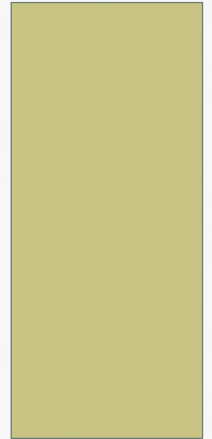




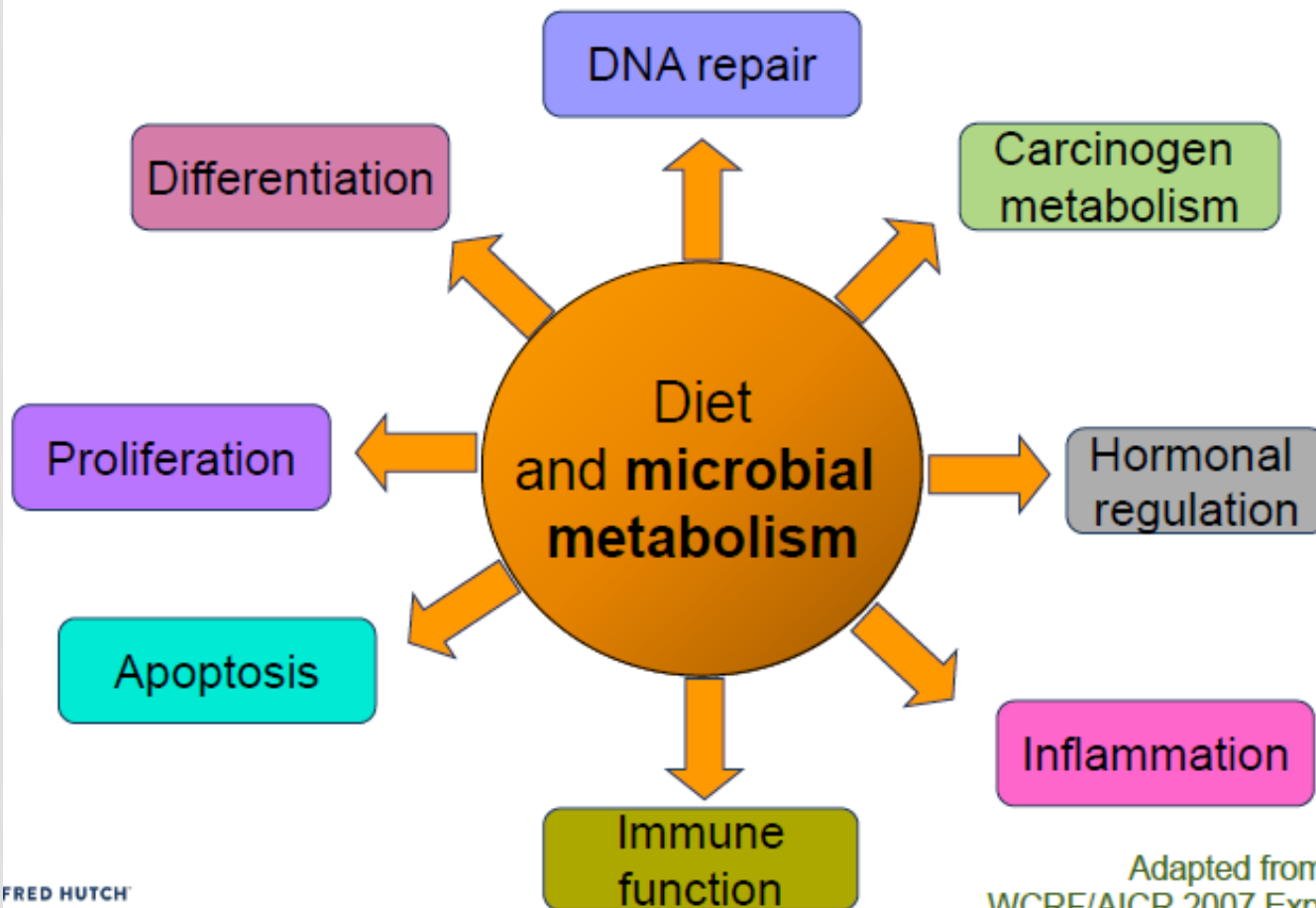
DIET AND MICROBIOME FUTURE OF FOOD SCIENCE AND TECHNOLOGY

DR. LUAY ABU-QATOUSEH
PHD MEDICAL MICROBIOLOGY AND IMMUNOLOGY



DIETARY EXPOSURES AND CELLULAR PROCESSES LINKED TO DISEASES

Involvement of Microbial Metabolism



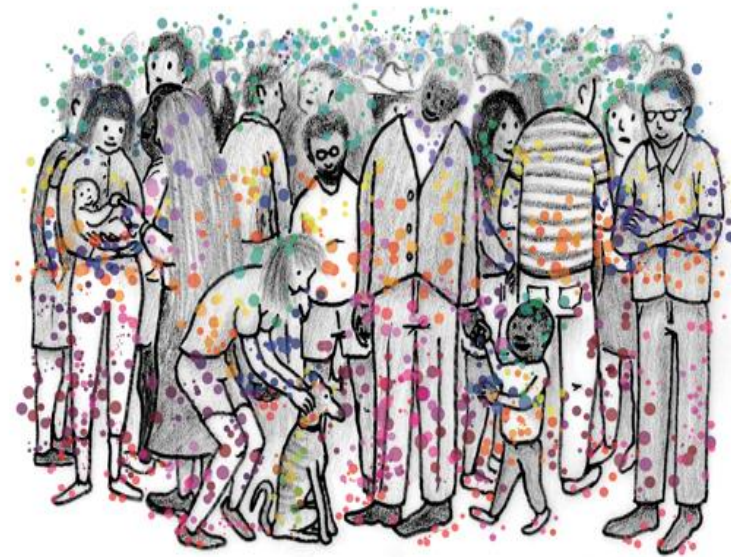
WIN-WIN RELATIONSHIP

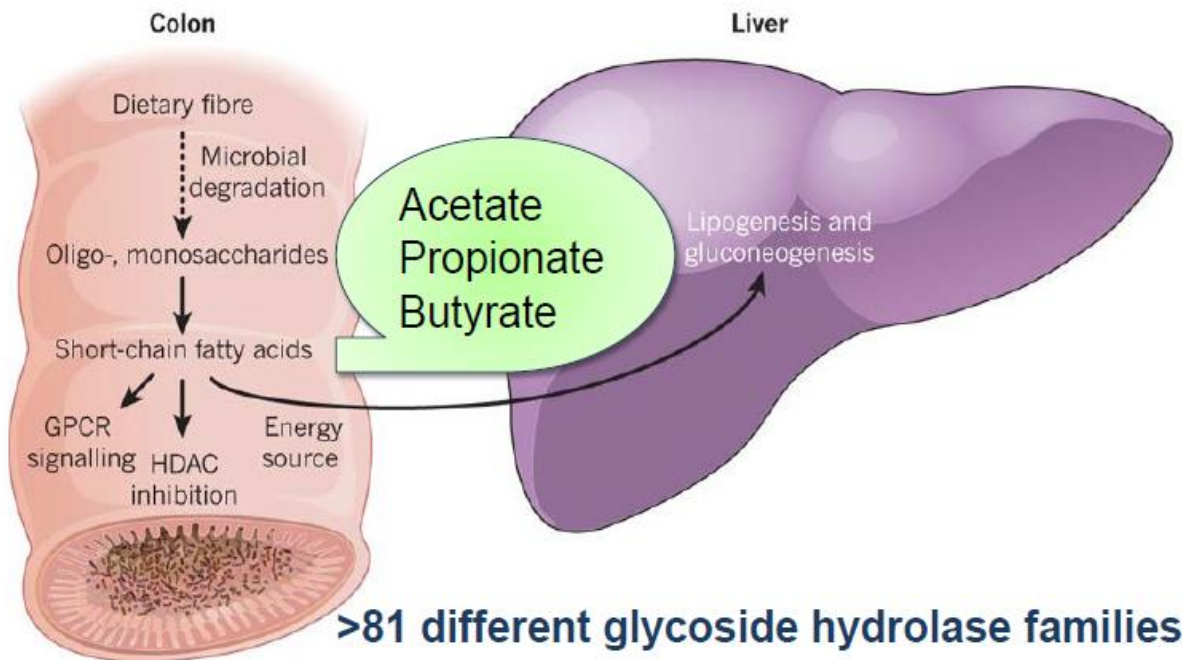
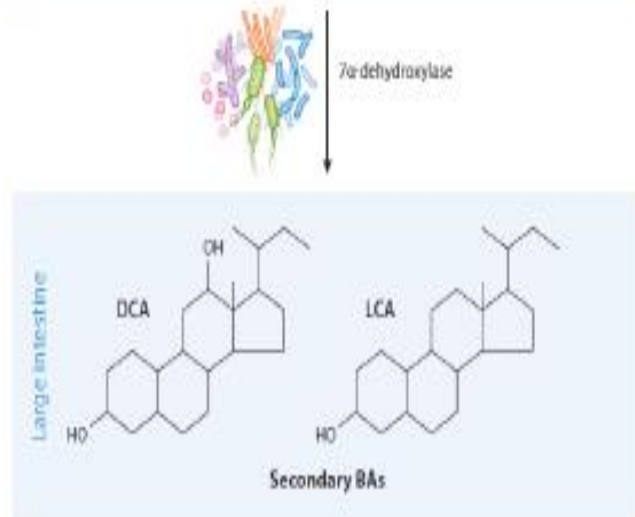
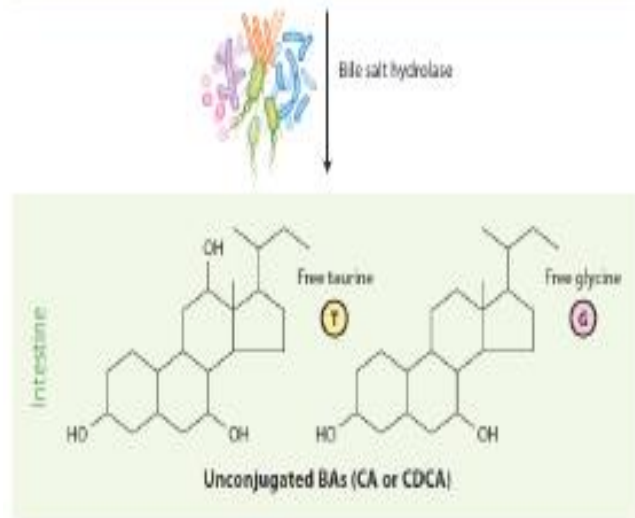
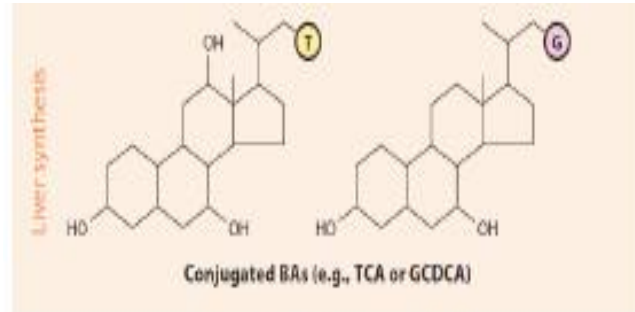
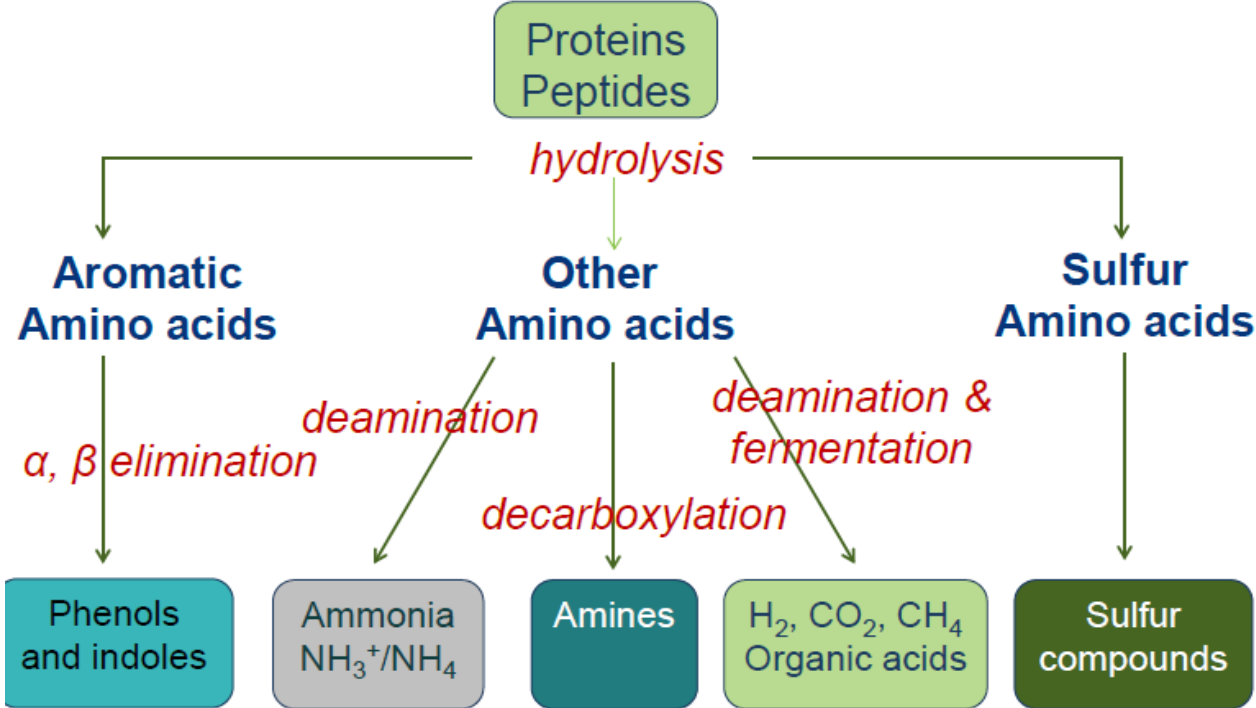
- Diet affects the gut microbial community
- Gut microbiome affects components of diet



MICROBIOME

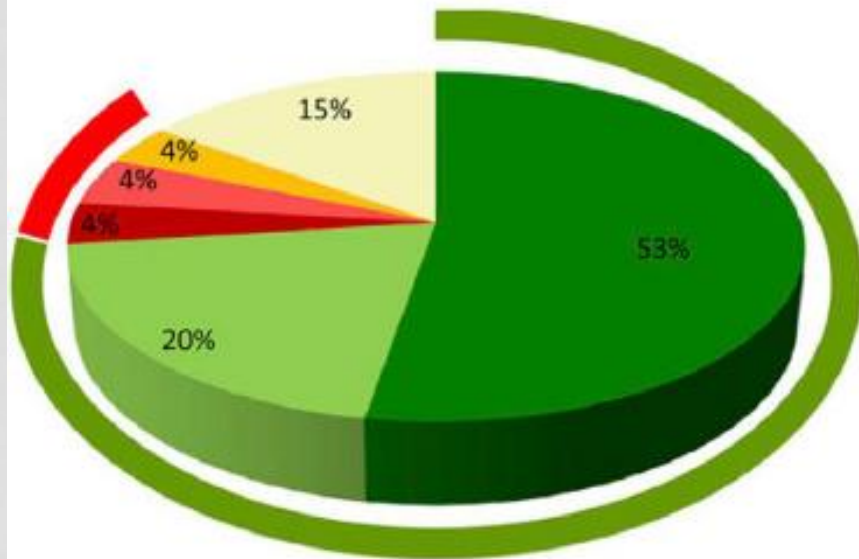
- Your bacterial community is a fingerprint for you
- Microbiome: >100 times as many genes as human genome
- Carry out reactions that human gut enzymes cannot
 - Fermentation
 - Denitrification
 - Sulfate reduction
 - Aromatic fission
 - Hydrolysis/deconjugation





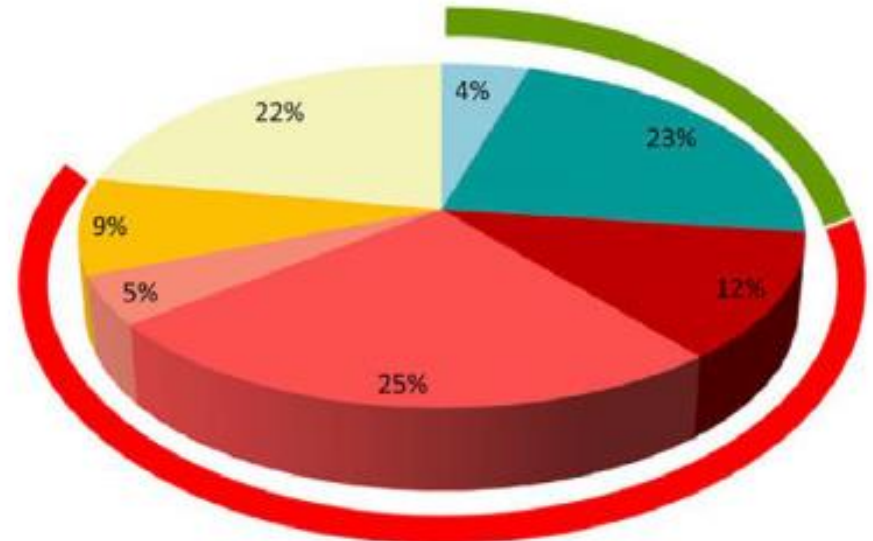
DIET TYPE CHANGES MICROBIOME

Global Population Differences: Children in Rural Africa (BF) vs Urban Europe (EU)



BF

| | |
|--------------------|-----------------|
| ■ Prevotella |] Bacteroidetes |
| ■ Xylanibacter | |
| ■ Acetitomaculum |] Firmicutes |
| ■ Faecalibacterium | |
| ■ Subdoligranulum | |
| ■ Others | |

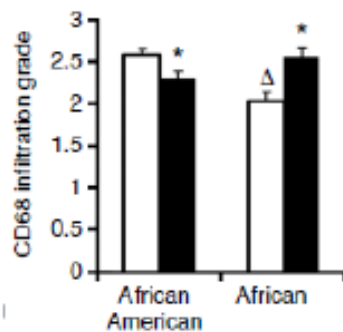
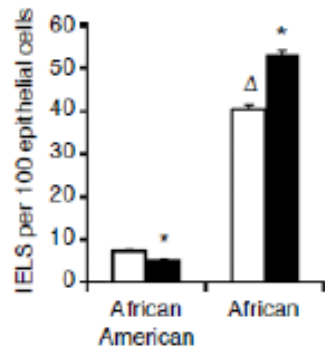
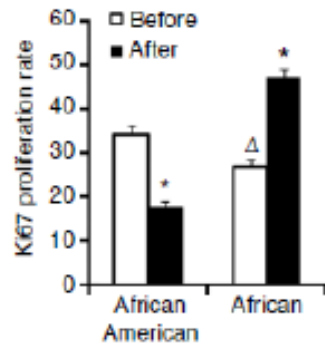


EU

| | |
|--------------------|-----------------|
| ■ Alistipes |] Bacteroidetes |
| ■ Bacteroides | |
| ■ Acetitomaculum |] Firmicutes |
| ■ Faecalibacterium | |
| ■ Roseburia | |
| ■ Subdoligranulum | |
| ■ Others | |

Diet Pattern Change and Gut Microbiome :

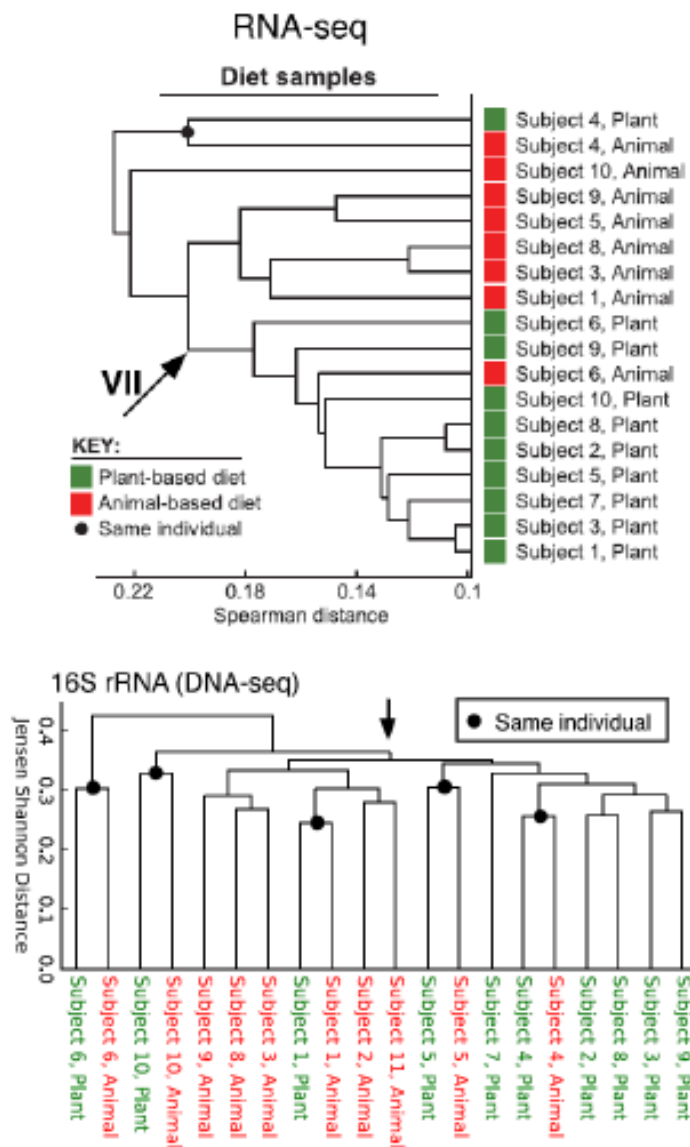
Fat & Fiber and Colorectal Cancer Risk Factors



- High-fiber, low-fat diet changed microbiome:
 - Increased saccharolytic fermentation and butyrate production
 - Decreased secondary bile acid synthesis
- Functional changes in gut microbiota were accompanied by colorectal cancer relevant changes in colonic mucosal proliferation and inflammation



Short-Term Feeding of Plant- and Animal-Based Diets Alters Gut Microbiota



- 10 subjects tracked across plant- and animal-based diet treatments.
- Animal-based diet increased bile-tolerant microorganisms and decreased microbes that metabolize plant polysaccharides.
- Bacterial metabolic gene expression (RNA-seq) tends to cluster by diet.
- Diet doesn't always overcome inter-individual differences in GMC structure (16S rRNA).



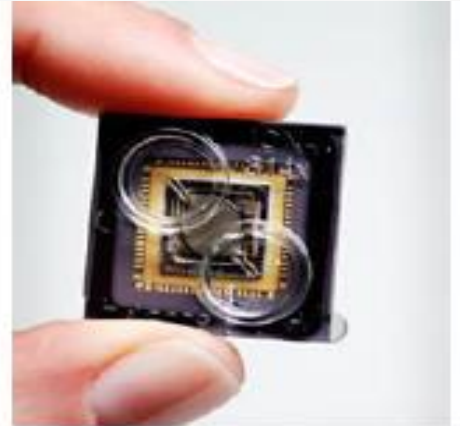
Obese Adults More Likely to be ODMA-Nonproducer Phenotype

| | 18 to <25 kg/m ² | 25 to 29.9 kg/m ² | 30+ kg/m ² | P-trend |
|-----------------------|--------------------------------|---------------------------------|-----------------------|--------------|
| ODMA producers n (%) | 142 (59.9) | 71 (30.0) | 24 (10.1) | |
| ODMA nonproducers | 29 (48.3) | 17 (28.3) | 14 (23.3) | |
| OR* | REF | 1.0 (0.5, 2.1) | 2.8 (1.2, 6.2) | 0.032 |
| Equol producers n (%) | 77 (62.1) | 32 (25.8) | 15 (12.1) | |
| Equol nonproducers | 94 (54.3) | 56 (32.4) | 23 (13.3) | |
| OR* | REF | 1.3 (0.7, 2.2) | 1.1 (0.5, 2.2) | 0.629 |

*n=297; adjusted for age (in years), race, and gender and menopausal status.

WHERE WE STAND

- ADVANCE
TECHNIQUES
- RT-PCR
- DNA SEQUENCING
- MALDI-TOF



CHEMO-GUT STUDY

- Pharmacomicrobiomics has the potential to enhance therapeutic efficacy and reduce side effects by manipulating host-chemotherapeutic-microbiota interactions and for personalisation of chemotherapy regimens based on the evaluation of an individual's microbiome (the genetic composition of their microbiota)

PERSONALIZED FOOD-MICROBIOME

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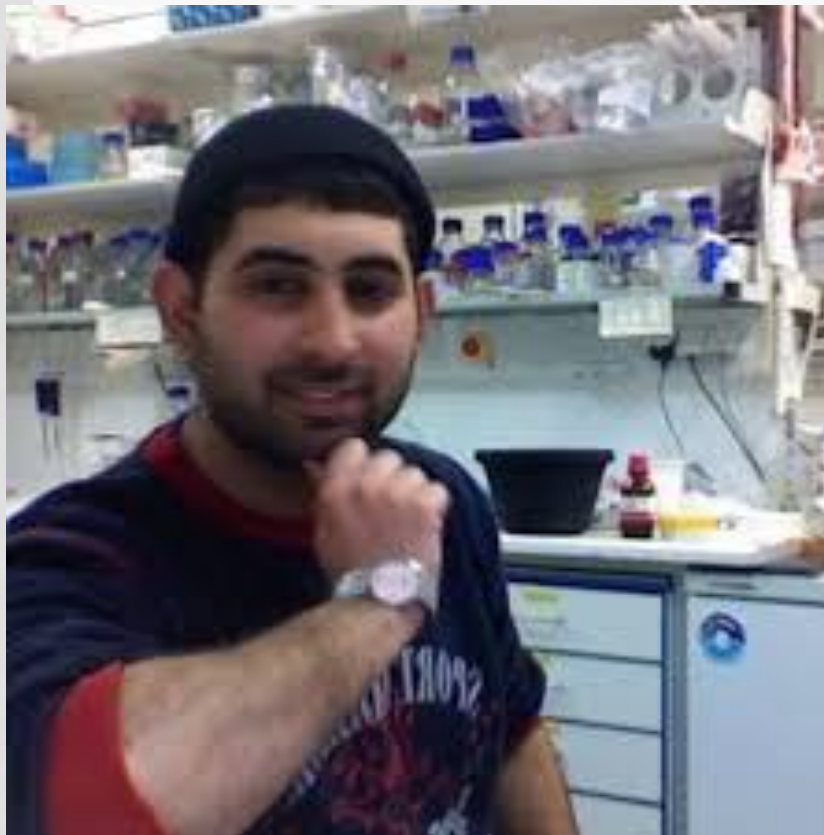
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Personalized nutrition recommendations based on your gut microbiome

The gut microbiome is associated with overall wellness including weight management, sleep, stress, digestion, and mood. Viome's gut microbiome test **stands above the rest** and gives you truly actionable insights.



RESEARCH



THANK YOU