Emmanuelle REBOUL
UMR NORT Nutrition, Obesity and Risk of Thrombosis
INRA/ INSERM/ Aix-Marseille Univ
Marseille (FRANCE)

ABCB1 is involved in vitamin D intestinal efflux

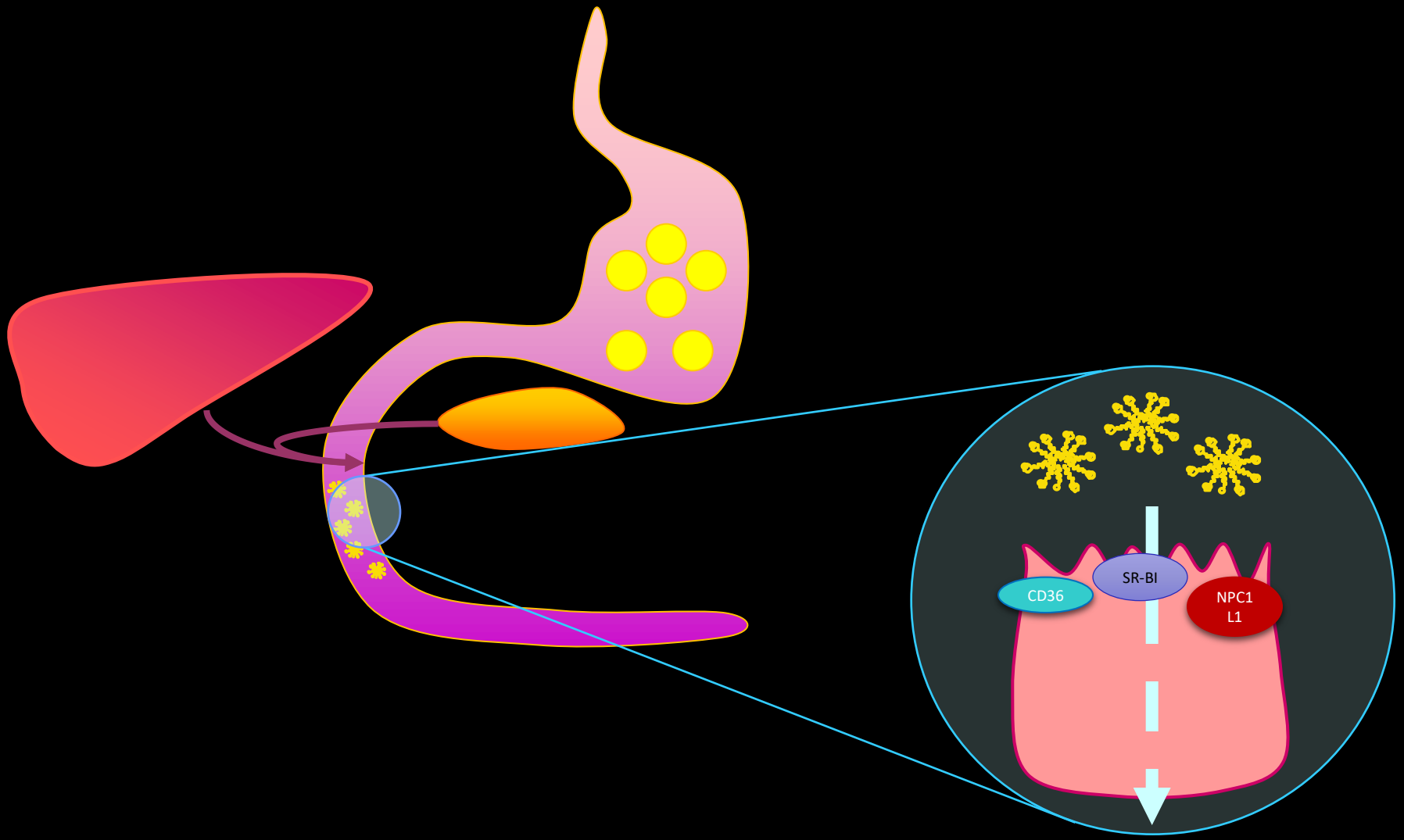
Vitamin D

Vitamin D plays key roles in phosphocalcic metabolism, immunity and cell differentiation

Mainly provided by sun exposure, fatty fish and supplemented dairy products

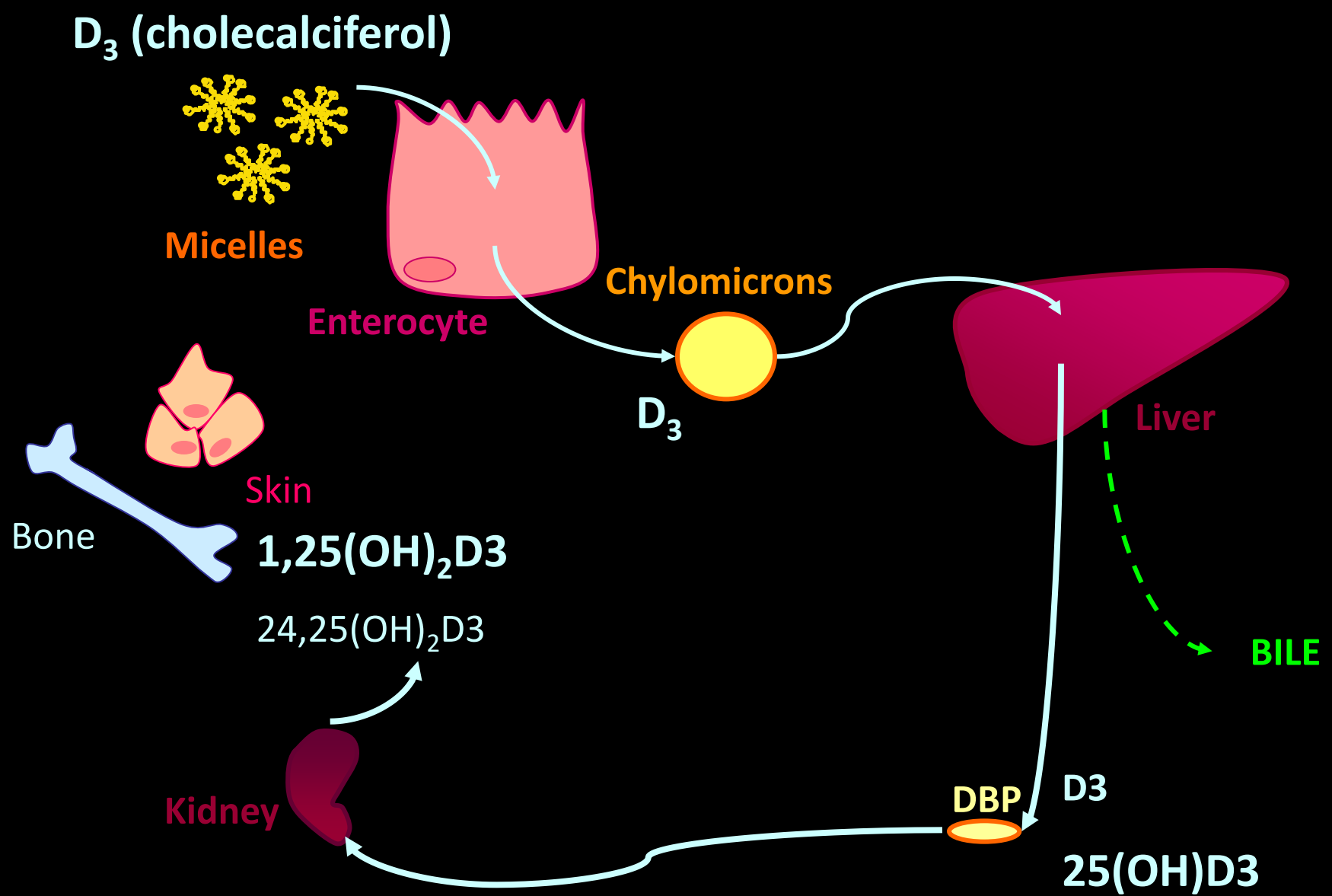
As sun exposure and dietary intake are often insufficient, a significant part of the population is (sub)deficient

Vitamin D intestinal absorption: current knowledge



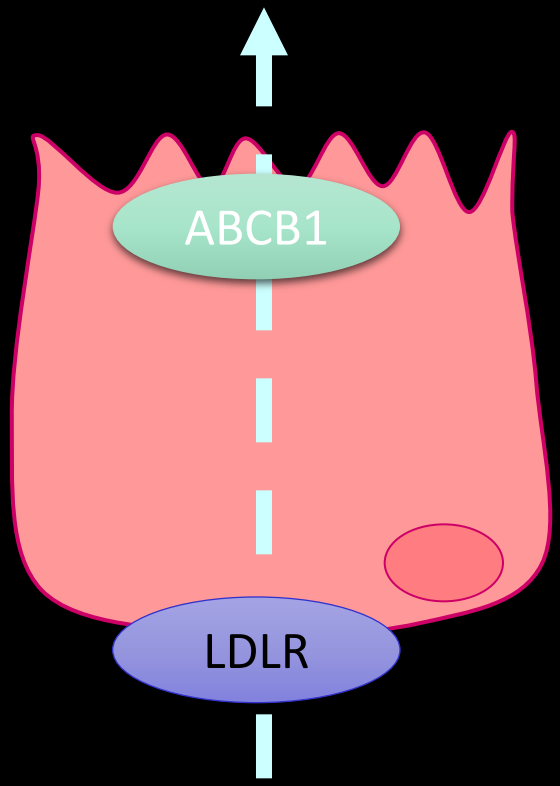
Reboul et al. 2011, Reboul and Borel 2011

Vitamin D metabolism

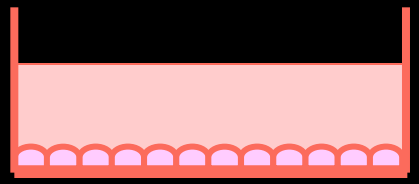


Another transport pathway of cholesterol through the enterocyte: TICE (Trans-Intestinal Cholesterol Excretion)

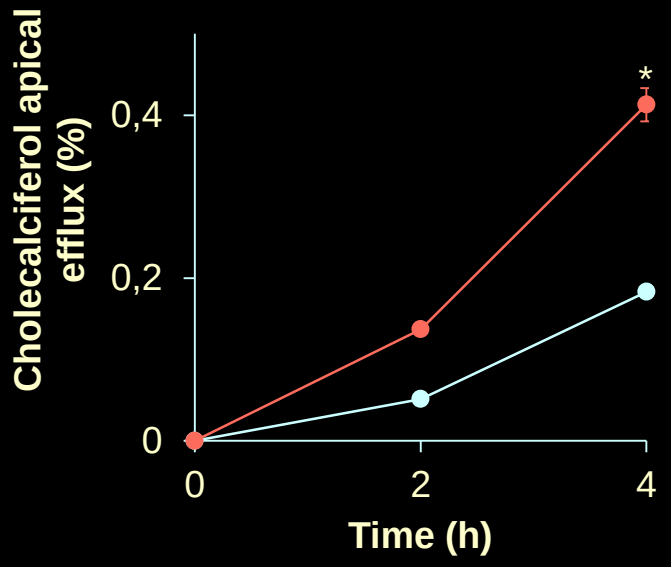
- TICE is a significant pathway of cholestol elimination through intestine
- TICE is inductible and likely involves a LDL route and the transporter ABCB1 (PGP/ MDR1)
- **Does an excretion route through ABCB1 also exist for vitamin D?**

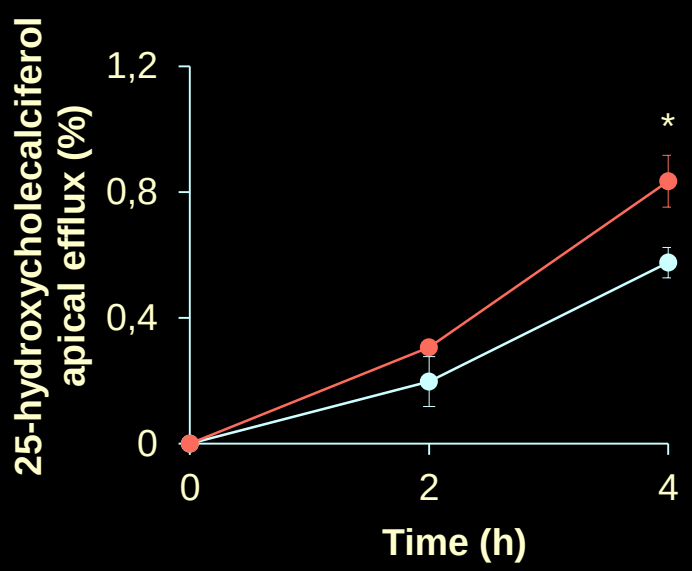


Effect of cell transfection with ABCB1 on vitamin D cellular efflux



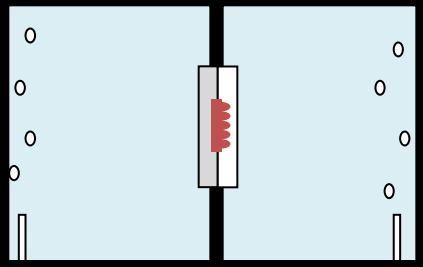
MCDK +/- ABCB1 (stably transfected)

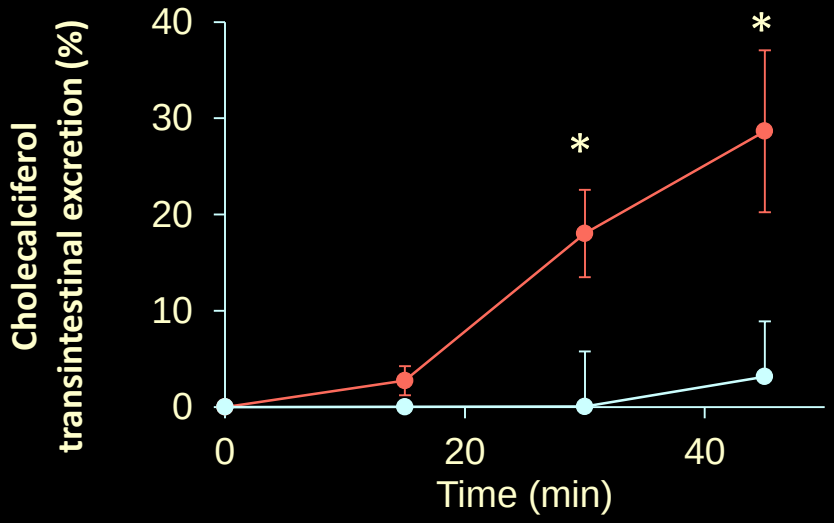


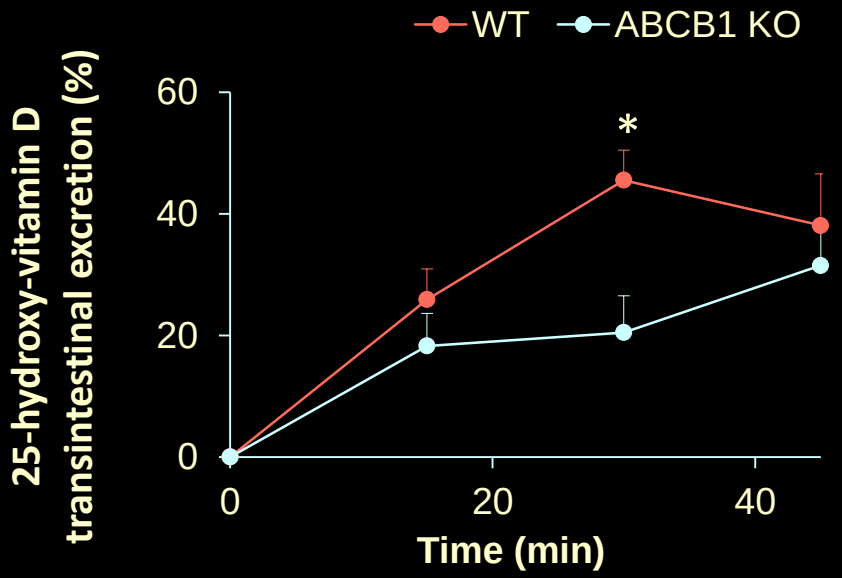


ABCB1 significantly increases vitamin D efflux from cells

Ussing chambers with intestinal explants from WT and ABCB1-/- mice

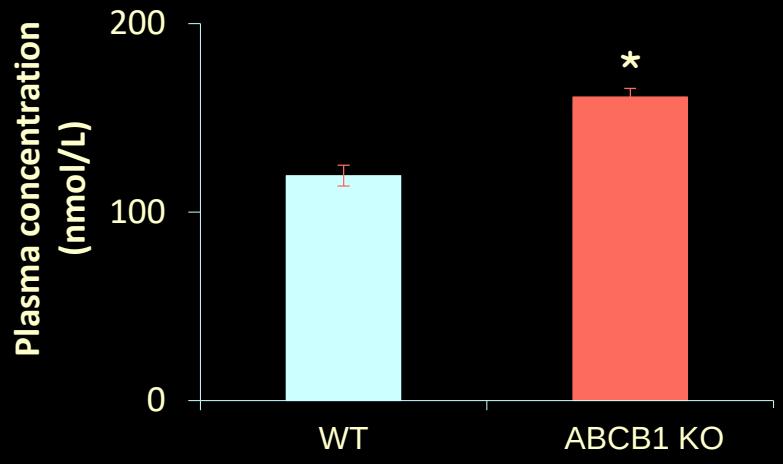






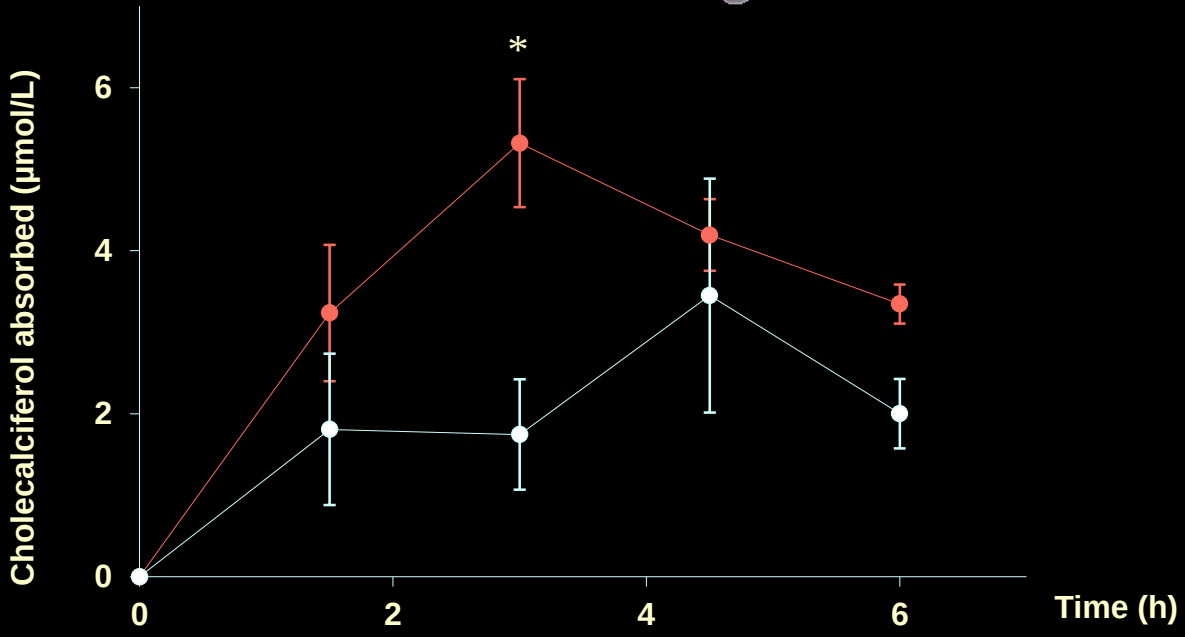
ABCB1 significantly increases vitamin D efflux through intestinal explants

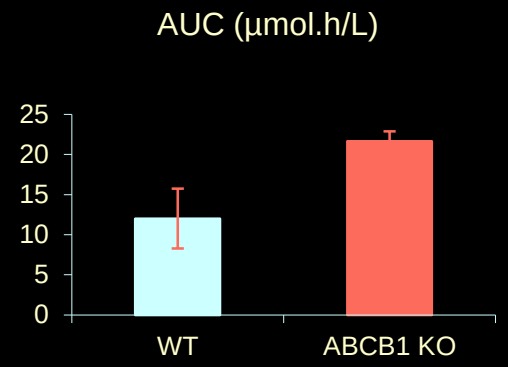
Characterization of ABCB1-/- mice



ABCB1 significantly affects vitamin D homeostasis

Postprandial experiments in WT and ABCB1-/- mice





ABCB1 significantly decreases vitamin D postprandial response in mice

Data from a clinical trial

✓ 39 healthy adult were genotyped using whole-genome microarrays

✓ Association between SNPs in genes involved in vitamin D and lipid metabolism and the 25(OH) status was analyzed by PLS regression

✓ A significant PLS regression model ($p = 3.94 \times 10^{-7}$) , which comprised 29 SNPs in 10 genes (including 3 SNPs in ABCB1), was associated with 73% of the interindividual variability in fasting plasma 25(OH)D concentration

Conclusion

✓ Our results highlight that a trans-intestinal excretion of vitamin D likely exists

✓ This trans-intestinal vitamin D excretion involves the membrane transporter ABCB1

✓ Further experiments are ongoing to confirm these data (vitamin D content in ABCB1 -/- mice tissues, *in situ* perfusion, vitamin D docking on ABCB1)

Thank you for your attention