6) SIRTFOOD shot and buchuinger fasting. The results are expressed as mean  $\pm$  SD. Statistical significance between timepoint 1 (T1) and end (T2 or T3) of the intervention was determined using paired t-test for parametric values and Wilcoxon test for nonparametric values.

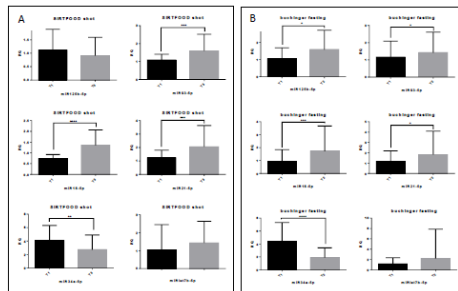


Figure 5: RQ selected miRNA gene expression (miR125b-5p, miR93-5p, miR16-5p, miR21-5p, miR146-5p, miRlet7b-5p) SIRTFOOD shot and buchuinger fasting. The results are expressed as mean  $\pm$  SD. Statistical significance between timepoint 1 (T1) and end (T2 or T3) of the intervention was determined using paired t-test for parametric values and Wilcoxon test for nonparametric values.

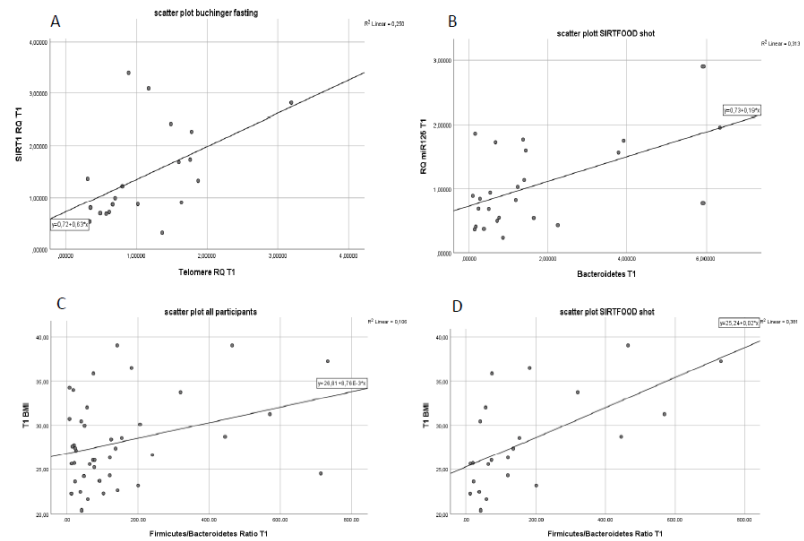


Figure 8: spss output scatter plots. (A) shows a positive correlation between telomere length and SIRT1 expression for buchuinger fasting at baseline. Bacteroidetes and miR125b-5p positively correlated in the SIRTFOOD shot intervention at baseline(B). For all participants the ratio of Firmicutes/Bacteroidetes increased with higher BMI (C), which was also seen for the SIRTFOOD shot intervention Discussion (D). Statistical significance was defined as  $p < 0.05$ .

# CONCLUSIONS

In conclusion fasting and to some extent fasting mimetics result in beneficial modulation of microbiota ( e.g diversity, SCFA, BHP) and metabolism ( e.g SIRT3, mtDNA, telomer length )

**Microbiota structure seems to interfere with the expression of Sirtuins and metabolism relevant miRNAs**

The image displays three overlapping journal article covers. The top cover is from Hindawi, titled "Epigallocatechin Gallate Effectively Affects Senescence and Anti-SASP via SIRT3 in 3T3-L1 Preadipocytes in Comparison with Other Bioactive Substances" by Stephanie Lilja et al. The middle cover is from MDPI, titled "Five Days Periodic Fasting Elevates Levels of Longevity Related Christensenella and Sirtuin Expression in Humans" by Stephanie Lilja et al. The bottom cover is from Bioactive Compounds in Health and Disease (BCHD), titled "Increased Sirtuin expression, senescence regulating miRNAs, mtDNA, and bifidobacteria correlate with wellbeing and skin appearance after Sirtuin-activating drink" by Stephanie Lilja et al.

Hindawi  
Oxidative Medicine and Cellular Longevity  
Volume 2020, Article ID 4793125, 13 pages  
<https://doi.org/10.1155/2020/4793125>

Research Article  
**Epigallocatechin Gallate Effectively Affects Senescence and Anti-SASP via SIRT3 in 3T3-L1 Preadipocytes in Comparison with Other Bioactive Substances**  
Stephanie Lilja,<sup>1</sup> Julia Oldenburg,<sup>1</sup> Angelika Pointner,<sup>1</sup> Laura Dewald,<sup>1</sup> Mariam Lerch,<sup>1</sup> Berit Hippe,<sup>2</sup> Olivier Switzeny,<sup>2</sup> and Alexander Haslberger<sup>1</sup>

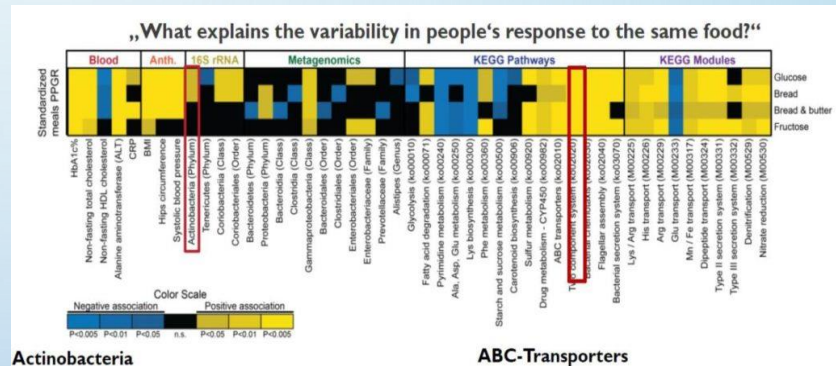
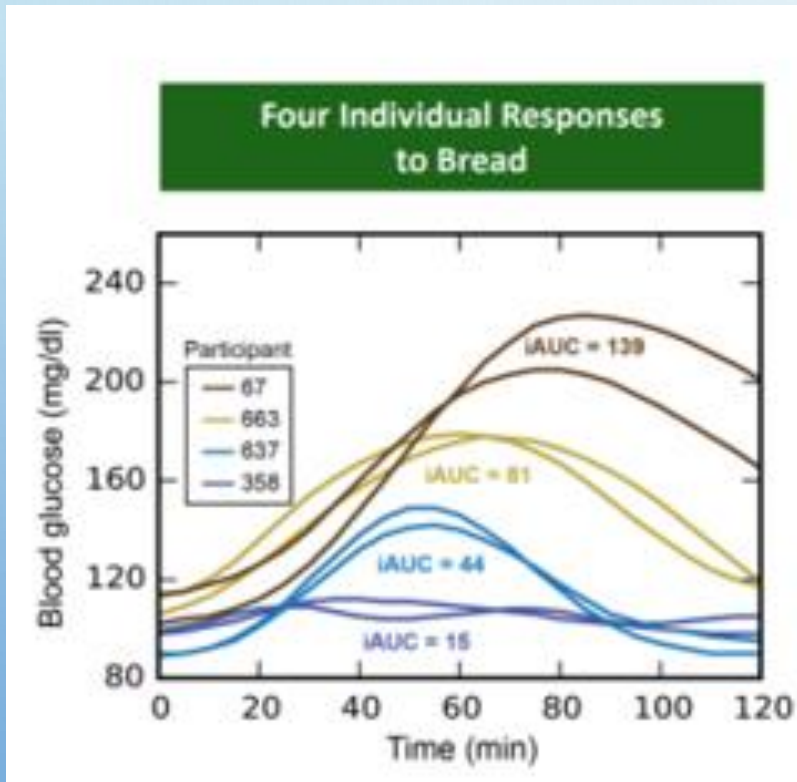
International Journal of  
Molecular Sciences  
Article  
**Five Days Periodic Fasting Elevates Levels of Longevity Related *Christensenella* and Sirtuin Expression in Humans**  
Stephanie Lilja<sup>1</sup>, Carina Stoll<sup>1</sup>, Ulrike Krammer<sup>1</sup>, Berit Hippe<sup>1</sup>, Kalina Duszka<sup>1</sup>, Tewodros Debebe<sup>1</sup>, Ingrid Höfner<sup>1</sup>, Jürgen König<sup>1</sup>, Angelika Pointner<sup>1</sup> and Alexander Haslberger<sup>1,\*</sup>

Online ISSN: 2160-3855, Print ISSN: 2378-7007  
Functional Foods in Health and Disease  
Home Editorial Team Iss

Home > Vol 10, No 10 (2020) > Lilja  
Fasting and fasting mimetic supplementation address sirtuin expression, miRNA and microbiota composition  
Stephanie Lilja, Hanna Bäck, Kalina Duszka, Berit Hippe, Lucia Suarez, Ingrid Höfner, Tewodros Debebe, Jürgen König, Alexander Haslberger

Bioactive Compounds in Health and Disease 2021; 4(4): 45-62  
Research Article  
BCHD  
Bioactive Compounds in Health and Disease  
Increased Sirtuin expression, senescence regulating miRNAs, mtDNA, and bifidobacteria correlate with wellbeing and skin appearance after Sirtuin-activating drink  
Stephanie Lilja, Hanna Bäck, Carinna Stoll, Anna Mayer, Angelika Pointner, Berit Hippe, Ulrike Krammer, Alexander G. Haslberger\*

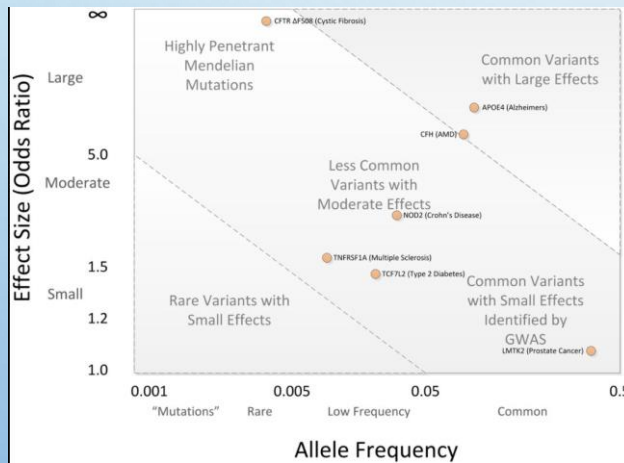
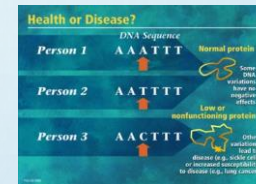
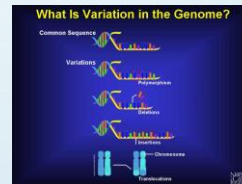
# PERSONALISED NUTRITION: HIGHLY DIFFERENT PERSONAL RESPONSES TO DIETS, GLYCEMIC RESPONSES, EXPLANATIONS?



Different people have different, opposite responses to standardized meal, bread, Zeevi et al., 2015, Cell



# GENETICS: GWAS : SNPS, COMMON VARIANTS HAVE OFTEN ONLY MODERATE EFFECTS

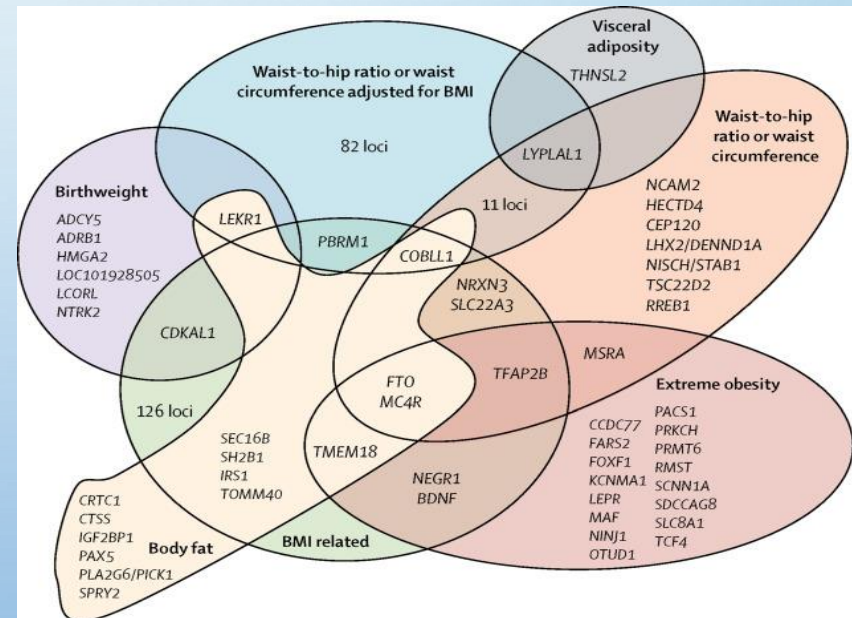


## Methods

### Prediction of individual genetic risk to disease from genome-wide association studies

Naomi R. Wray,<sup>1,4</sup> Michael E. Goddard,<sup>2,3</sup> and Peter M. Visscher<sup>1</sup>

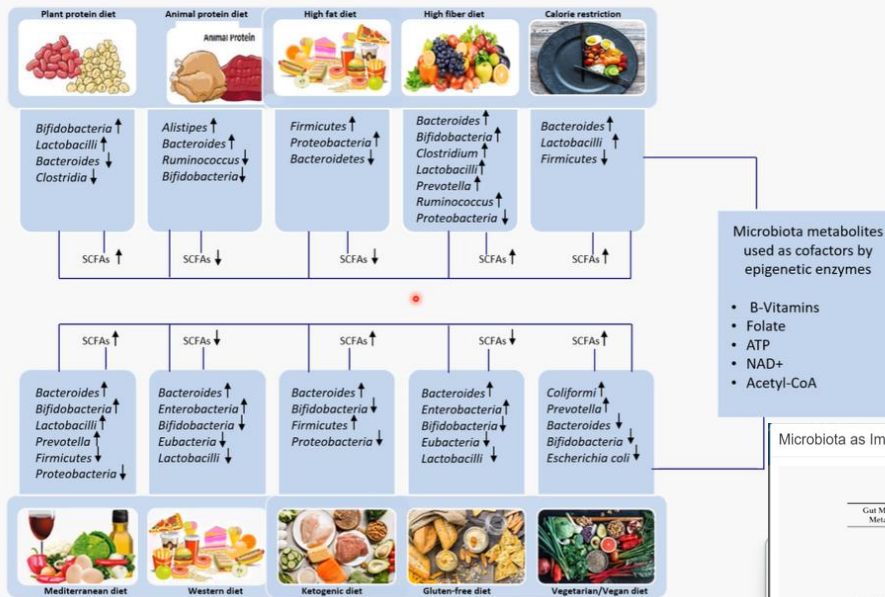
<sup>1</sup>Genetic Epidemiology, Queensland Institute of Medical Research, Queensland 4029, Brisbane, Australia; <sup>2</sup>Faculty of Land and Food Resources, University of Melbourne, Victoria 3010, Australia; <sup>3</sup>Department of Primary Industries, Victoria 3049, Australia





# INTERACTIONS BETWEEN DIETS, MICROBIOTA AND EPIGENETICS ARE MORE IMPORTANT, EXPERIENCE

Microbiota as Important Mediator Between Diet and DNA Methylation and Histone Modifications in Host



- Microbiota metabolites used as cofactors by epigenetic enzymes
- B-Vitamins
  - Folate
  - ATP
  - NAD+
  - Acetyl-CoA

Microbiota as Important Mediator Between Diet and DNA Methylation and Histone Modifications in

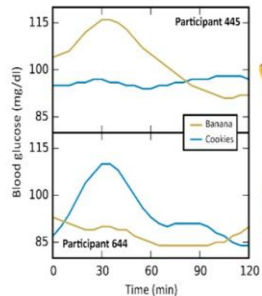
Gut Microbiota Metabolites	Metabolite Producing Bacteria	Biological Functions of Metabolites	Metabolite-Induced Epigenetic Changes	Epigenetics-Associated Effects	Associated Diseases
		Regulation of: <ul style="list-style-type: none"> <li>• fatty acid, glucose, and cholesterol metabolism</li> <li>• mucin synthesis</li> <li>• synthesis of AMP, daily turnover of the epithelial lining and skin cell proliferation</li> <li>• gut integrity by T<sub>H</sub>17 reactivity functions</li> <li>• differentiation and function of T<sub>H</sub>1, T<sub>H</sub>2, and regulatory T (T<sub>reg</sub>) cells</li> <li>• intestinal macrophage activation and recruitment</li> <li>• dendritic cells in the induction of tolerance</li> </ul> Suppression of pro-inflammatory cytokine secretion Improvement in insulin sensitivity and weight control Energy source for colonocytes	<ul style="list-style-type: none"> <li>• Inhibition of DNMT1 activity</li> <li>• Decreased DNA methylation</li> <li>• Inhibition of HDACs</li> <li>• Increased histone acetylation</li> <li>• Activation of HAT</li> <li>• Increased histone acetylation</li> </ul>	<ul style="list-style-type: none"> <li>• Upregulation of FOXO3, <math>\beta</math>-defensin 2 and 3, ADIPOQ, RETN, SIRT3, BAK1, CDKN1A, CDKN1B, PPAR<math>\gamma</math>, IRS1, FAS, NOS2, CD36, IL6, IL1A, IL12B, ERK6, MHC class II, USF1, ACOT7, TAC1, LMNA, SCD5, HDAC7, RGF2B2, and SIRT1 genes</li> <li>• Downregulation of NR1, NF4B, FTO, MCR4, FMO1, KCNIP4, SERINC3, MEPA2, and STAT1 genes</li> </ul>	Inflammatory bowel disease, cardiovascular disease, ulcerative colitis, Crohn's disease, obesity, metabolic syndrome, colorectal cancer, type 1 diabetes, type 2 diabetes, nephropathy, autism spectrum disorders
Short-chain fatty acids (SCFAs): Acetate, propionate, butyrate, iso-butyrate, caproate, branched SCFAs (BCFAs), hexanoate, lactate, 2-methylisopropionate, valerate, iso-valerate	Lactobacillus, Eubacterium, Roseburia, Anaerostipes hadrum, Faecalibacterium, Coprococcus catus, Clostridia (clusters IV and XIVa)	Maintenance of intestinal barrier function Regulation of intestinal IgA production Improvement in insulin sensitivity Regulation of development and function of the central nervous system	<ul style="list-style-type: none"> <li>• Inhibition of DNMTs activity</li> <li>• Decreased DNA methylation</li> <li>• Decreased histone methylation and phosphorylation</li> <li>• Increased SIRT1 deacetylase activity</li> </ul>	<ul style="list-style-type: none"> <li>• Downregulation of EZH2 and CBX2 genes</li> <li>• Upregulation of CDH1, PRKAA1, and IGF1BP3 genes</li> </ul>	Chronic systemic inflammation, hyperhomocolemia, depression, cognitive anxiety
Polyunsaturated fatty acid (PUFAs): Arachidonic acid, docosahexaenoic acid, conjugated linoleic acids, conjugated linoleic acids, linoleic acid derivative	Bifidobacterium, Roseburia, Lactobacillus, Akkermansia, Eubacterium, Clostridium				

Dina Bellizzi, University of Calabria, Italy , Annalisa Terranegra, Sidra Medical and Research Center, Qatar

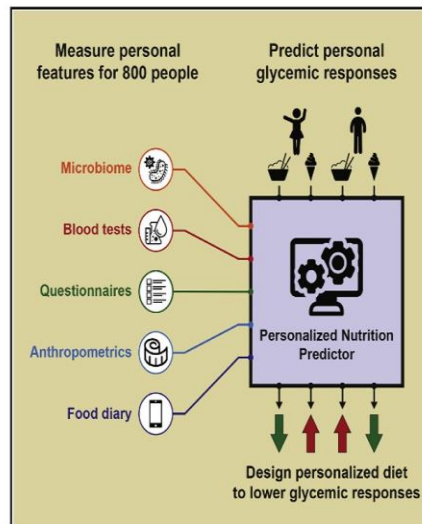
# CORRELATION OF MICROBIOTA STRUCTURE WITH GLYCEMIC RESPONSES USED FOR ALGORITHMS FOR DIETARY ADVICE

Beispiel - Personalized Nutrition by Prediction of Glycemic Responses  
David Zeevi, 2016

- 800 Personen – jeder hat andere „post meal Glucose response“

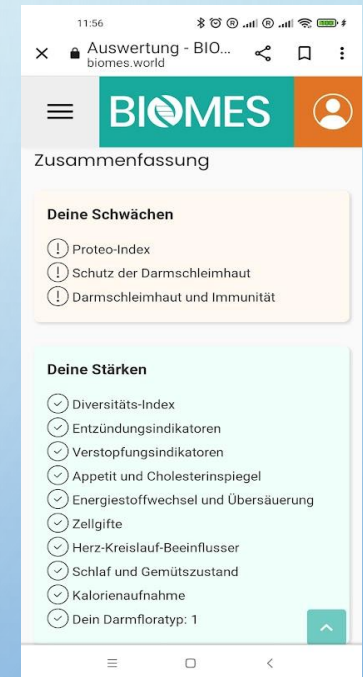


Mikrobiota Zusammensetzung beeinflusst Blutglucoselevel



Eran Elinav and Eran Segal, Weizmann Institute of monitoring the blood sugar, diets, and other traits of 800 people, **they built an algorithm** that can accurately predict how a person's blood-sugar levels will spike after eating any given meal.

They also used these personalized predictions to develop tailored dietary plans for keeping blood sugar in check.



# DEFINITION OF METABOTYPES FROM GENETIC-, MICROBIOTA- BASED INFORMATION, METABOTYPING, FOOD4ME



## Does personalised nutrition work?

Professor John Mathers, Newcastle University, UK



John Mathers leads work on the design, delivery and evaluation of outcomes from the Food4Me project's Proof-of-Principle study. He is professor of human nutrition and director of the Human Nutrition Research Centre, Newcastle University, UK.

## Molecular Nutrition Food Research

Research Article | Open Access | CC BY | DOI

### Evaluation of the Metabotype Concept Identified in an Irish Population in the German KORA Cohort Study

Anna Riedl, Elaine Hillesheim, Nina Wawro, Christa Meisinger, Annette Peters, Michael Roden, Florian Kronenberg, Christian Herder, Wolfgang Rathmann, Henry Völzke, Martin Reincke ... See all authors

First published: 11 February 2020 | <https://doi.org/10.1002/mnfr.201900918> | Citations: 1

Hillesheim et al. *Nutr Metab (Lond)* (2020) 17:82  
<https://doi.org/10.1186/s12986-020-00499-z>

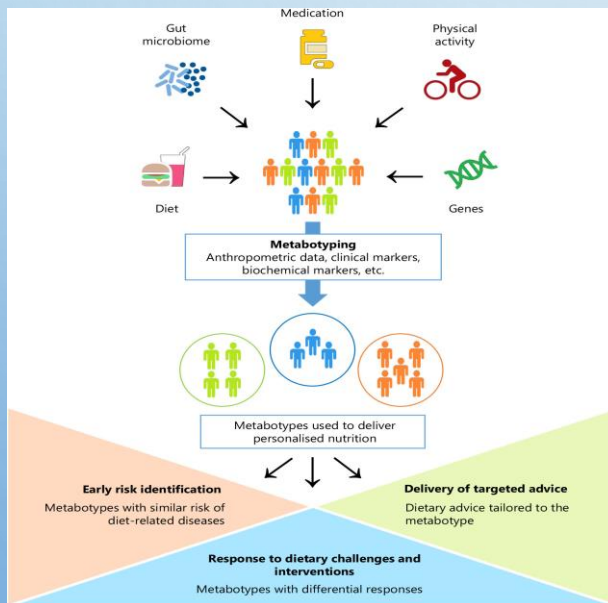
Nutrition & Metabolism

RESEARCH

Open Access

## Optimisation of a metabotype approach to deliver targeted dietary advice

Elaine Hillesheim<sup>1,2</sup>, Miriam F. Ryan<sup>1</sup>, Eileen Gibney<sup>1</sup>, Helen M. Roche<sup>2,3</sup> and Lorraine Brennan<sup>1,2\*</sup>



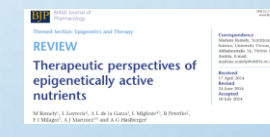
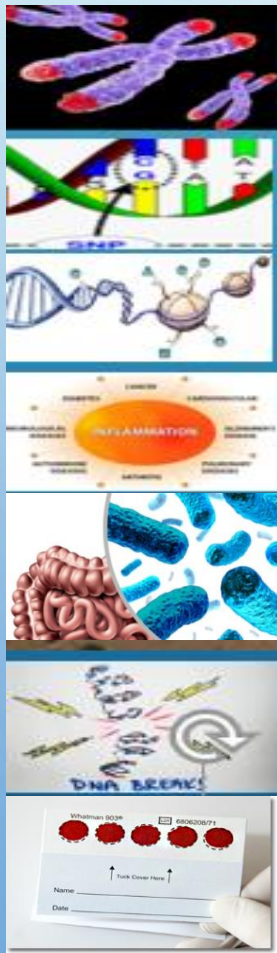
## Spectrum of Possibilities for Human Metabolism

Carbo Types	Mixed Types	Protein Types
Increasing need for Carbohydrates Decreasing need for Proteins, Fats & Purines	Relatively balanced need for Carbohydrates, Proteins, Fats & Purines	Increasing need for Proteins, Fats & Purines Decreasing need for Carbohydrates
<p><b>Carbo Type Characteristics:</b></p> <ul style="list-style-type: none"> <li>Casual relationship with food</li> <li>Skipping a meal is usually not a big deal</li> <li>Needs high quality Vegetable and/or Fruit nutrition at their</li> </ul>	<p><b>Mixed Types:</b></p> <p>Can identify with some characteristics of both Carbo Types &amp; Protein Types - but, typically</p>	<p><b>Protein Type Characteristics:</b></p> <ul style="list-style-type: none"> <li>Intense relationship with food - loves to eat &amp; tends to eat fast</li> <li>Skipping a meal IS a big deal</li> <li>Needs some high quality animal Protein &amp; Fat at every meal to</li> </ul>



# Personalisation of Additives for Prevention: Monitoring basic hallmarks of health/aging.

## Use of mixes of supplements, functional foods which address specific mechanisms



Precision Probiotics + Prebiotics with Viome's Gut Intelligence™ Test

For gut health



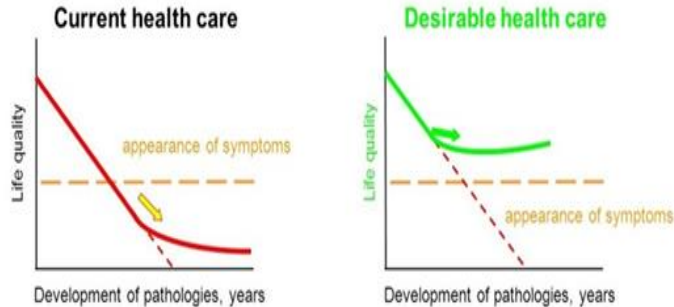
# EPIGENETIC EFFECTS OF PHYTOCEUTICALS USING EPIGENETIC BIOMARKERS FOR PERSONALISED INTERVENTION

 <b>Senescence</b>	 <b>Oxidative Damage</b>	 <b>Telomere length</b>	 <b>Inflammation</b>	 <b>epigen. Clock Methalation</b>	 <b>Performance Fatigue</b>	 <b>Gut Health Metabolism</b>	 <b>Skin Hair</b>	 <b>Antiviral capacity</b>	 <b>"Inflamm-Aging"</b>	 <b>Stress</b>	 <b>Depression</b>
Spermidine Curcumine Phloretine Fisetin	Sirtfoodshot Resveratrol Phloretin Fisetin Sulforaphan	Timeblock Resveratrol vegan Vit . D 3 Tocotrienole Quercetin White-Tea Extract Ginseng Grapefruit Extract Tagetes Extract Omega 3 Mix	Resveratrol Sulforaphan Tocotrienole Quercetin Curcumin Pomegranate Extract White-Tea Extract Broccoli Extract Blueberry Extract EU Apple Extract Strawberry Extract Mango Extract Omega 3 Mix Hyalurone	EGCG Vit B 12 Quercetin Folate	Virmune Tegaran Zhen Hua	Galactooligos. Sirtfood Shot Butyrate Ginseng Grapefruit Extract	Hyaluron Sirtfood Shot	EGCG Sagepolyphenols Phloretin Berberin Quercitin Resveratrol Virmune	Methionin Folsäure Sulforaphan	Butyrate Gingerol Quercetin White-Tea Extract Broccoli Extract Apple Extract Olive Leaf powder Ginseng Grapefruit Extract Tagetes Extract Omega 3 Mix	Resveratrol Curcumin White-Tea Extract Broccoli Extract Tagetes Extract Omega 3 Mix

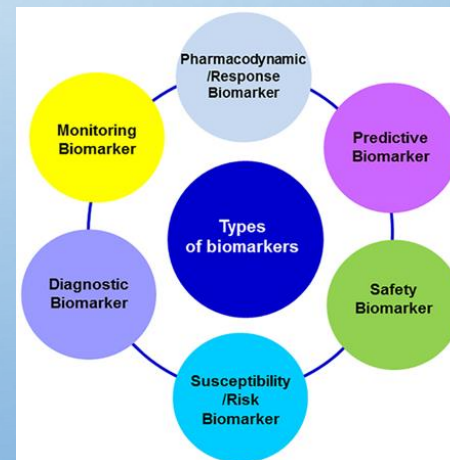
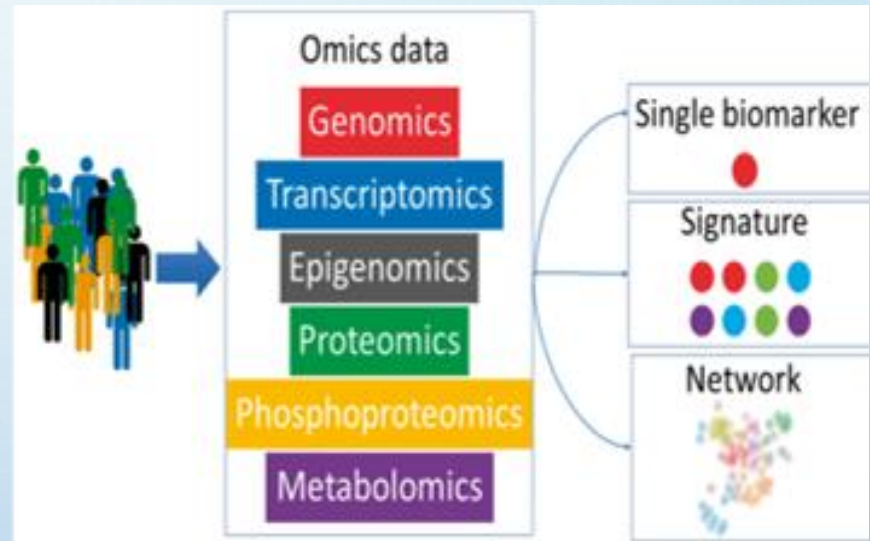


# DISCUSSION: PREVENTIVE PERSONALISED (PRECISION) MEDICINE, NUTRITION NEEDS GOOD MARKERS

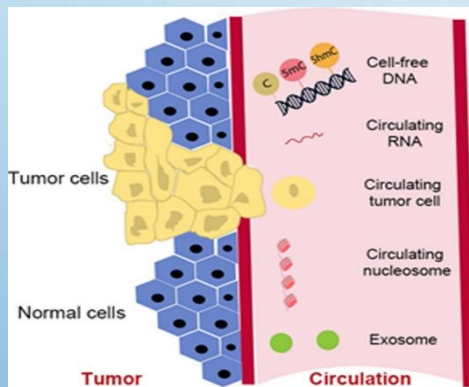
Application of Molecular Medicine towards personalised treatment



The Paradigm Shift from Reactive to Predictive, Preventive and Personalized Medicine




# GOOD MARKERS: COMBINATIONS!



Article

## Comprehensive Approach to Distinguish Patients with Solid Tumors from Healthy Controls by Combining Androgen Receptor Mutation p.H875Y with Cell-Free DNA Methylation and Circulating miRNAs

Elena Tomeva <sup>1</sup>, Olivier J. Switzeny <sup>1</sup>, Clemens Heitzinger <sup>2</sup>, Berit Hippe <sup>1,3</sup> and Alexander G. Haslberger <sup>3,\*</sup> 

<sup>1</sup> HealthBioCare GmbH, A-1090 Vienna, Austria; et@healthbiocare.at (E.T.); switzeny@healthbiocare.at (O.J.S.); bh@healthbiocare.at (B.H.)

<sup>2</sup> Center for Artificial Intelligence and Machine Learning (CAIML), TU Wien, A-1040 Vienna, Austria; clemens.heizinger@tuwien.ac.at

<sup>3</sup> Department of Nutritional Sciences, University of Vienna, A-1090 Vienna, Austria

\* Correspondence: alexander.haslberger@univie.ac.at

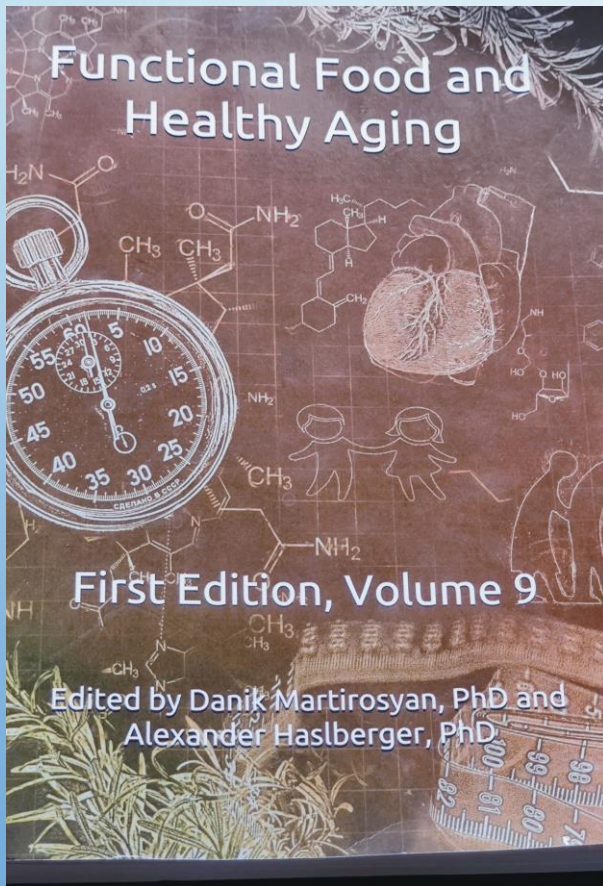
**Simple Summary:** Blood-based tests for cancer detection are minimally invasive and could be useful for screening asymptomatic patients and high-risk populations. Since a single molecular biomarker is usually insufficient for an accurate diagnosis, we developed a multi-analyte liquid biopsy-based classification model to distinguish cancer patients from healthy subjects. The combination of cell-free DNA mutations, miRNAs, and cell-free DNA methylation markers improved the model's performance. Moreover, we demonstrated that the androgen receptor mutation p.H875Y is not only relevant in prostate cancer but had a strong predictive value for colorectal, bladder, and breast cancer. Our results, although preliminary, showed that a single liquid biopsy test could detect multiple cancer types simultaneously.



**Citation:** Tomeva, E.; Switzeny, O.J.; Heitzinger, C.; Hippe, B.; Haslberger, A.G. Comprehensive Approach to Distinguish Patients with Solid




# Slides and materials: [www.My-Personal.Health](http://www.My-Personal.Health)



**MPH**  
PERSONAL DISEASE  
PREVENTION HEALTHY AGING

Home Ways to your Health, Opportunities ▾ **News, Materials from us** ▾ Functional Food/month ▾ Blogs ▾ Personal health, s

## Info, presentations, articles, meetings, downloads Alexander G Haslberger



### Conferences and media

Articles in Researchgate >>> Scopus >>> Orcid >>>

- TV- ProSieben ; Pro 7 featuring our work, aging >>>
- AKE Jahrestagung, 102021; Microbiota and lifestyle >>>
- The Paris conference on targeting microbiota, 2021, summarizes the newest research, especially the session on gut host interactions.  
<https://www.microbiota-site.com/> this is our contribution:  
<https://youtu.be/c2PROMXbAn0>
- Conference personalised nutrition, University Heilbronn, Oct 5th, 2021  
>>> personalised nutrition; my presentation >>>
- Conference OeGE, Vienna, Nov. 2020 Personalised Nutrition, >>>
- Sigmund Freud University 2020: Health,epigenetics and Salutogenesis; Vienna, 2020/8 >>>



# COMING END OF OCTOBER 2022

## Advances in Precision Nutrition, Personalization and Healthy Aging

Editor Proof

 Springer

1	<b>Trends in Personalised Precision Nutrition, Objectives</b> .....	1
	Petra Rust and Alexander G. Haslberger	
2	<b>Individualization, Precision Nutrition Developments for the 21st Century</b> .....	25
	María-Carmen López de Las Hazas and Alberto Dávalos	
3	<b>Precision Nutrition from the View of Genetics and Epigenetics</b> .....	51
	Lucia Migliore and Fabio Coppedè	
4	<b>Precision Nutrition from the View of the Gut Microbiome</b> .....	67
	Plamena Dikarlo, Isabel Dorst, Olga Moskalenko, and Murad Yateem	
5	<b>Personalized Nutrition for Healthy Aging, A Review</b> .....	97
	Angelika Pointner and Alexander G. Haslberger	
6	<b>Precise Nutrition and Metabolic Syndrome, Remodeling the Microbiome with Polyphenols, Probiotics, and Postbiotics</b> .....	145
	Djordjevic I. Brizita and Ivanovic Dj. Nevena	
7	<b>Precision Nutrition and Metabolomics, a Model of Alzheimer's Disease</b> .....	179
	Stefan Ledinger, Carmen Ludwig-Papst, and Matthias Scheffler	
8	<b>Precision Nutrition and Cognitive Decline</b> .....	191
	Peterlin Borut, Zalar Bojan, and Peterlin Ana	
9	<b>Algorithms for and Challenges in the Analysis of Markers in Personalized Health Care</b> .....	203
	Clemens Heitzinger	
10	<b>Precise Nutrition and Functional Foods</b> .....	231
	Ivanovic Dj Nevena, Berit Hippe, Stephanie Lilja, and Alexander G. Haslberger	
11	<b>Precision Nutrition from a Practical Clinical View, Case Study</b> .....	269
	Ursula Jacob	

