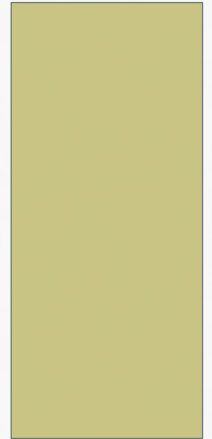




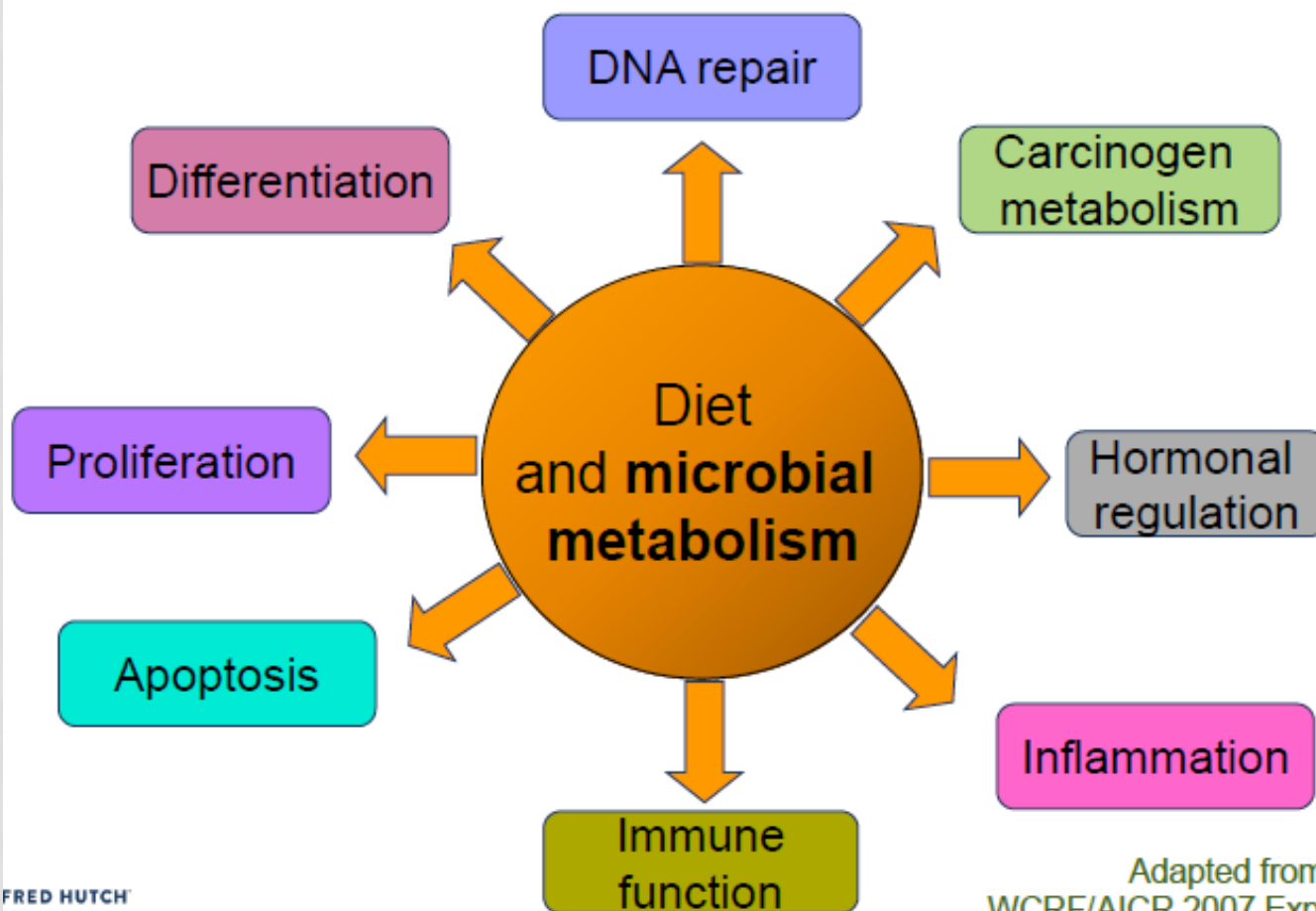
DIET AND MICROBIOME FUTURE OF FOOD SCIENCE AND TECHNOLOGY

DR. LUAY ABU-QATOUSEH
PHD MEDICAL MICROBIOLOGY AND IMMUNOLOGY



DIETARY EXPOSURES AND CELLULAR PROCESSES LINKED TO DISEASES

Involvement of Microbial Metabolism



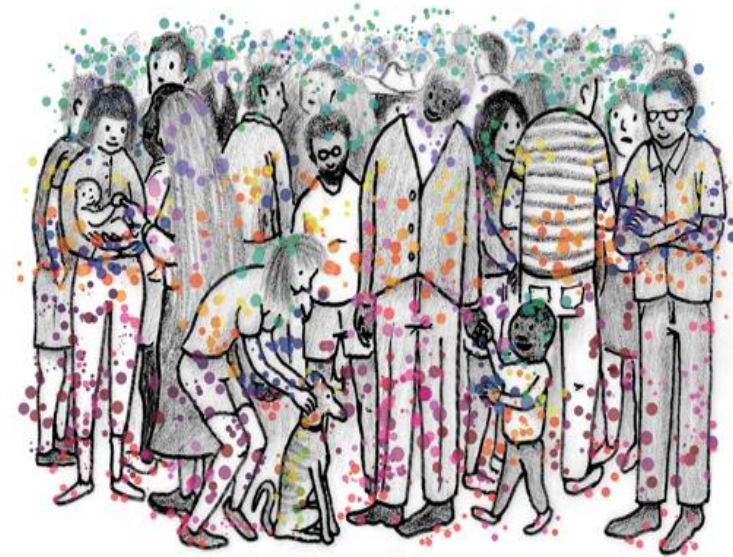
WIN-WIN RELATIONSHIP

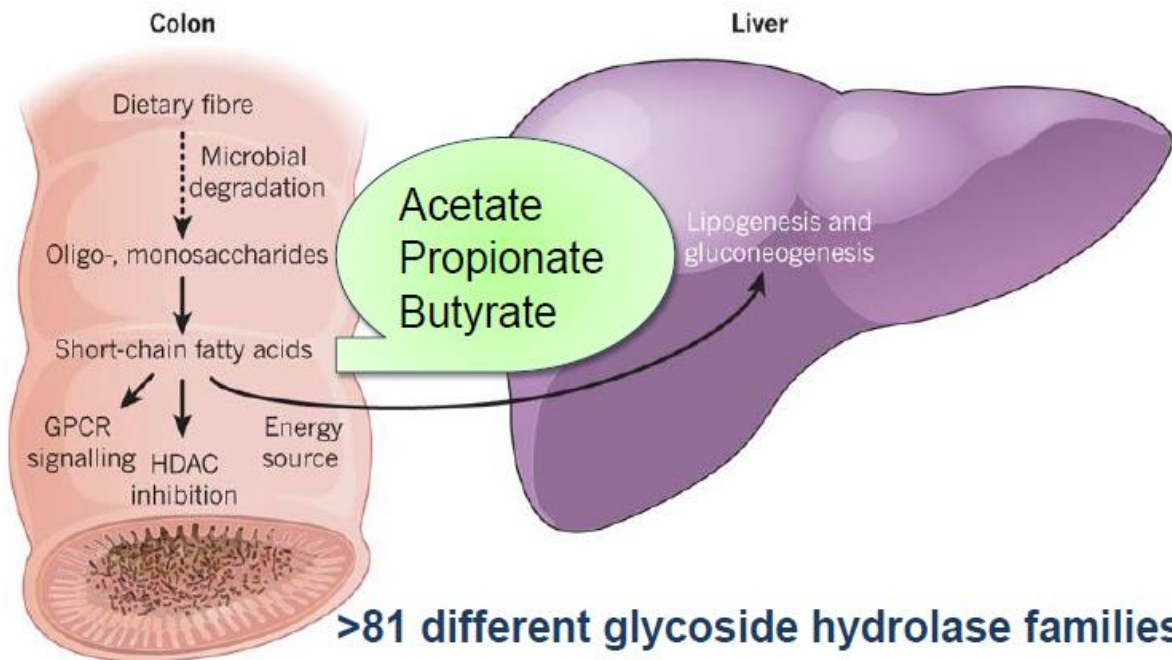
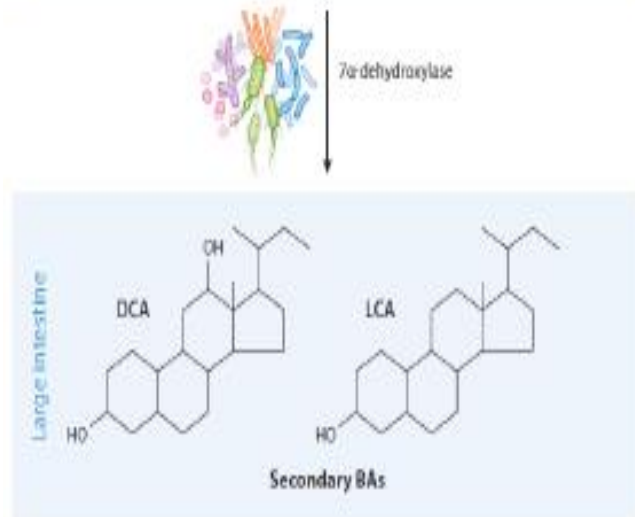
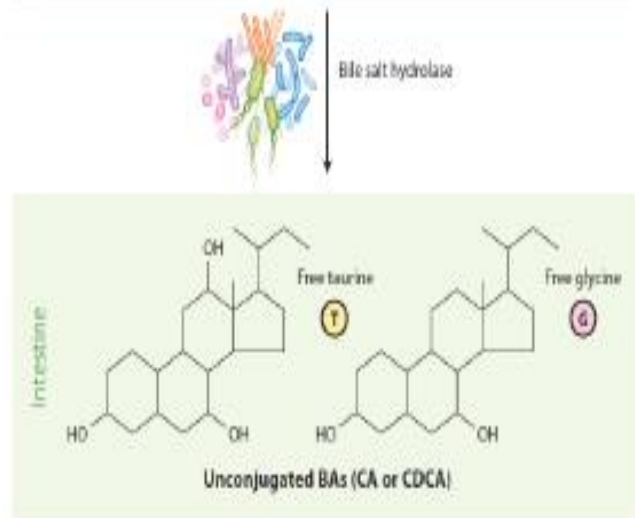
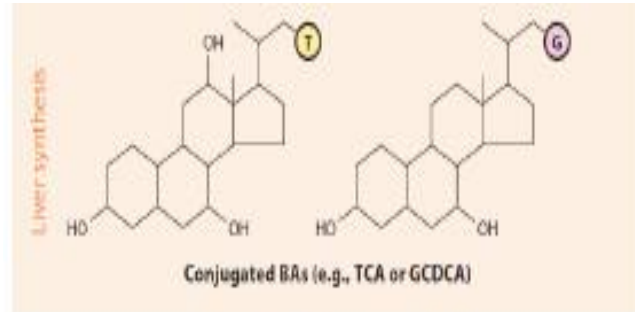
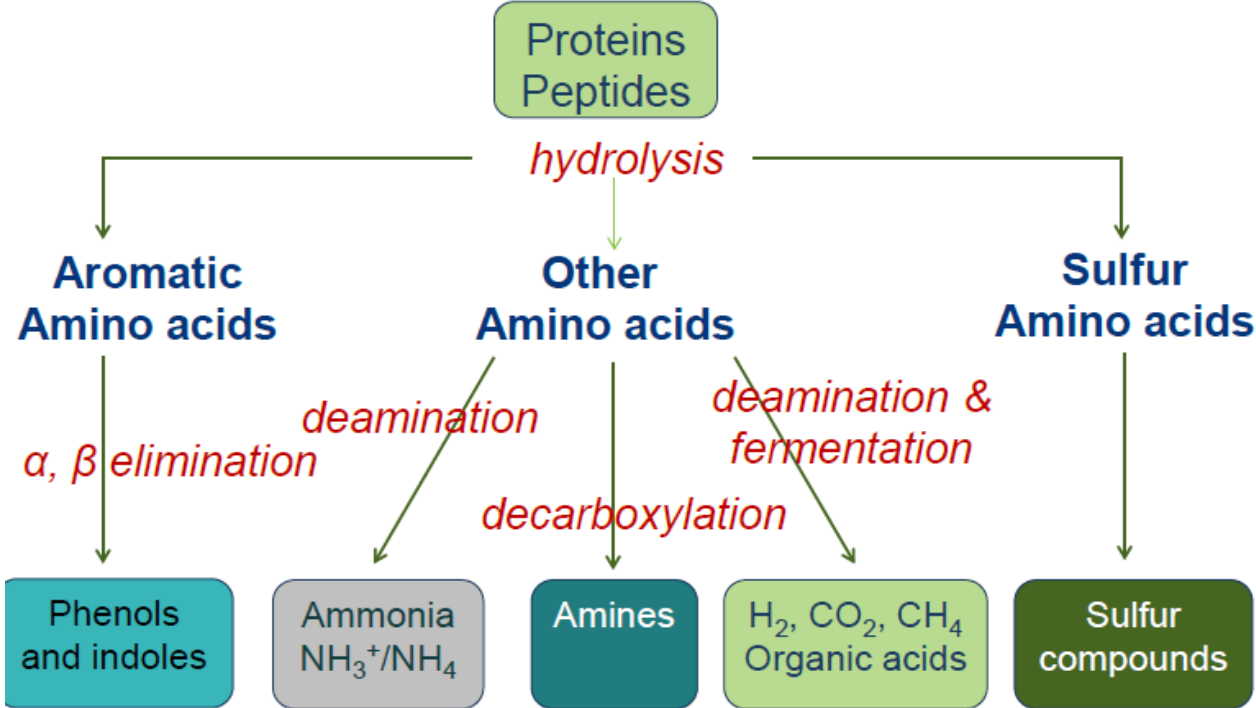
- Diet affects the gut microbial community
- Gut microbiome affects components of diet



MICROBIOME

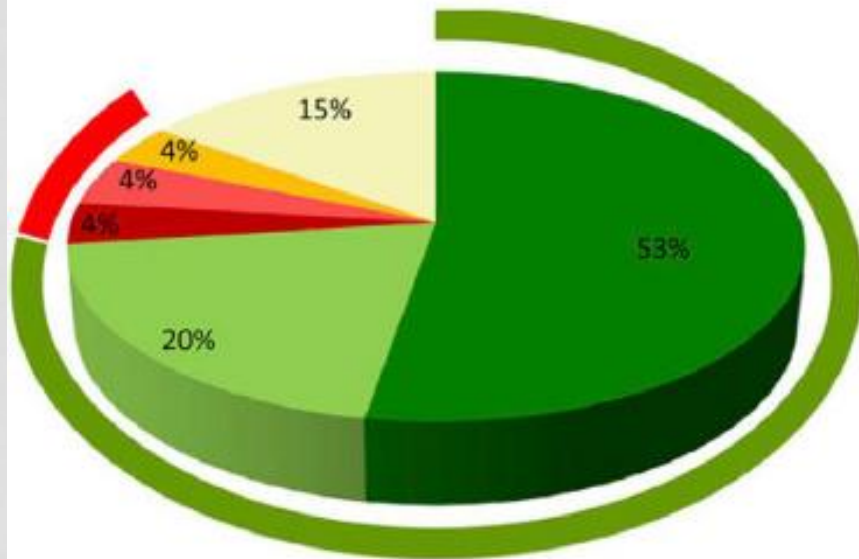
- Your bacterial community is a fingerprint for you
- Microbiome: >100 times as many genes as human genome
- Carry out reactions that human gut enzymes cannot
 - Fermentation
 - Denitrification
 - Sulfate reduction
 - Aromatic fission
 - Hydrolysis/deconjugation





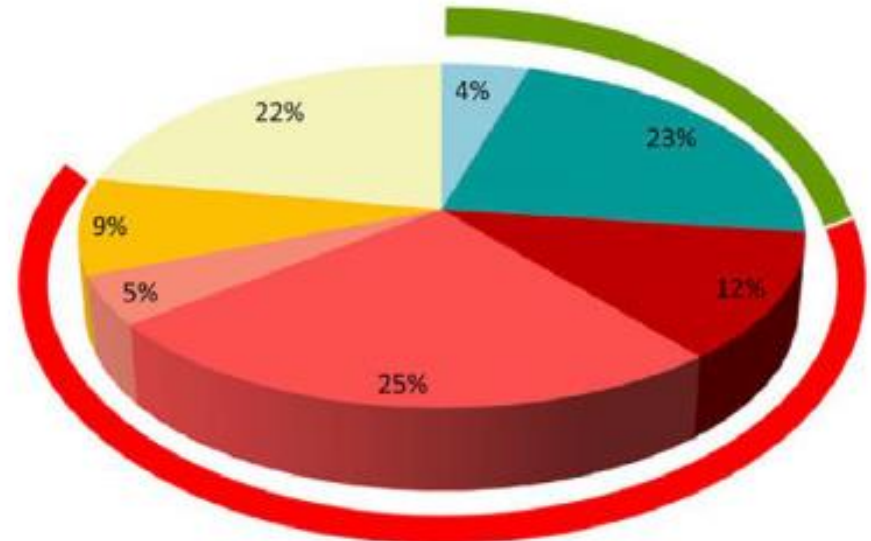
DIET TYPE CHANGES MICROBIOME

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



BF

- Prevotella } Bacteroidetes
- Xylanibacter } Bacteroidetes
- Acetitomaculum } Firmicutes
- Faecalibacterium } Firmicutes
- Subdoligranulum } Firmicutes
- Others

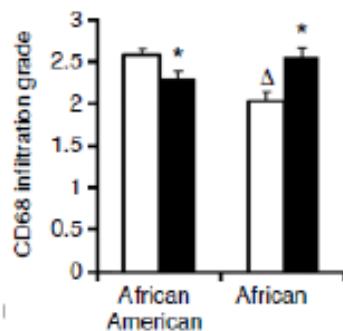
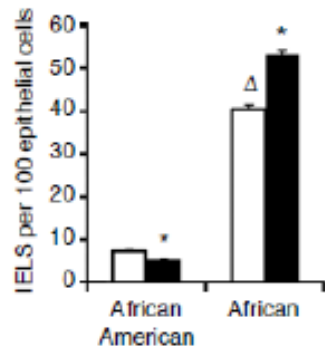
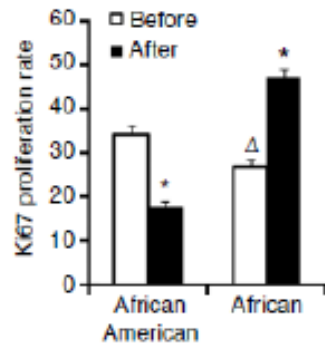


EU

- Alistipes } Bacteroidetes
- Bacteroides } Bacteroidetes
- Acetitomaculum } Firmicutes
- Faecalibacterium } Firmicutes
- Roseburia } Firmicutes
- Subdoligranulum } Firmicutes
- Others

Diet Pattern Change and Gut Microbiome :

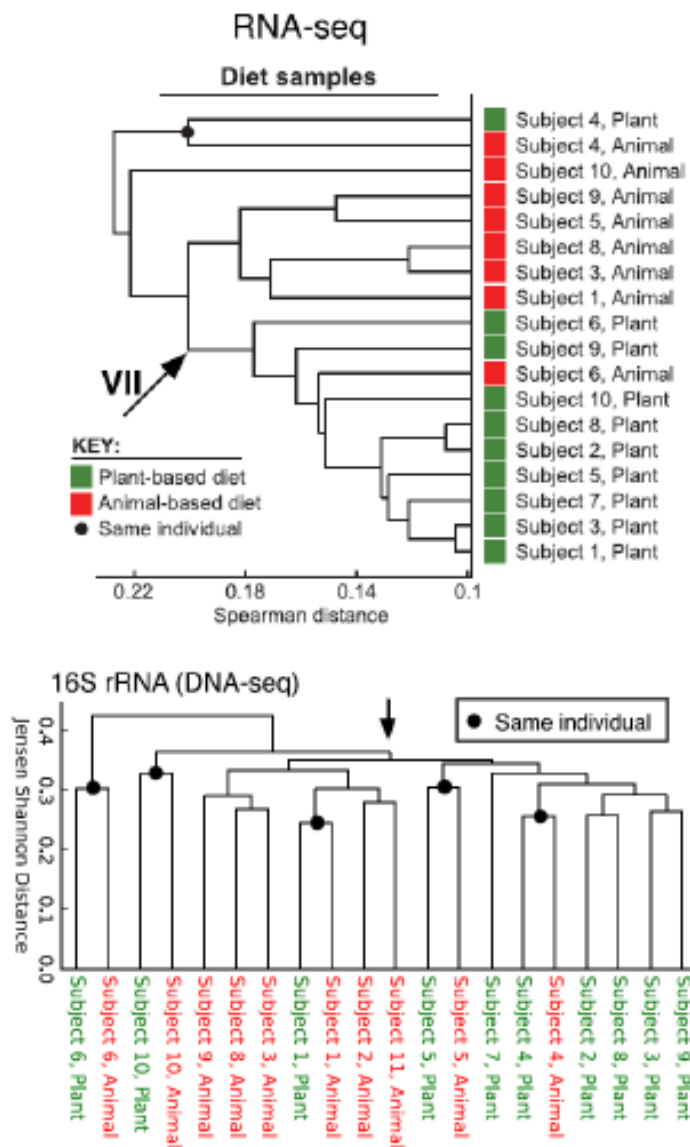
Fat & Fiber and Colorectal Cancer Risk Factors



- 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



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THANK YOU