

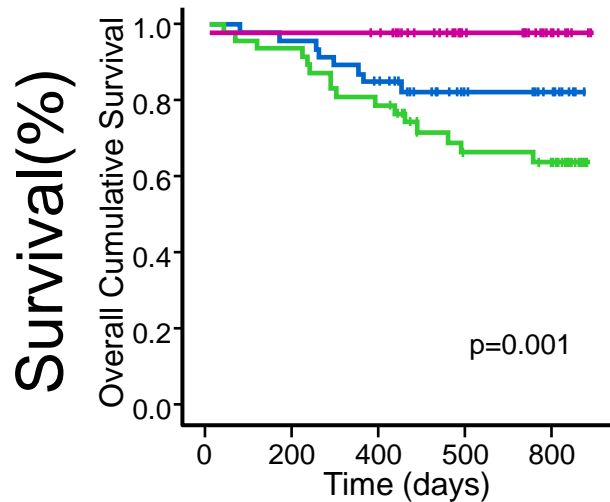
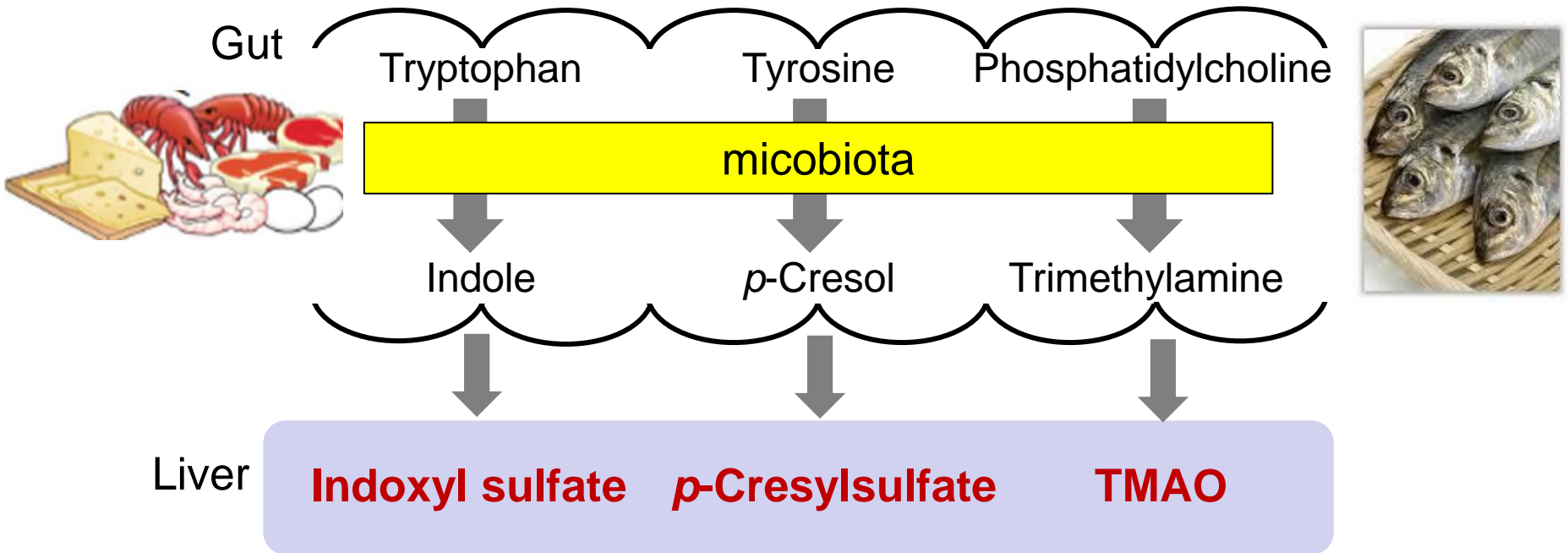
CKD and gut microbiome

Takaaki Abe, M.D., Ph.D.^{1, 2}

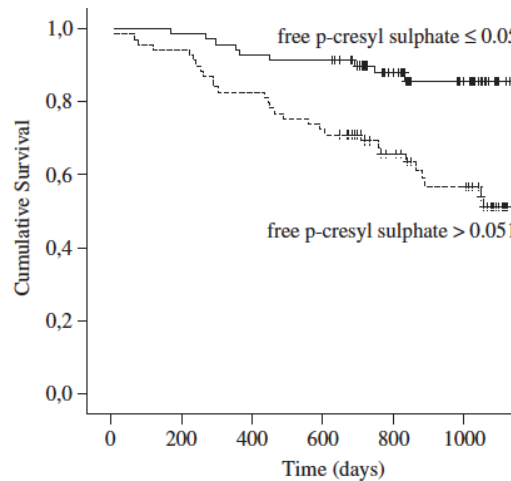
¹Department of Clinical Biology and Hormonal Regulation
Tohoku University Graduate School of Medicine

²Tohoku University Graduate School of Biomedical
Engineering

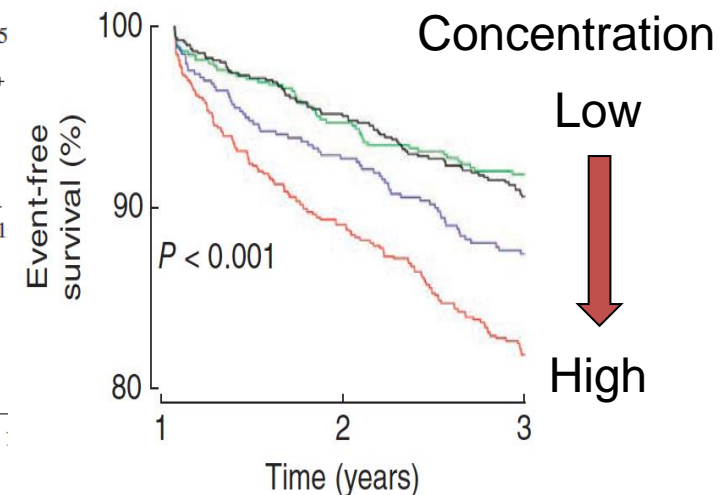
Elevated uremic toxins are CVD and CKD risk



Barreto FC. *CJASN* 4: 1551, 2009

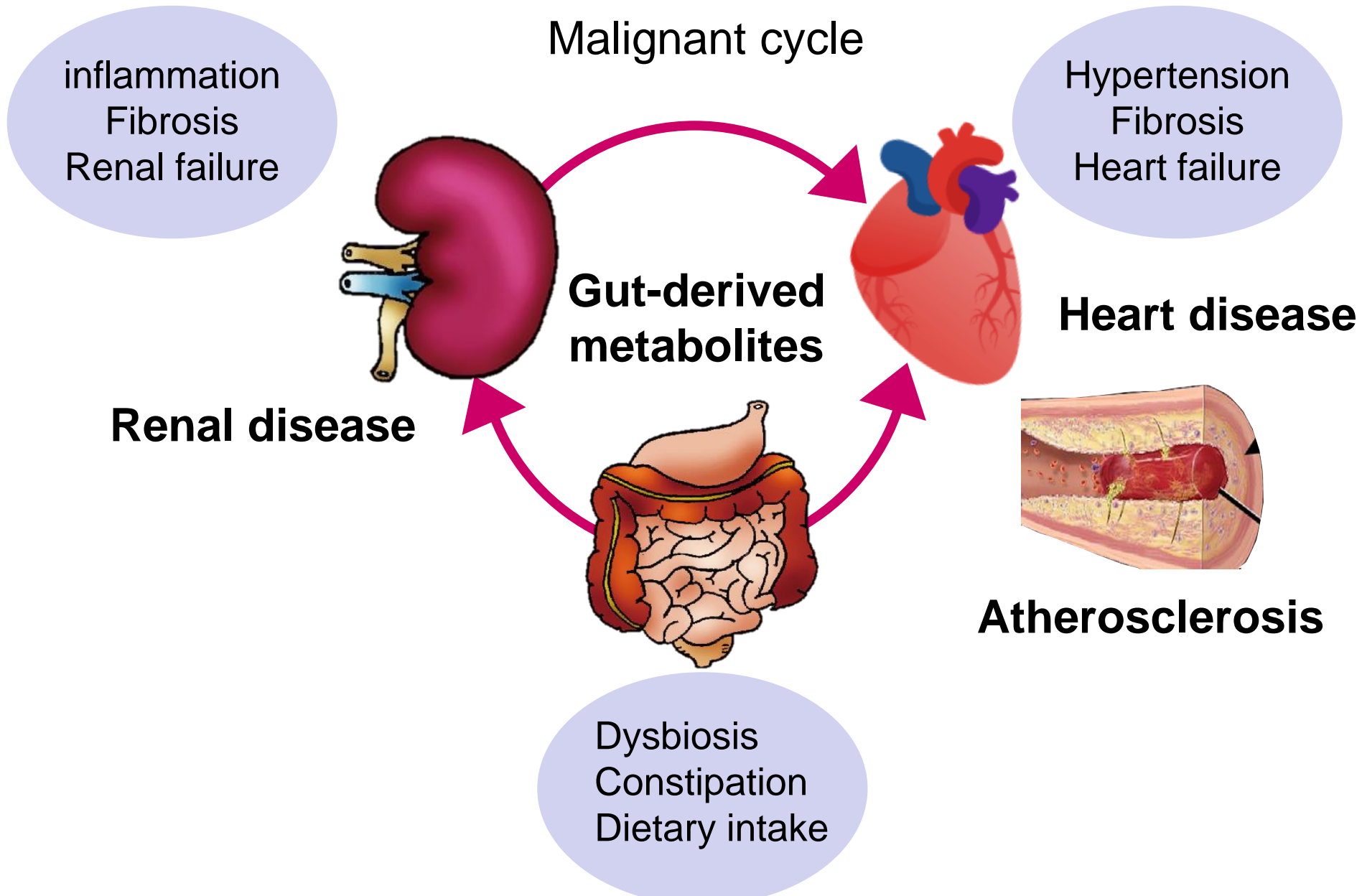


Wu WI *NDT* 26: 938, 2011



Koeth RA *Nat. Med.* 19: 576-85, 2013

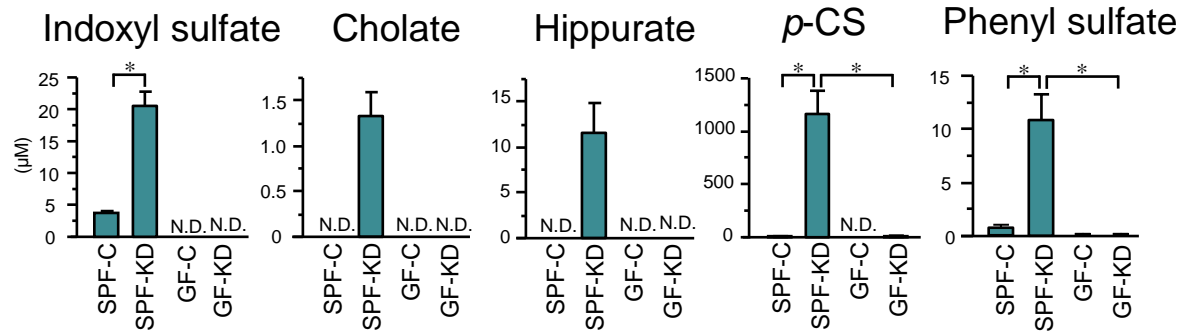
"Gut-cardio-renal axis"



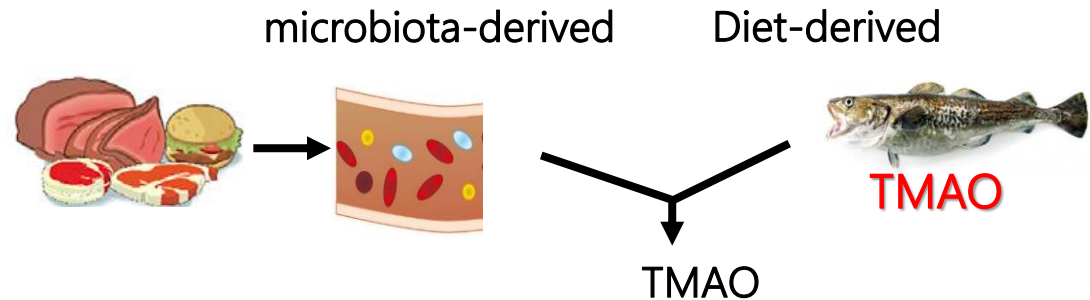
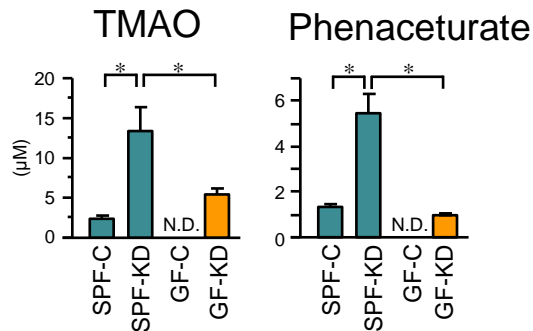
Metabolites in Germ-free mice

Gut-derived

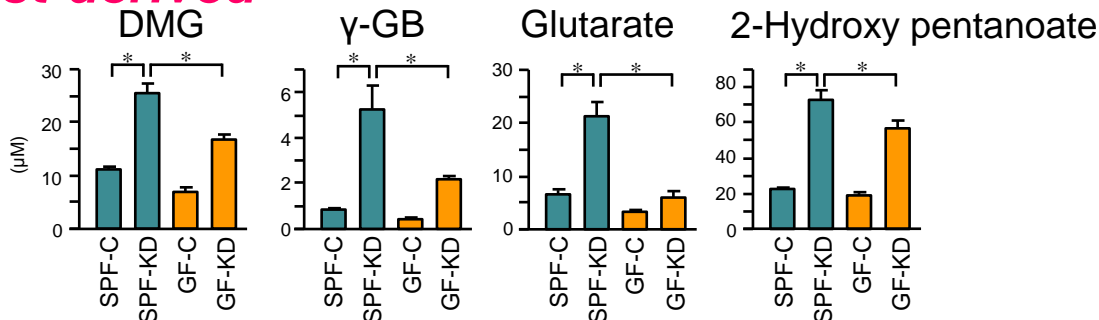
In plasma



Gut and Diet-derived

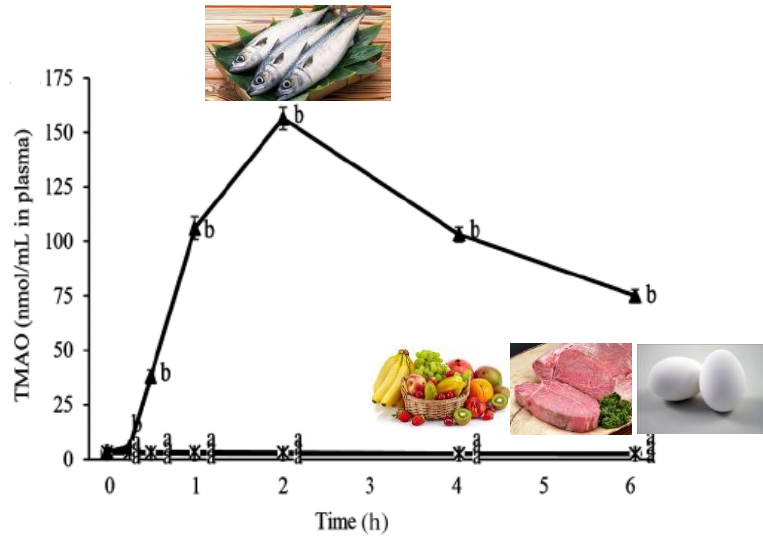


Host-derived

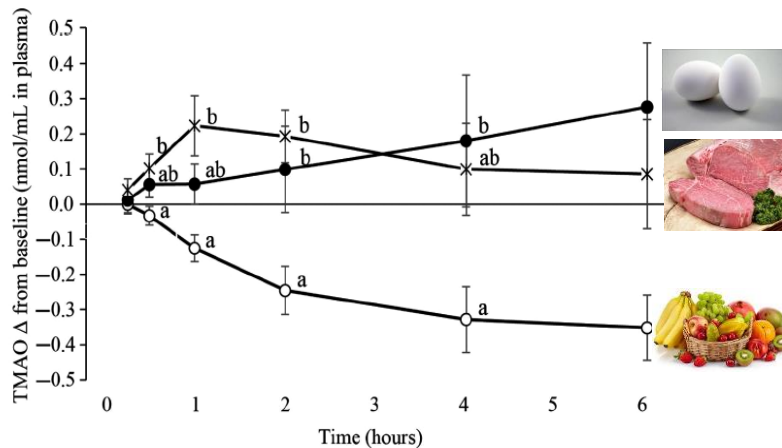


Diet-induced TMAO level in healthy volunteers

Concentration after meal



Concentration among protein diet



Gut microbiota diversity

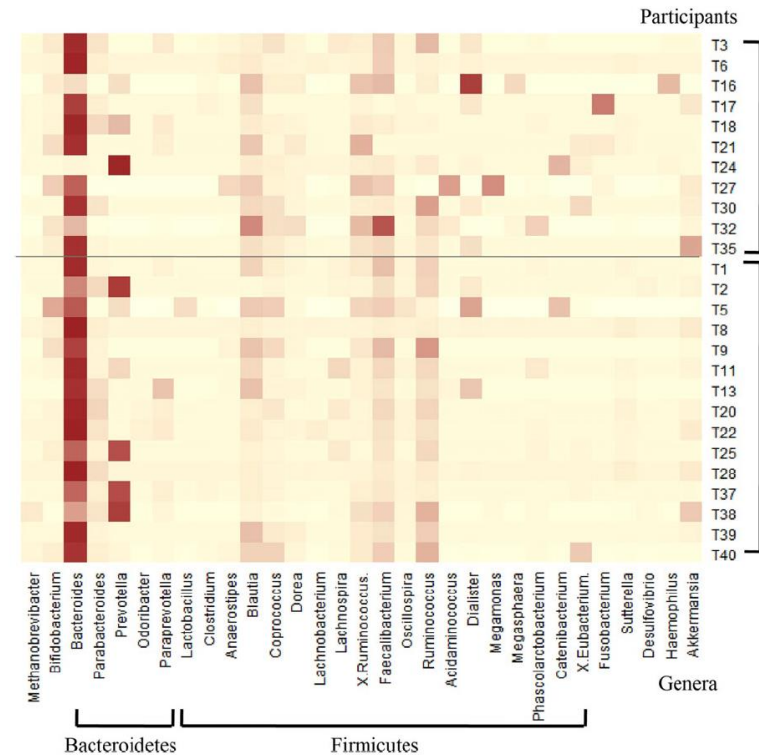
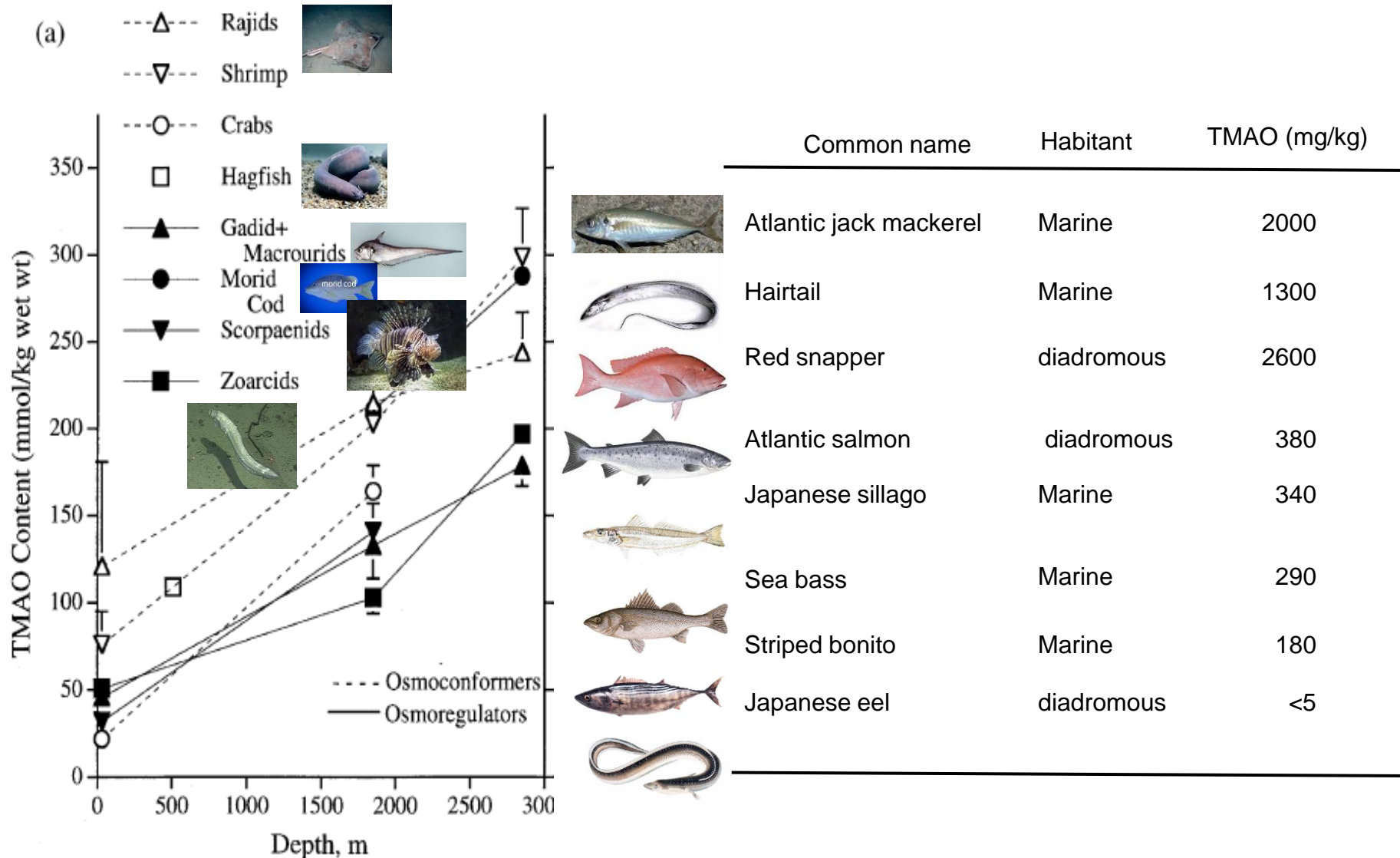


Figure 7 Heatmap of relative operational taxonomic unit (OTU) abundances for the 16S rRNA

Adaptations to hydrostatic pressure by TMAO



"Gut-cardio-renal axis"

Malignant cycle

inflammation
Fibrosis
Renal failure

Hypertension
Fibrosis
Heart failure

Renal disease

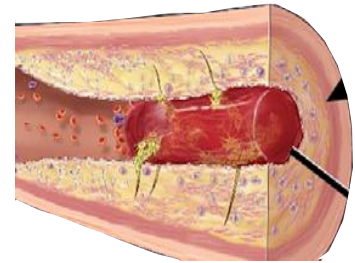
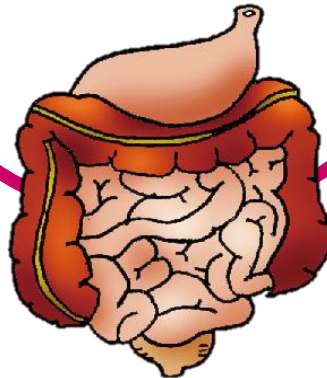
Heart disease

Gut-derived
metabolites

**Diet control
Intervention**

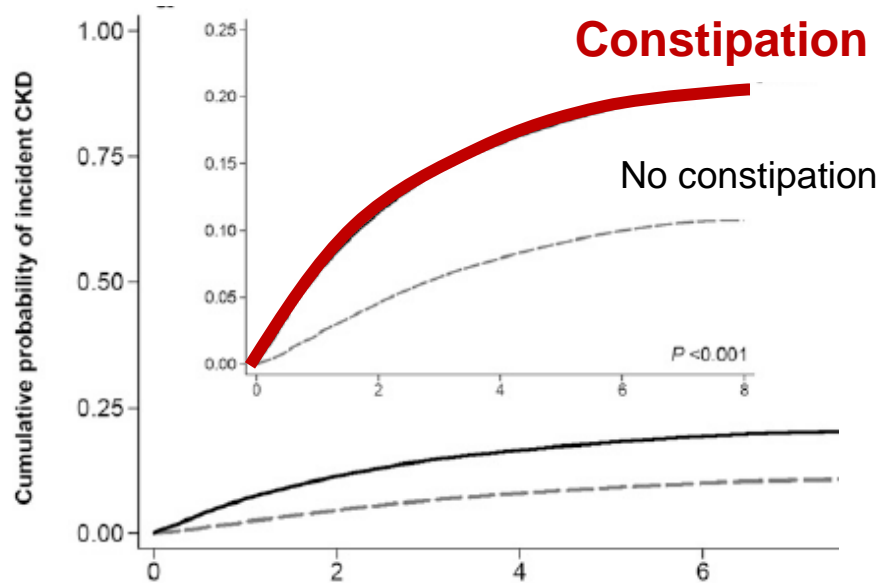
Atherosclerosis

Dysbiosis
Constipation
Dietary intake

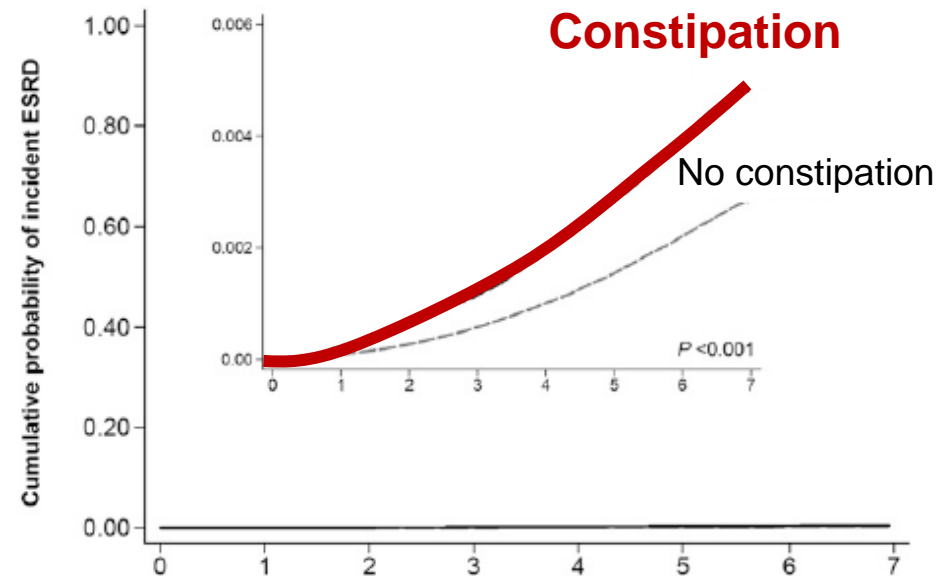


Constipation and renal failure

Chronic Kidney disease (CKD)



End-stage renal failure (CKD)



Lubiprostone ameliorates the progression of CKD

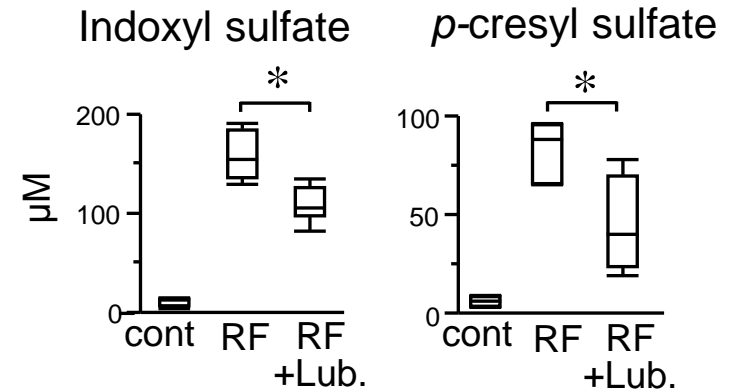
Lubiprostone (Lub.)

Drug for constipation
ClC-2 chloride channel activator

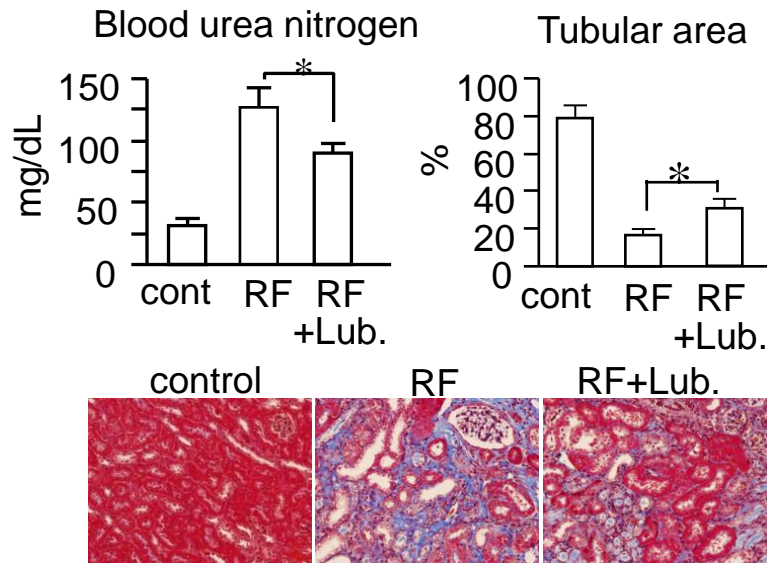
Adenine-induced renal failure mouse



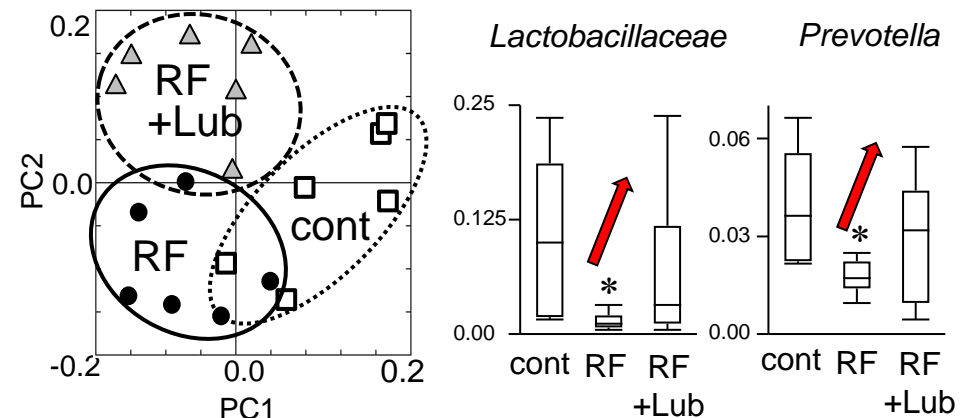
Uremic toxin



Renal function



Gut microbiota



Uremic toxins are from gut microbiota

