Microbiota e salute scheletrica: stato dell'arte

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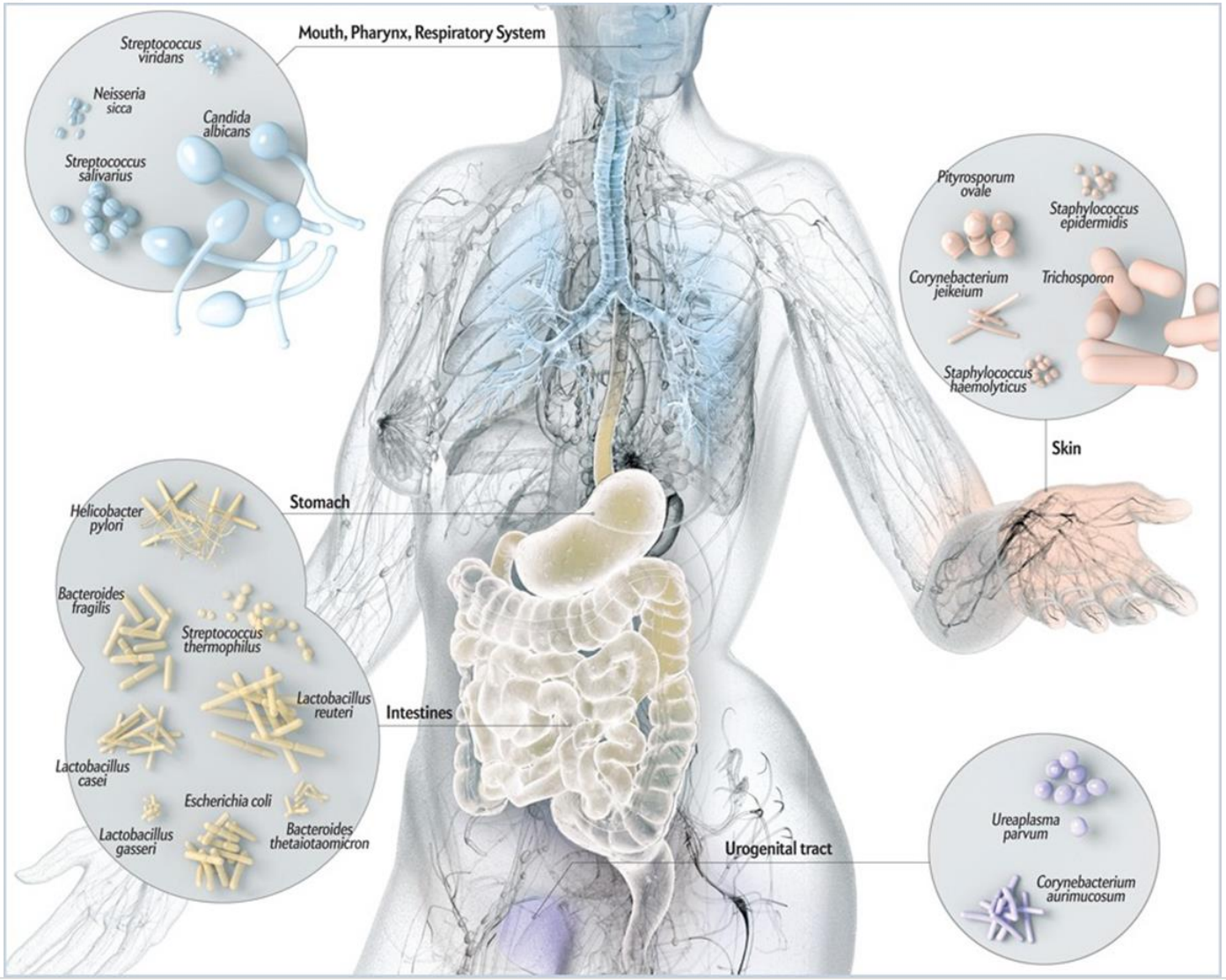
Service de Gériatrie et réadaptation gériatrique
CHUV, Lausanne

Roma – 18 Settembre 2021

The human body contains over 10 times more microbial cells than human cells!

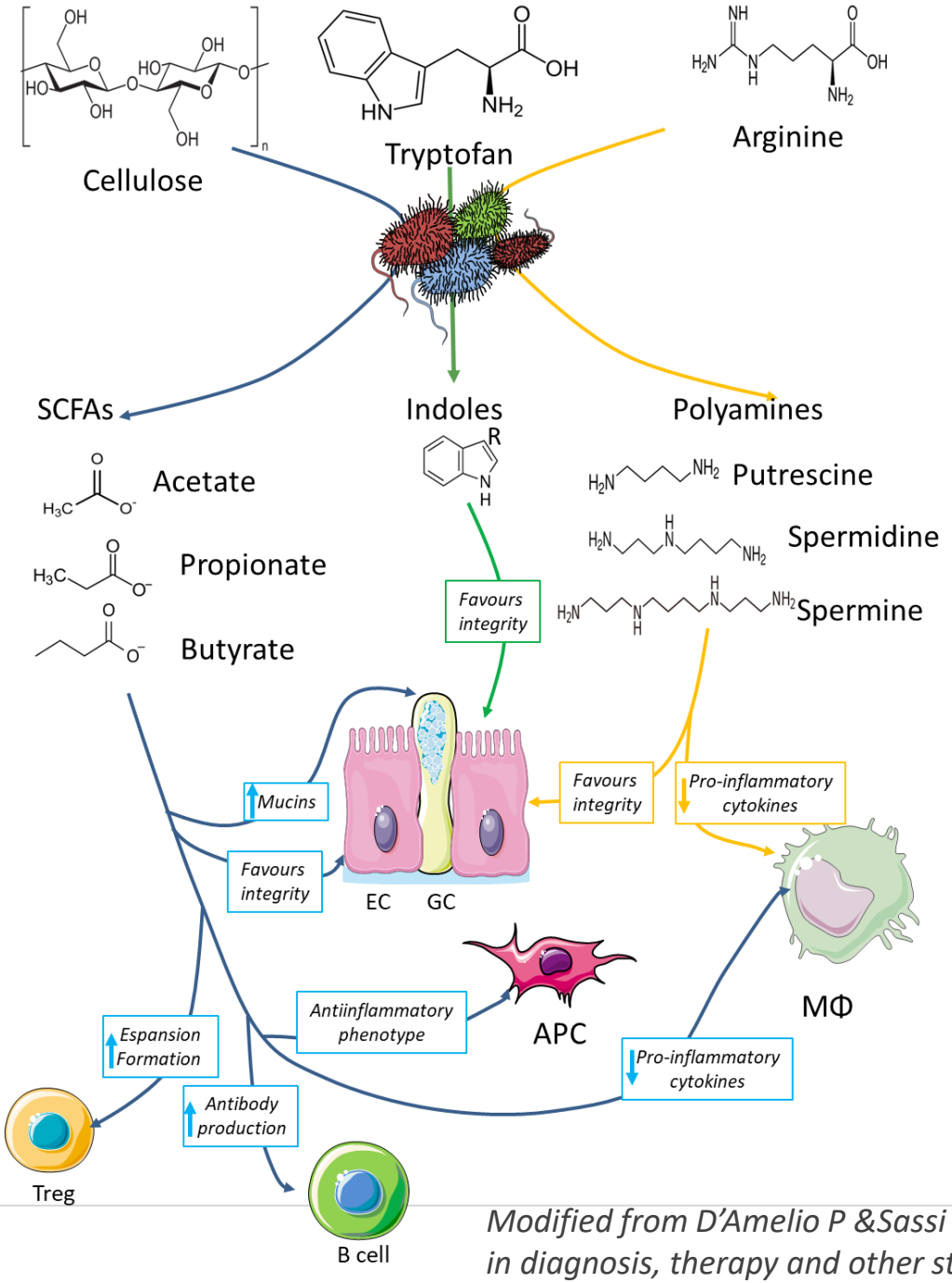


Ohland C L. and Jobin C CMGH Cellular and Molecular Gastroenterology and Hepatology, 2015

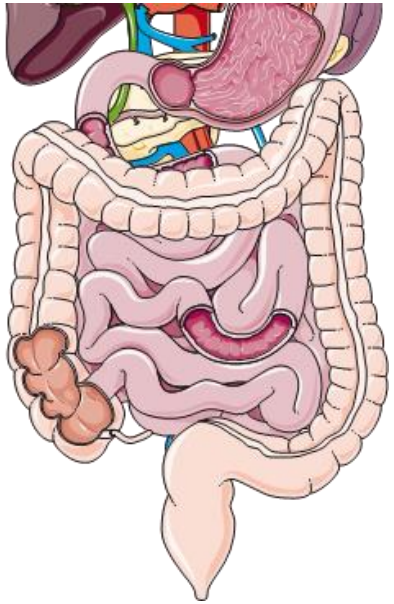
AGENDA

- Gut microbiota and bone health
- Treatment perspectives
- Conclusions

GM and host interaction



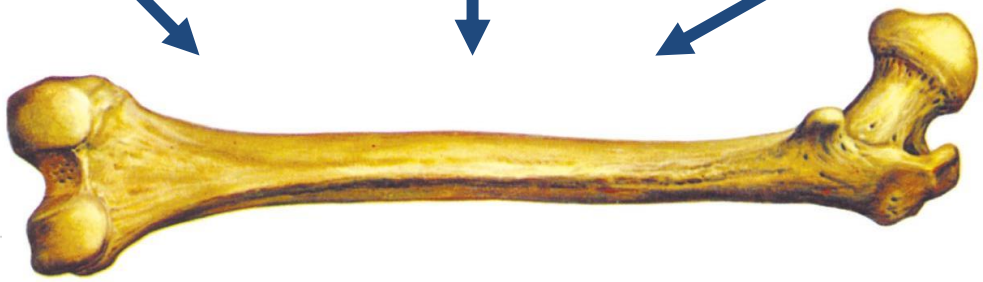
Modified from D'Amelio P &Sassi F. In microbiome and metabolome in diagnosis, therapy and other stategic aplications. 2018



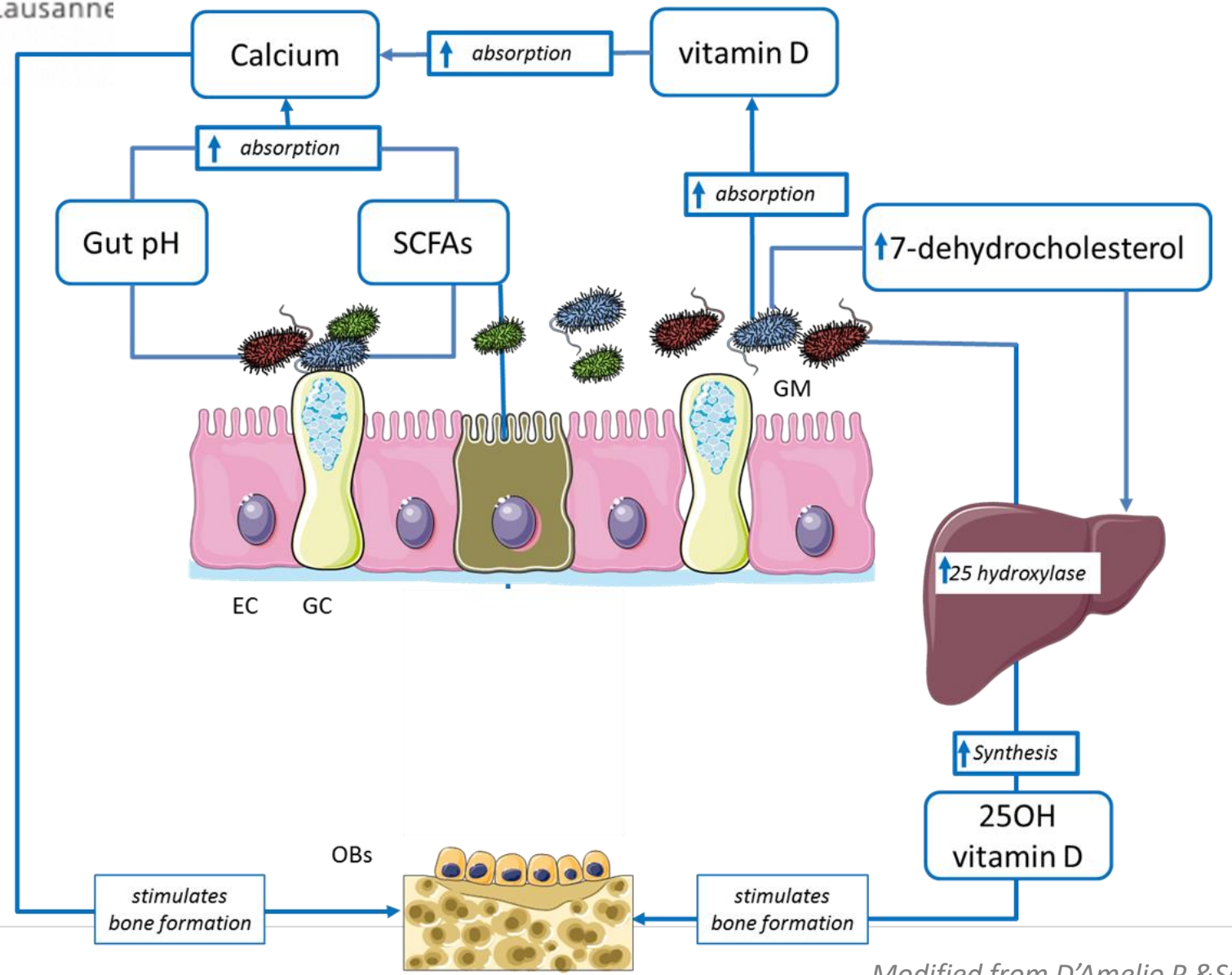
Calcium absorption

Immune system

Gut serotonin

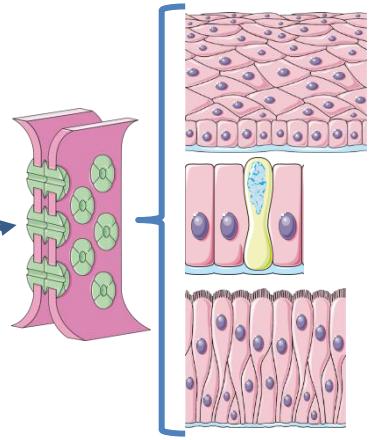


GM and bone turnover beyond immune system

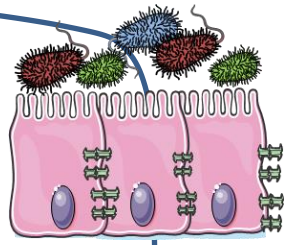


Modified from D'Amelio P &Sassi F. CTI 2018

GM and vitamin D



Increases physical barrier function

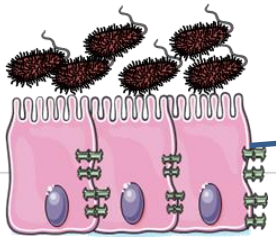


GM

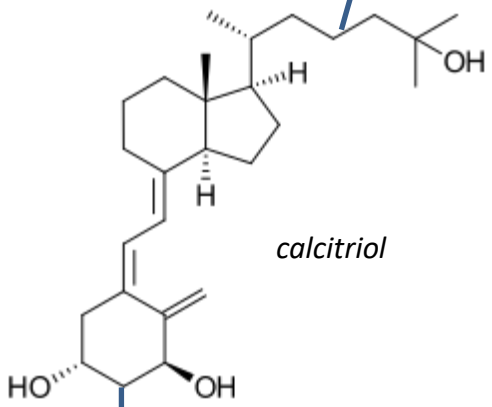
EC

Reduces gut permeability

Reduces inflammation



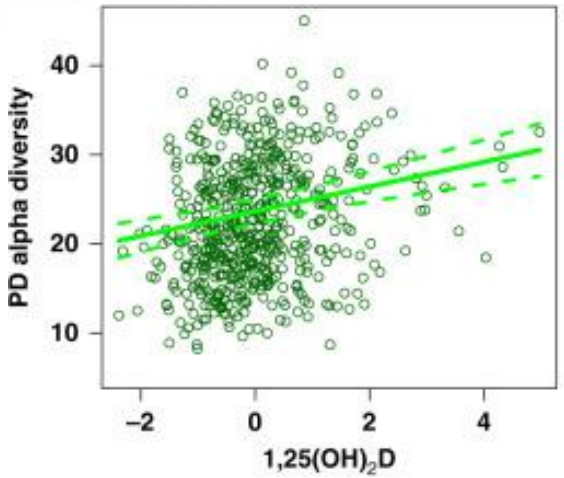
Influences GM composition

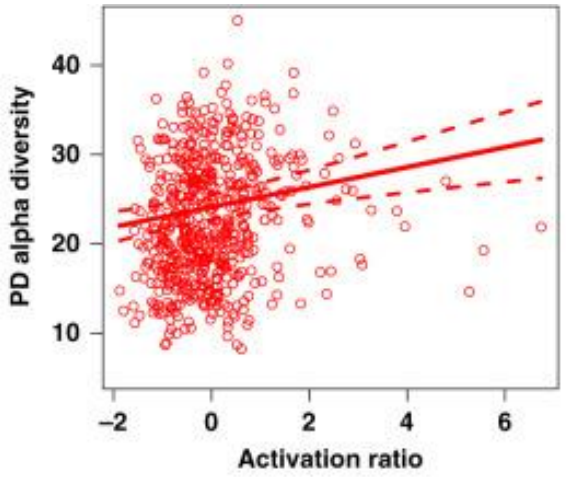


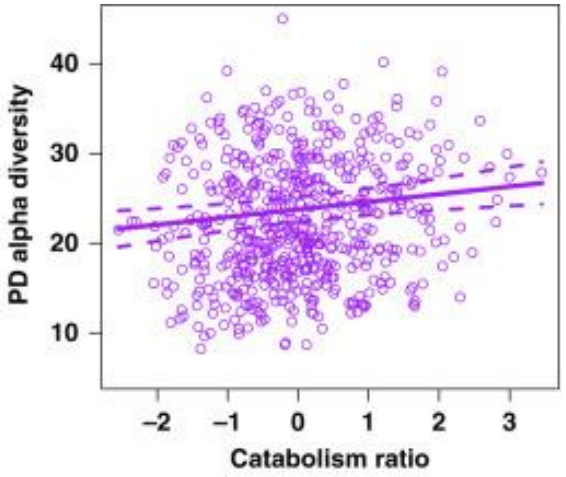
calcitriol

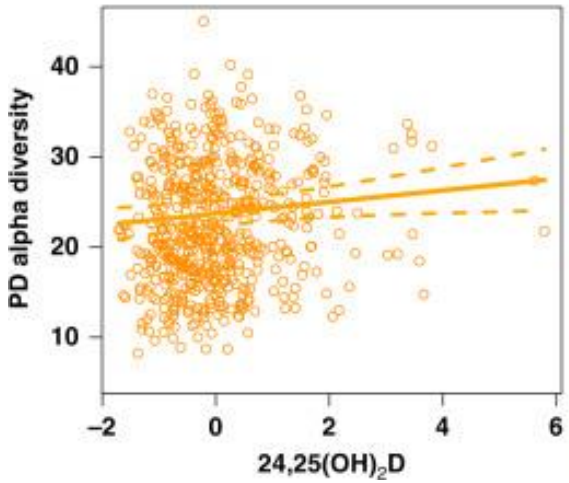
Modified from Sassi F. et al Nutrients 2018

GUT MICROBIOTA AND VITAMIN D

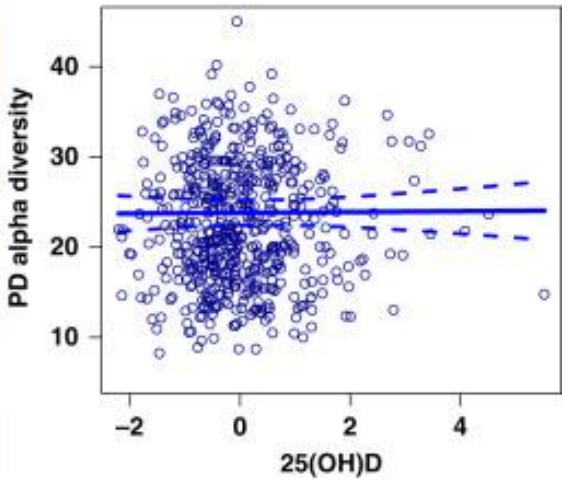




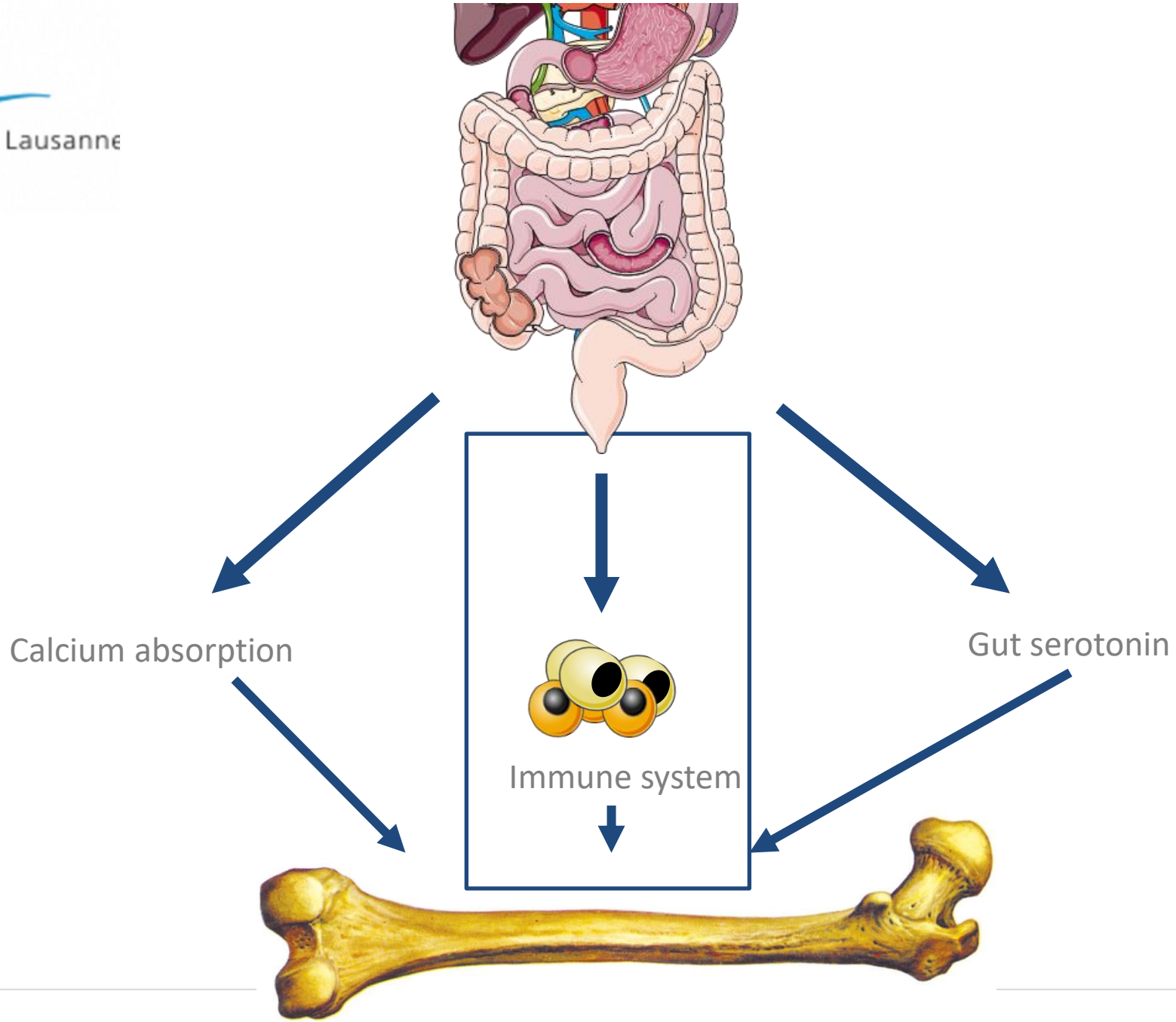




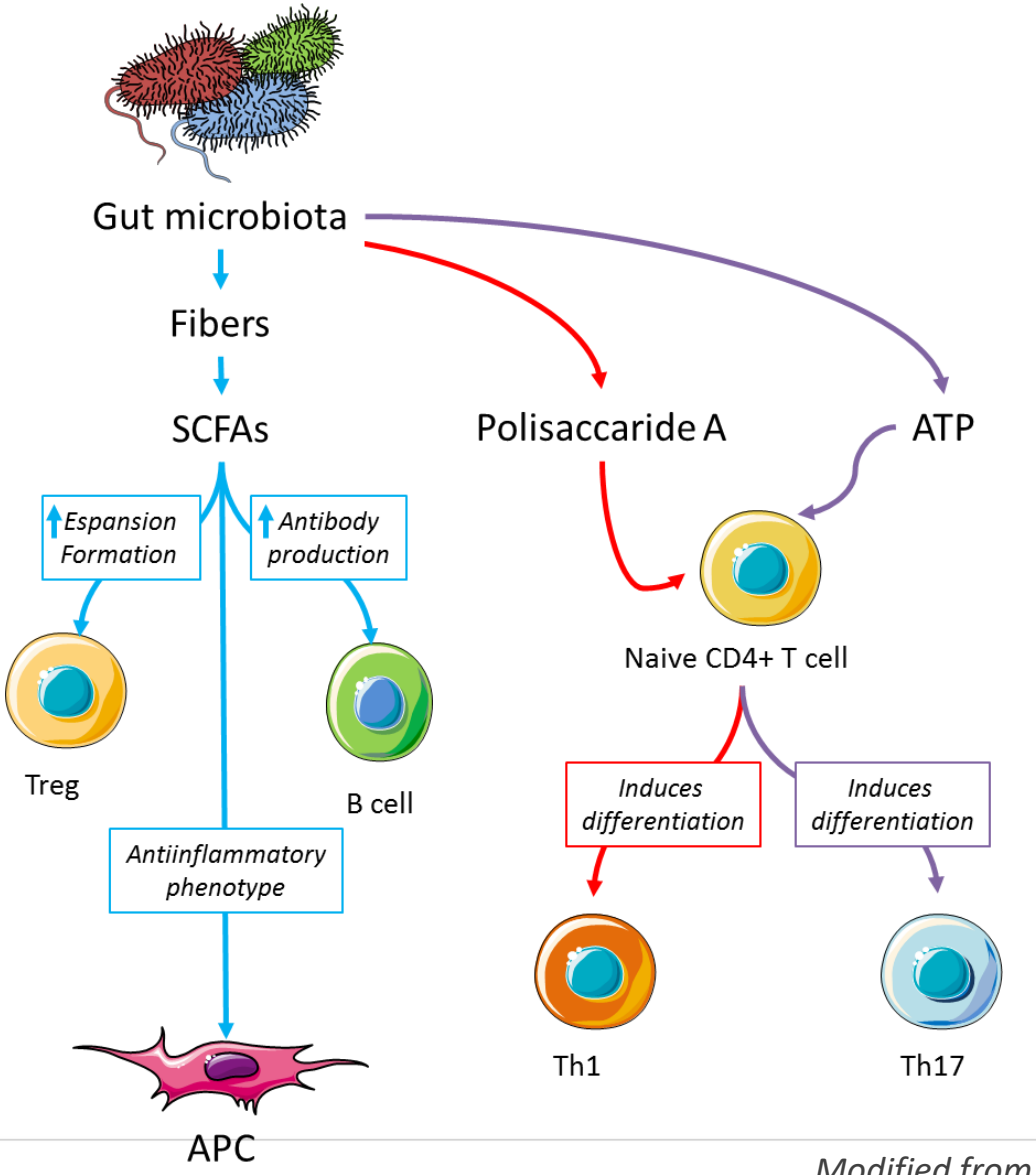
Vitamin D Metabolites	Slope	*P*-value
$1,25(OH)_2D$	1.39	7.23×10^{-7}
Activation ratio	1.12	0.0002
Catabolism ratio	0.85	0.003
$24,25(OH)_2D$	0.64	0.02
25(OH)D	0.04	0.88



Thomas RL, et al. Nat Commun. 2020


Calcium absorption
Immune system
Gut serotonin

GM metabolites and immune system



Modified from D'Amelio P &Sassi F. CTI 2018

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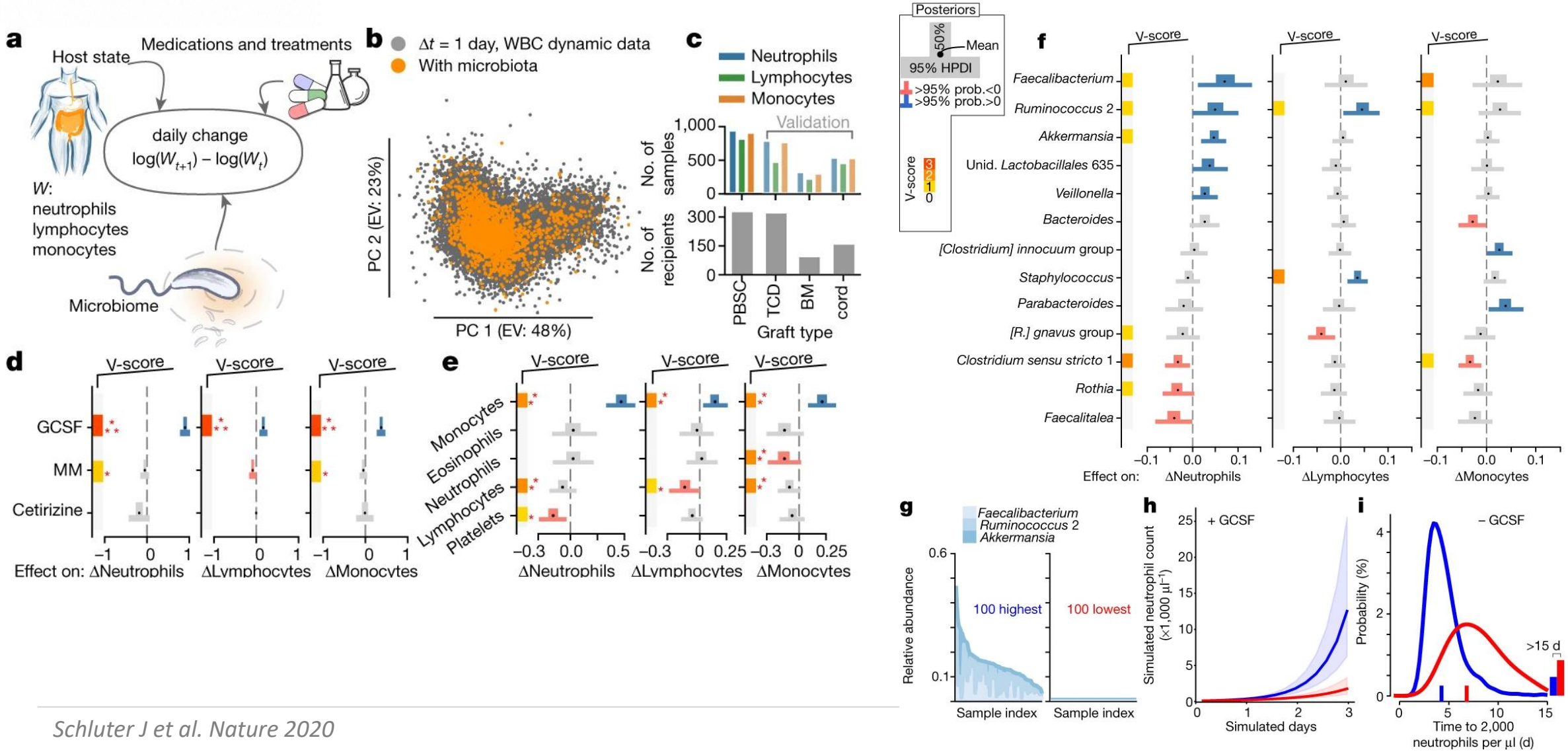
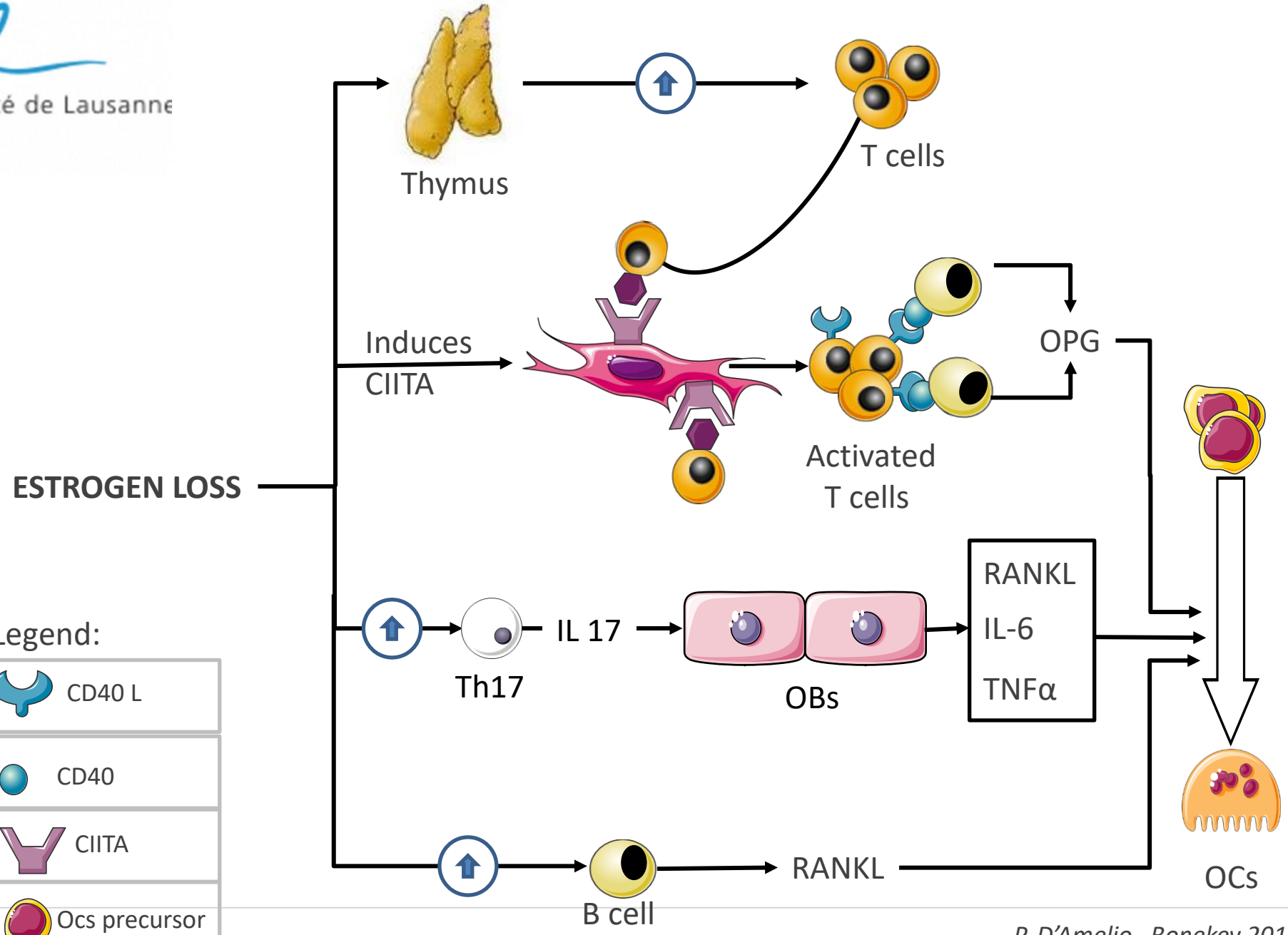
Bayesian inference reveals associations between the microbiota and dynamics of circulatory WBC counts.

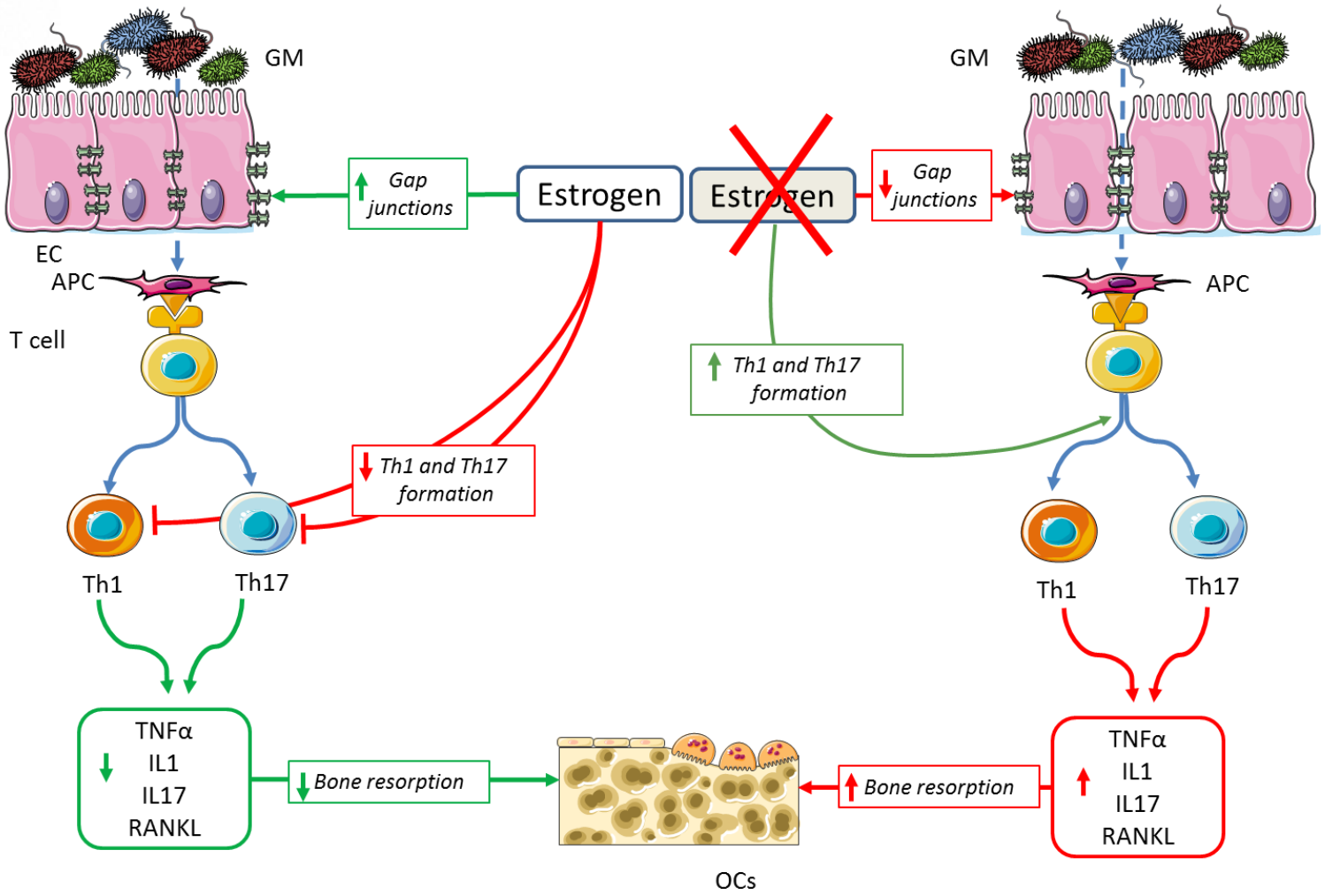


Schluter J et al. Nature 2020



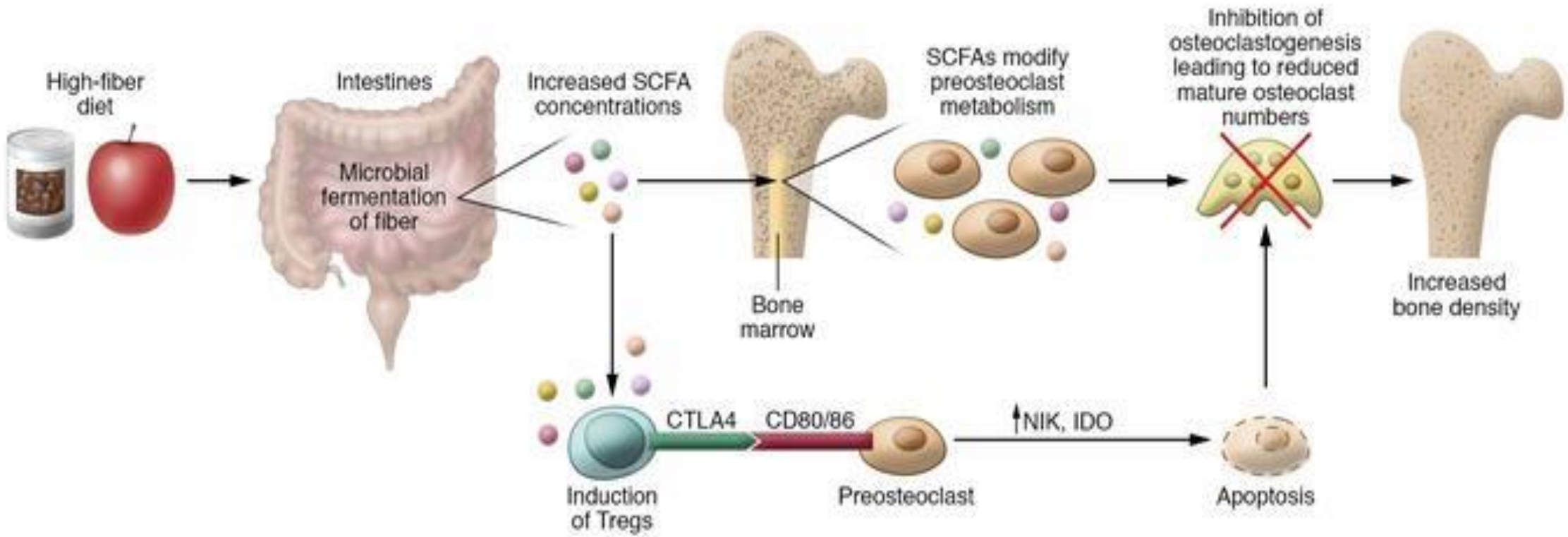
P. D'Amelio , Bonekey 2016

GM, estrogen deficiency and bone loss



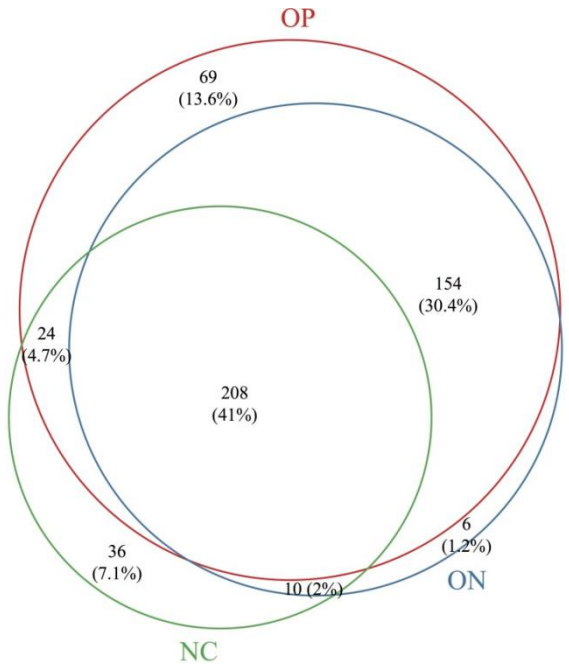
D'Amelio P &Sassi F. CTI 2018

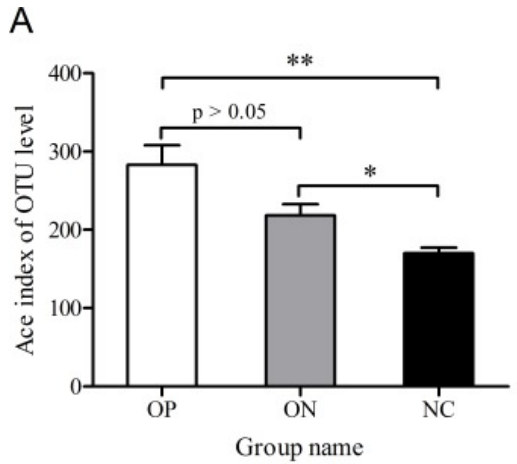
GM metabolites and direct effects on OCs

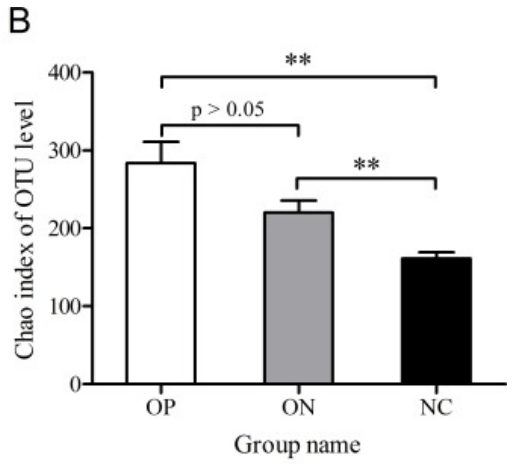


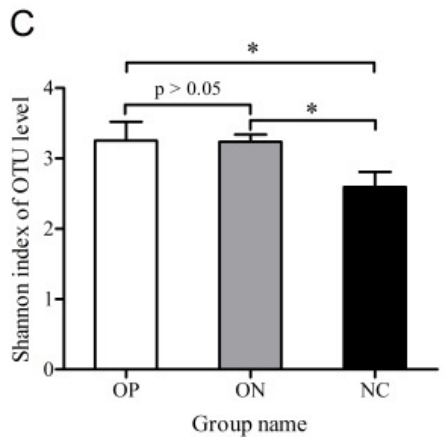
Modified from Zaiss MM, et al. J Clin Invest. 2019

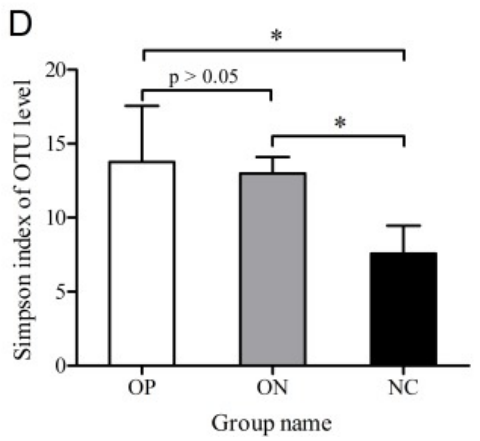
Differences in GM in osteoporosis and controls





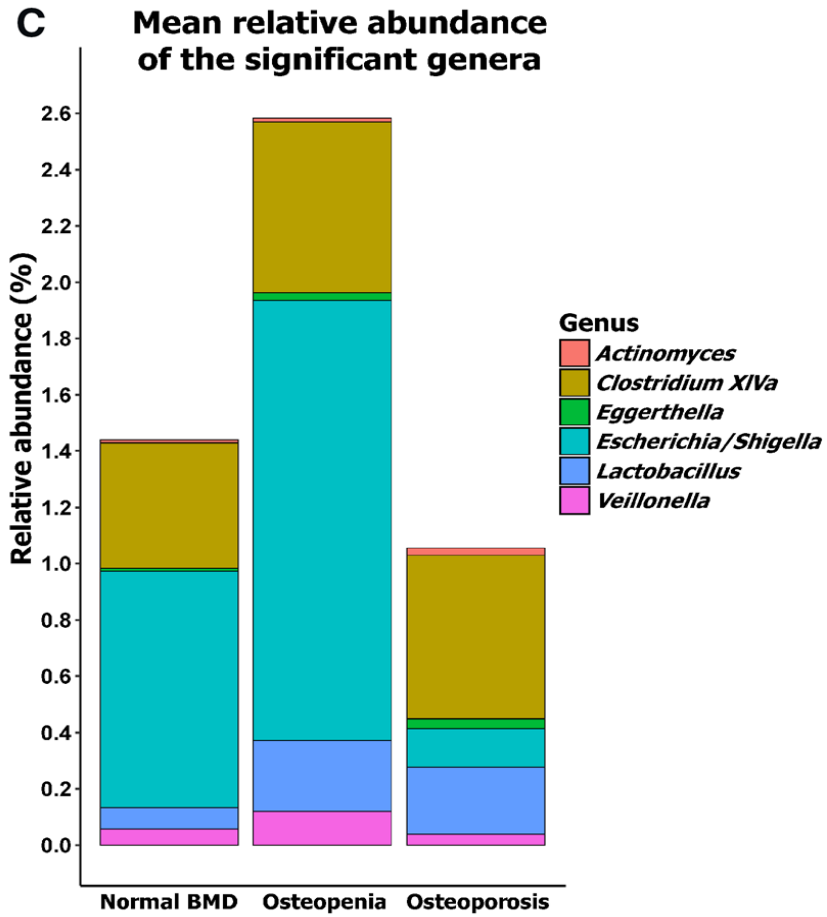


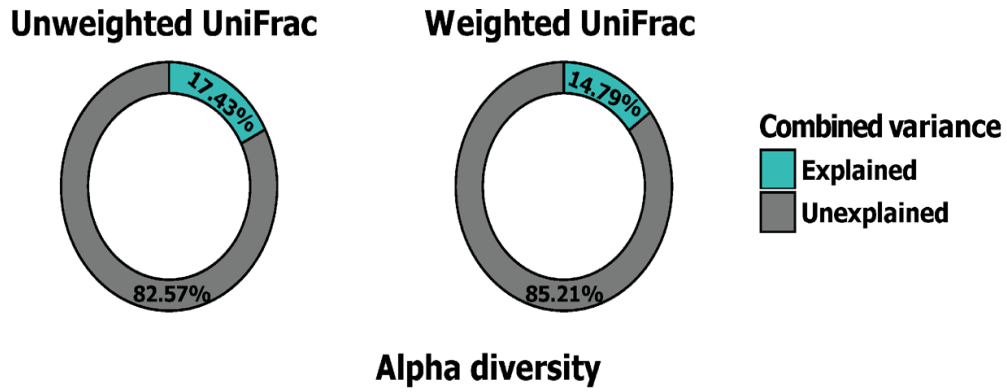




Wang J. et al. Peer J. 2017

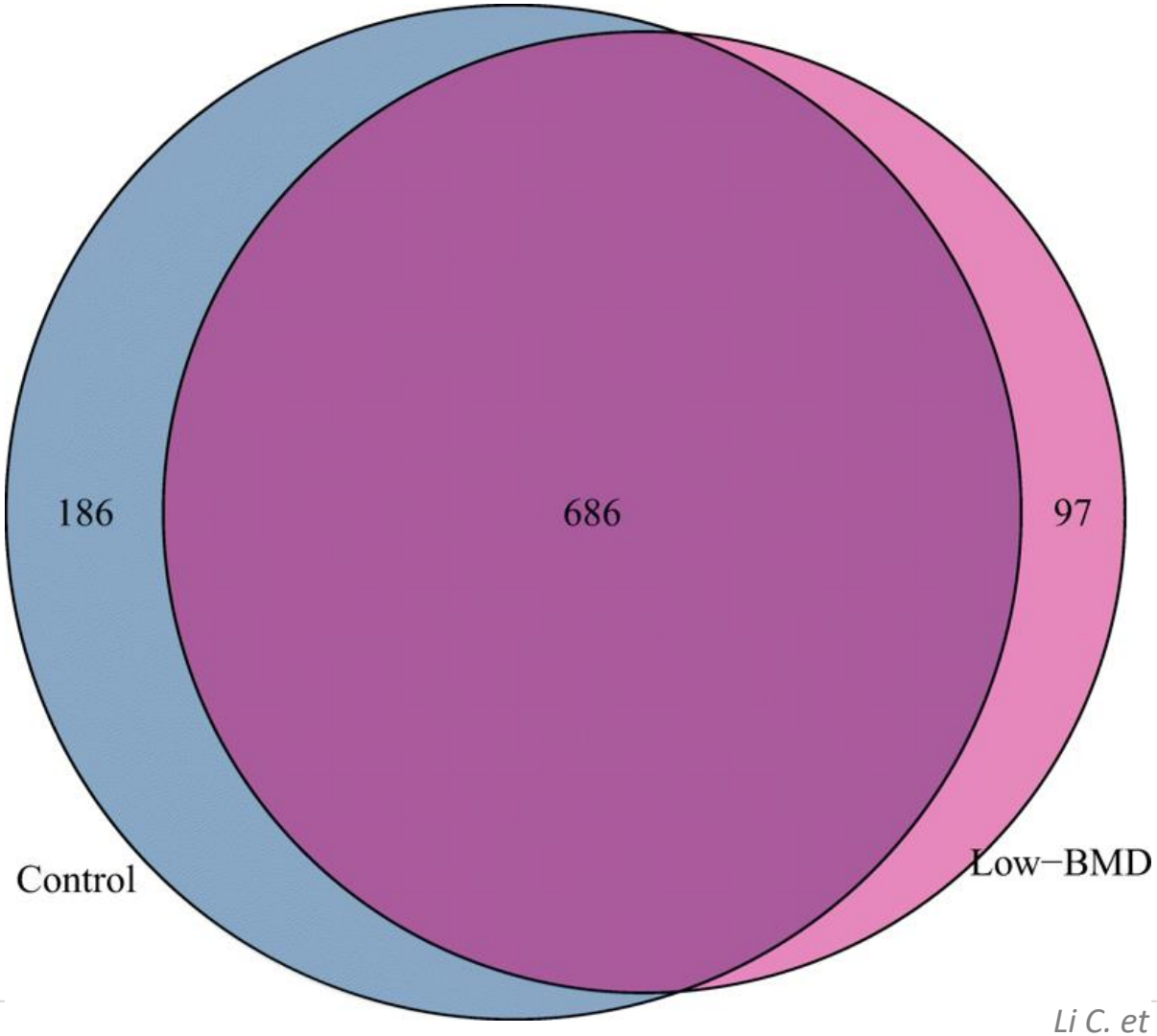
Differences in GM in osteoporosis and controls





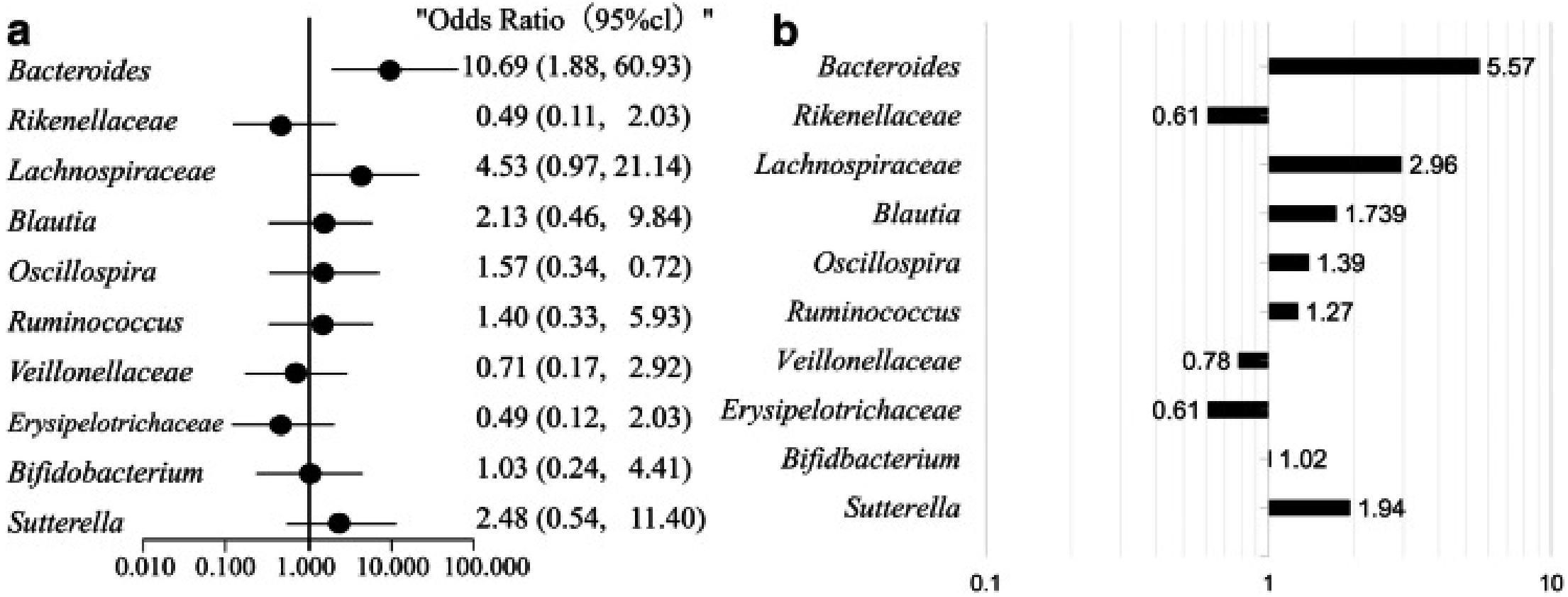
Das M. et al. Rheumatology 2019

Differences in GM in osteoporosis and controls



Li C. et al. Osteoporos Int. 2019

GM and fracture risk

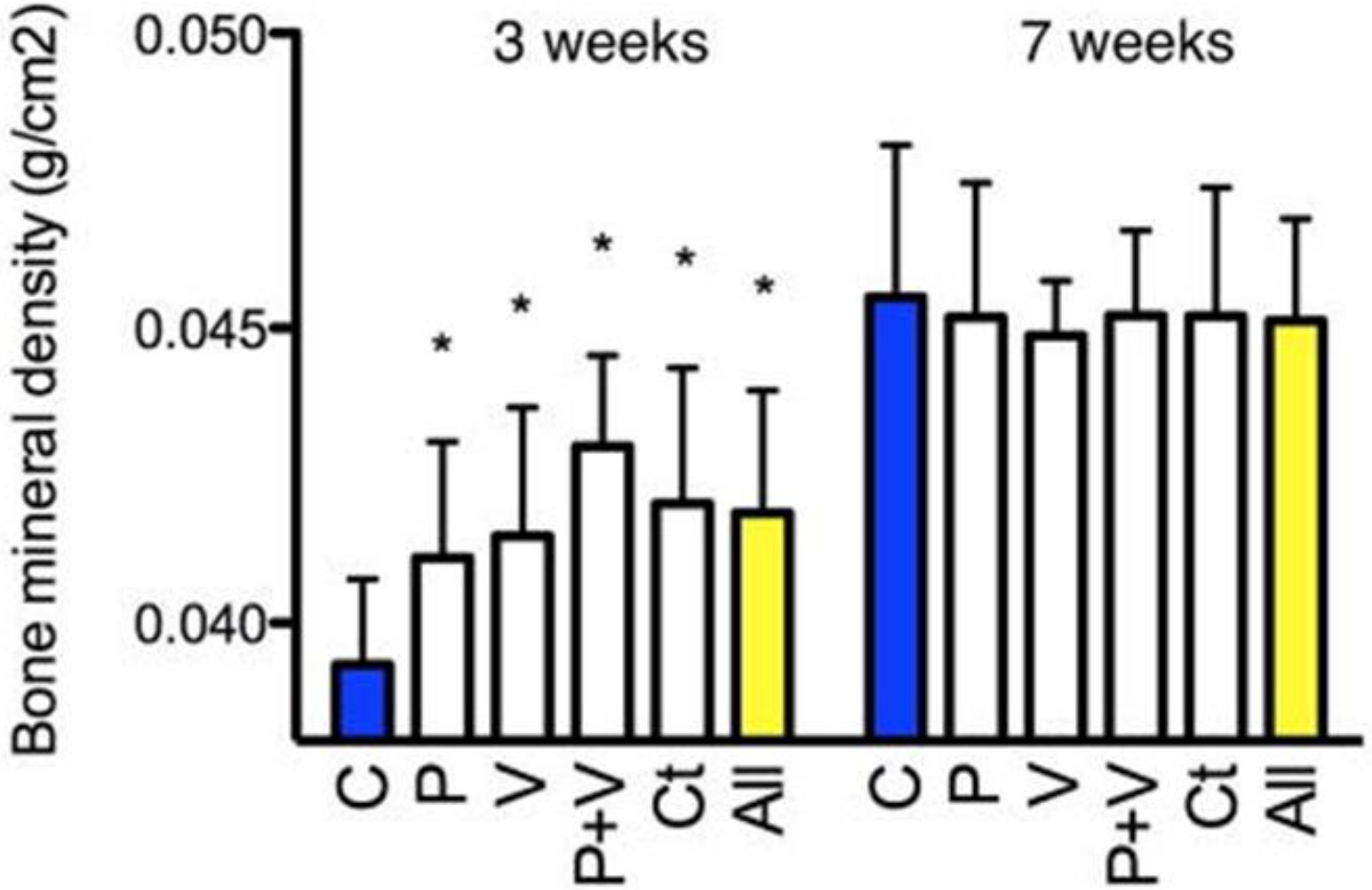


Ozaki D et al. Osteoporos Int. 2021

AGENDA

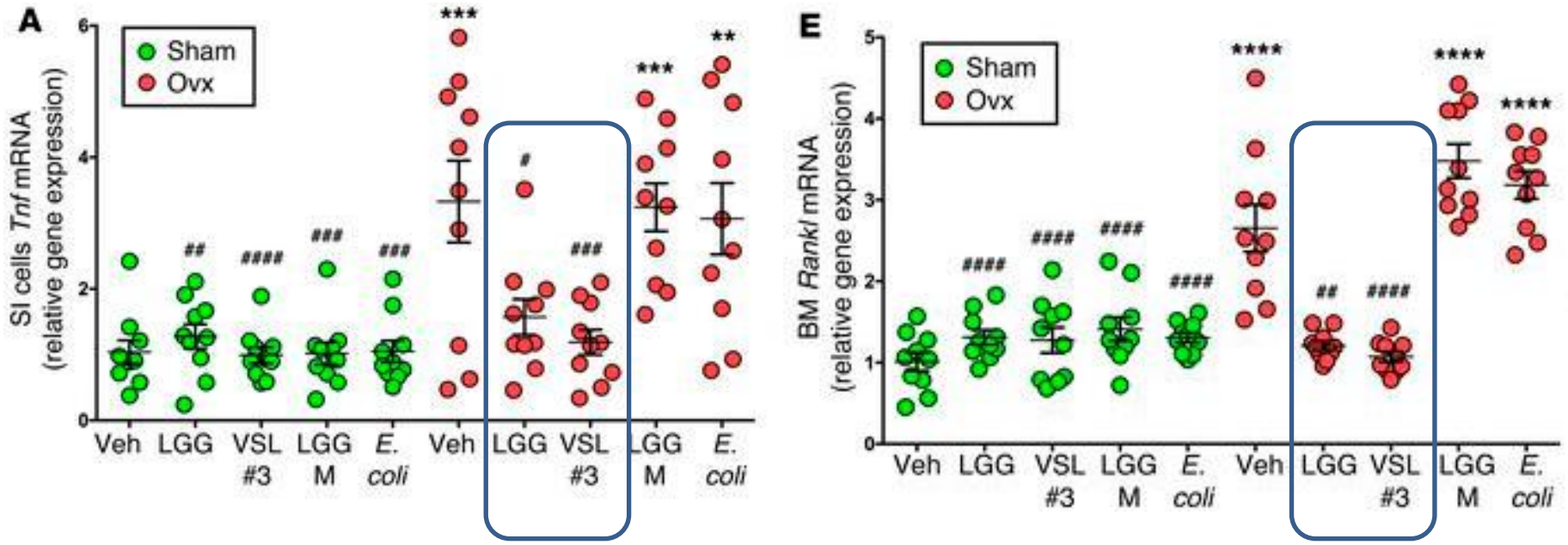
- ✓ Gut microbiota and bone health
- Treatment perspectives
- Conclusions

Antibiotics in early life modify gut microbiota and influence BMD



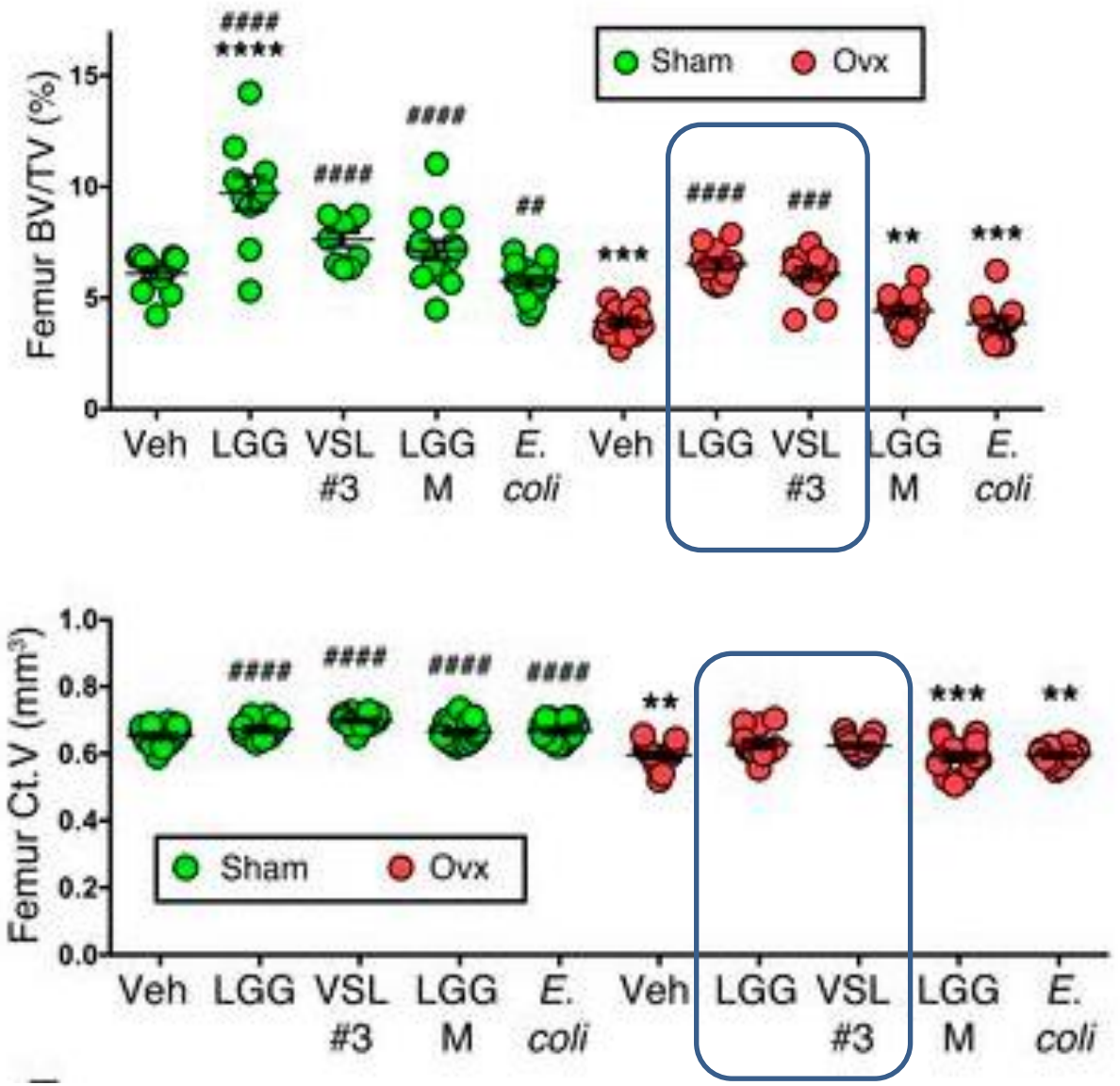
Cho I, et al. Nature 2012

Probiotics reduces pro-inflammatory cytokines in mice



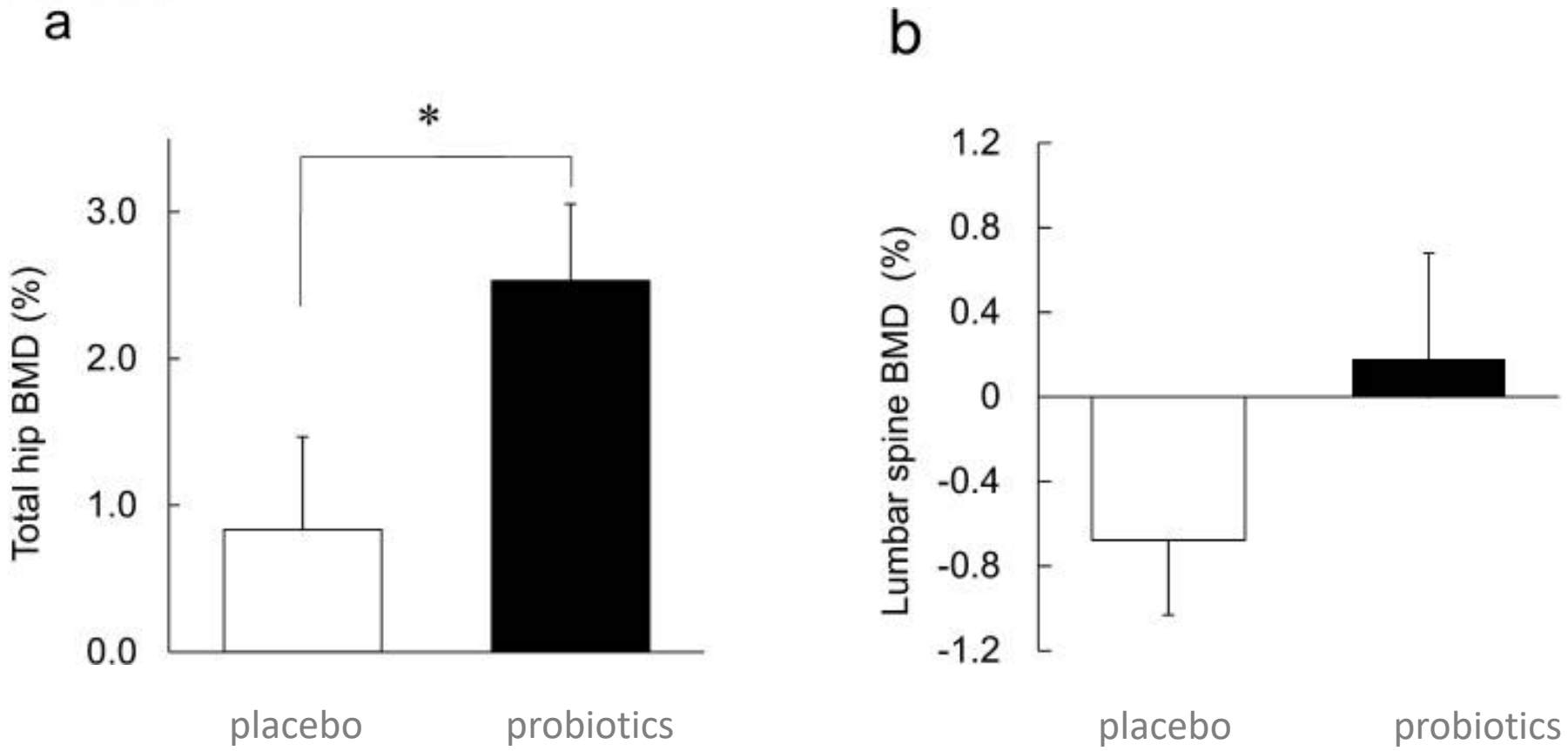
Li YJ, et al. JCI 2016

Probiotics prevented OVX induced bone loss in mice



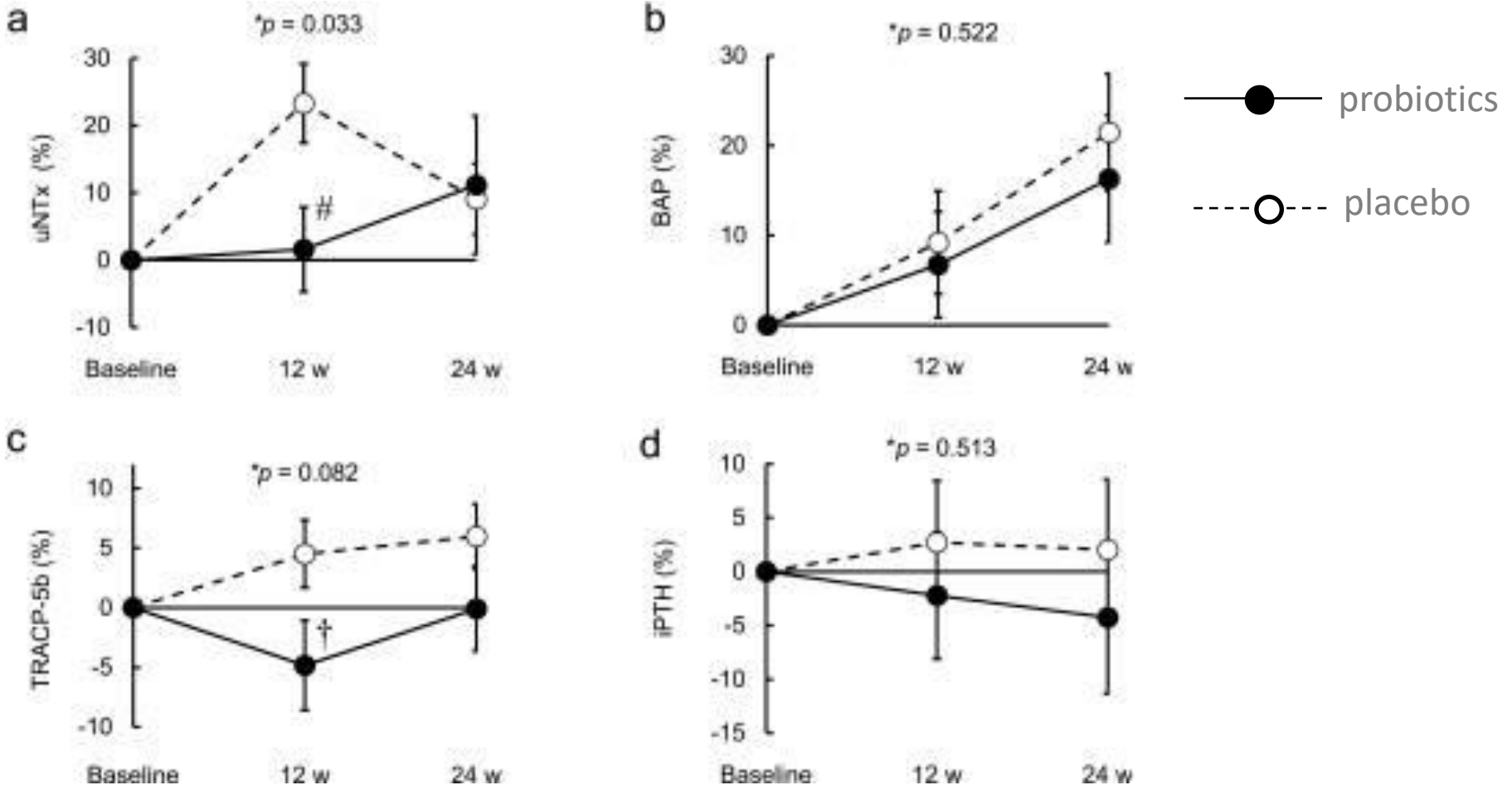
Li YJ, et al. JCI 2016

Probiotics affects BMD in healthy humans



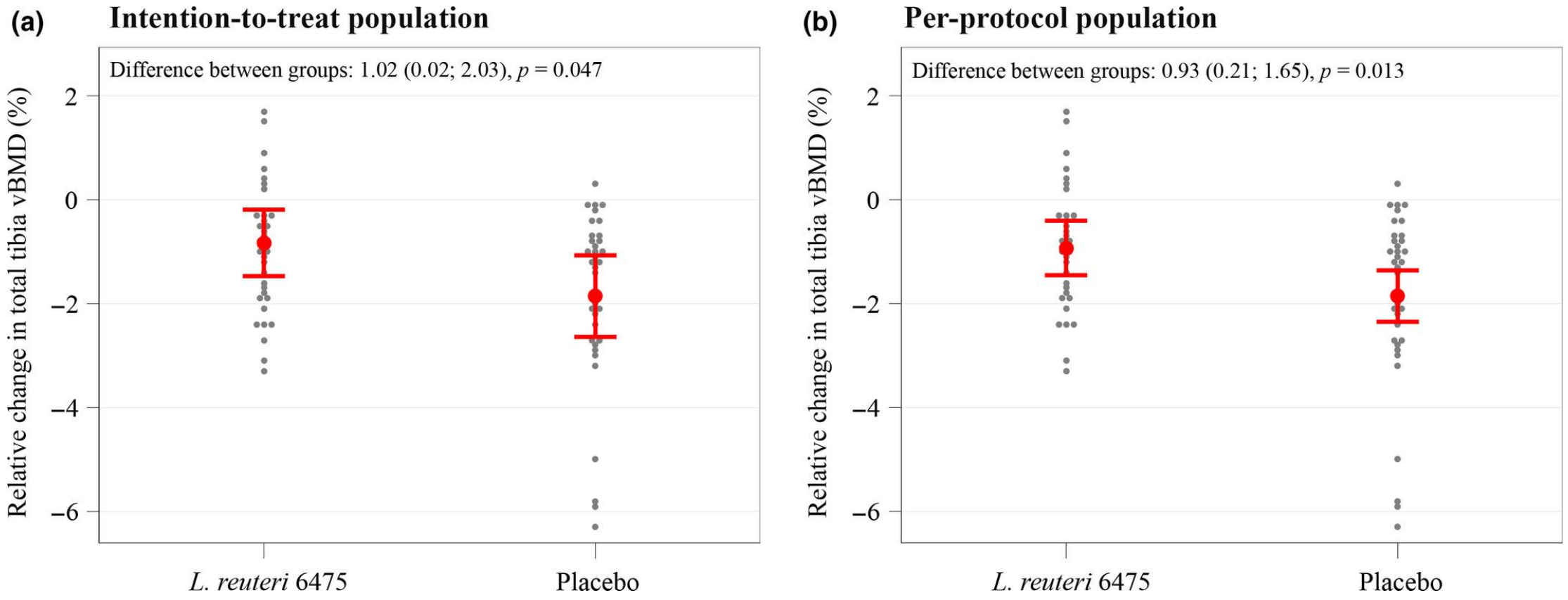
Takimoto T et al. Biosci Microbiota Food Health 2018

Probiotics affects bone turnover in healthy humans



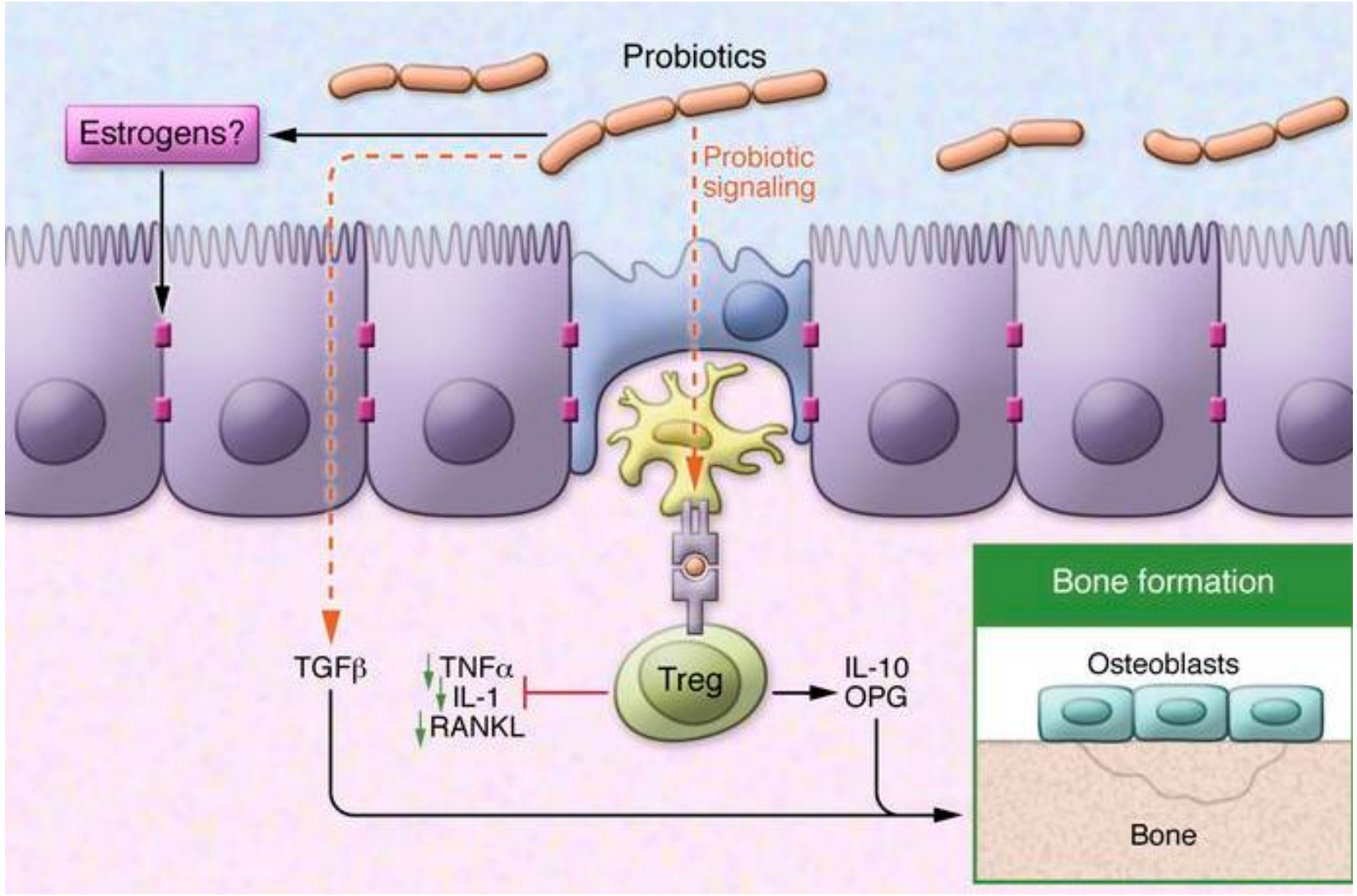
Takimoto T et al. Biosci Microbiota Food Health 2018

Lactobacillus reuteri reduces bone loss in older women with low bone mineral density



Nilsson AG et al. Journal of Internal Medicine, 2018

Probiotics, immune system and bone



Iqbal J, et al. J Clin Invest. 2016

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- Conclusions

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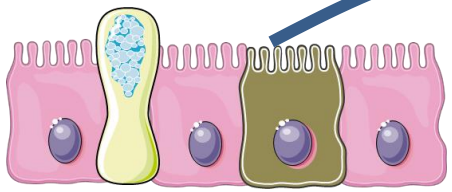
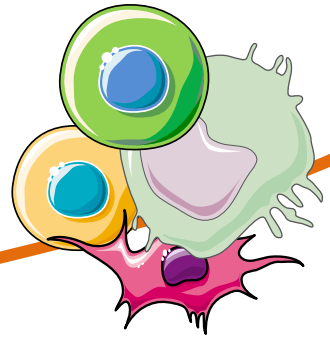
Calcium absorption





Immune system

10 times more microbial cells than human cells

canton de vaud

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