Gut microbiome and clinical risk factors in maintenance hemodialysis patients

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Introduction and Aims

The gut microbiota (GM) is important for human health and has been implicated in the pathogenesis of many chronic diseases. However, little is known about the composition and effects of the GM in patients undergoing chronic hemodialysis (HD) treatment. ***Our aim was to examine the GM structure and its association with clinical risk factors in HD patients.***

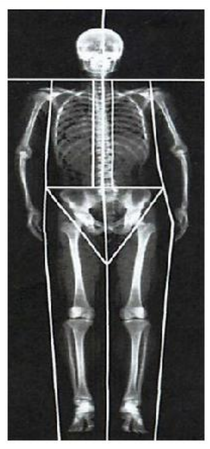
Conclusions

- ↓ species diversity with age
- ↑*F-to-B ratio* was associated with traditional risk factors for CVD
- *Faecalibacterium* was negatively associated with arterial stiffness
- Future studies should aim to explore the modulation of the GM and reduction of arterial stiffness in CKD and ESRD

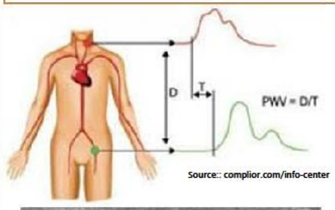
Methodology

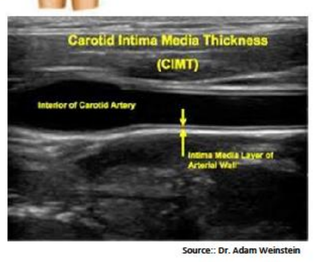
- Ten HD patients (7M, 50 ± 4years, 80% AA)
- Testing on a non-dialysis day (18-24hrs after treatment):

1. Bone and body composition by DXA



2. Cardiovascular assessment





3. Dietary intake of 48-hr prior to fecal sample

4. Physical function (exercise capacity and lower-body strength)

5. Fecal sample, DNA extraction, sequence of V4 HV region of 16S rRNA gene and analysis

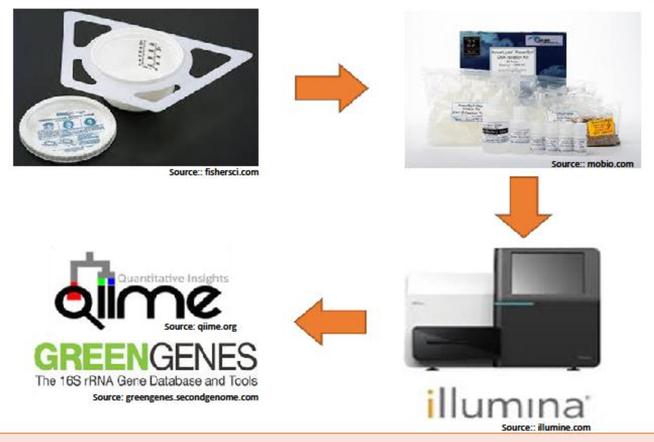
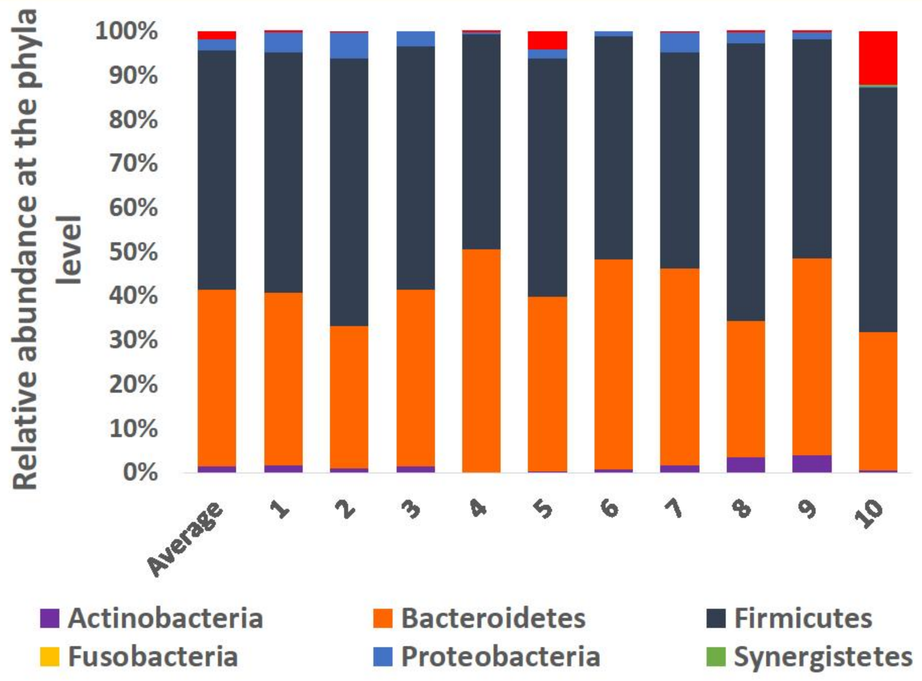


Table and Figure 1. Patient's characteristics and dietary patterns

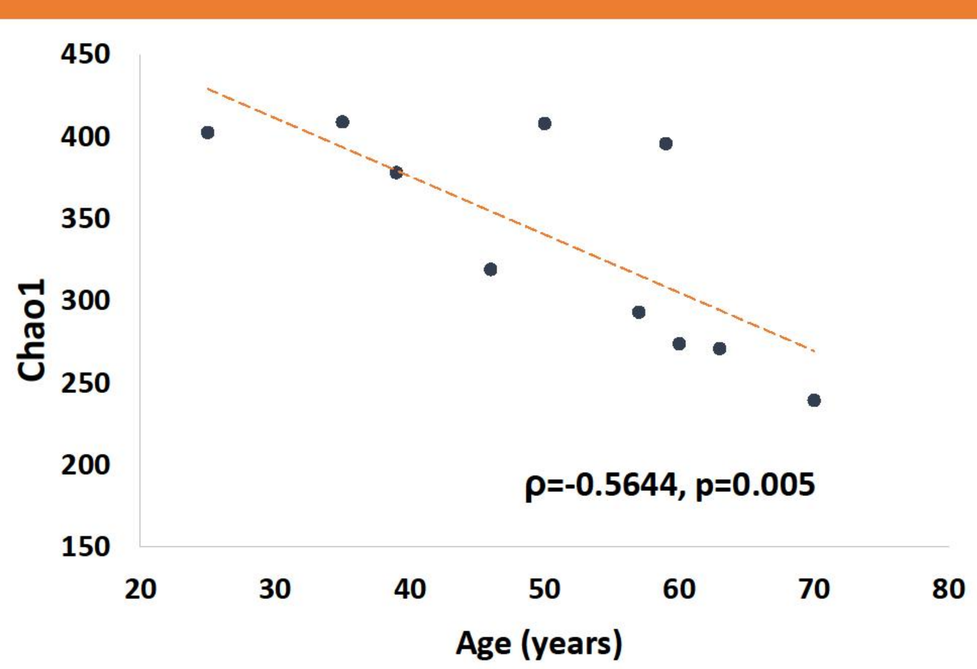
Variable	Mean ± SD
Age (years)	50 ± 14
BMI(kg/m^2)	31.04 ± 7.4
Body fat (%)	30.2 ± 10.7
BMD (g/cm^2)	1.2 ± 0.9
Energy (kcal/kg/d)	24.4 ± 8.8
Protein (g/kg/d)	0.86 ± 0.3
Carbohydrates (% total kcal)	48.22 ± 7.99
Fat (% total kcal)	37.91 ± 7.56
Fiber (g/1000kcal)	6.25 ± 2.5
Albumin (g/dL)	4.05 ± 0.29
Phosphorus (mg/dL)	5.98 ± 1.82
Potassium (mg/dL)	4.95 ± 0.58

Figure 2. *Firmicutes-to-Bacteroidetes* ratio is associated with traditional risk factors for CVD



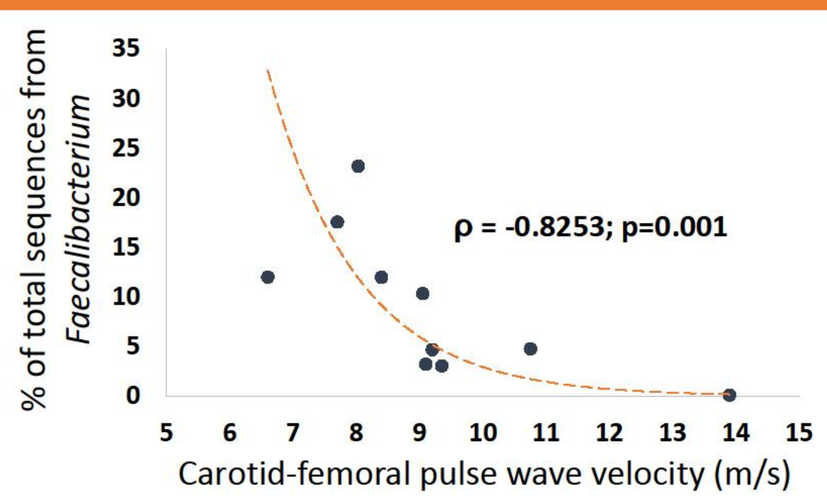
- *F-to-B* ratio of 1.4±0.37
- *F-to-B* ratio positively associated with central and peripheral systolic blood pressures (ρ=0.636, 0.648), meat intake (ρ=0.661), total and saturated fat (ρ=0.667, 0.636), all p ≤0.05

Figure 3. Species diversity is inversely associated with age



- 339±66 species per sample
- 25% less diversity in >50y
- No association with dialysis vintage

Figure 4. *Faecalibacterium* is inversely associated with arterial stiffness



- Positive association with α-diversity
- Positive association with carbohydrate intake (ρ=0.636, p<0.05)

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Lab's website

Abstract

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