

Effects of P and Ca depletion-repletion periods on intestinal and renal expression of genes associated with P, Ca and vitamin D metabolism in pigs.

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Introduction: Growing pigs replenish phosphorus (P) and calcium (Ca) reserves under depletion-repletion sequences but the underlying mechanisms need clarification. **Material-Methods:** Two groups of 30 pigs (initial BW 24±3.3 kg) received randomly a control or low P-Ca diet during two and three 28-day feeding phases (CC, CL and LC, and CCC, CLC, LCC, respectively). Control diet (C) fulfilled digestible P and total Ca requirements, whereas low diet (L) provided 60% of both. Mid-jejunum and kidney were sampled at slaughter for gene expression analysis of genes associated with P (*FGFR1/IIIc*, *SLC20A1*, *SLC20A2*, *SLC34A1*, *SLC34A3*), Ca (*S100G*, *CALB1*, *ATP2B1*, *SLC8A1*, *TRPV5*, *TRPV6*) and vitamin D (*CYP24A1*, *CYP27B1*, *KL*) metabolisms. **Results-Discussion:** For mid-jejunum, genes related with Ca absorption presented higher transcript levels in depleted pigs (CL vs CC; *TRPV6*, $P=0.02$; *S100G*, $P=0.07$), probably indicating higher dietary Ca utilization. For kidney, *S100G* gene expression in CL compared to CC and LC pigs was, respectively, four times ($P=0.01$) and eight times ($P<0.01$) higher, and two times for *CALB1* gene expression ($P=0.04$ and $P<0.01$, respectively). A higher *CYP27B1* gene expression ($P=0.09$) was observed in CL compared to LC pigs, which might indicate an increased renal synthesis of calcitriol. Besides, P transport genes were less expressed in LC diets compared to CC (*SLC20A2*, $P=0.04$; *SLC34A3*, $P=0.04$), probably indicating lower P reabsorption during repletion. Gene expression was similar between treatments after three 28-d phases. **Conclusion:** in pigs following P-Ca depletion-repletion sequences, gene expression in mid-jejunum and kidney only increased during depletion to face Ca deficiency rather than P deficiency.