

Development of Hypocalciuria and hyperphosphaturia during early stages of magnesium deprivation in mice

Jacob MacWilliams, Nicholas Desain, Justin Leach and Bernardo Ortega

Department of Biology, The College at Brockport, SUNY

Magnesium (Mg^{2+}) is the second most abundant ion in the body but its regulation is poorly understood. Mg^{2+} deficiency is known to interfere with the physiological regulation of other electrolytes, such as calcium (Ca^{2+}) and phosphate (P_i), and a number of hormones have been implicated in mediating such disturbances. Here we use a mouse model to understand how these changes occur over time. We show that in as little as one day, mice experienced a dramatic decrease in Mg^{2+} and Ca^{2+} excretion in urine. At the same time, P_i excretion was significantly increased. Given the speed of these changes, it is unlikely that FGF-23 regulates the increase in P_i excretion. Instead, other factors such as PTH may have a predominant role during the early stages of hypomagnesaemia. Our ultimate goal is to unravel the precise mechanism by which Mg^{2+} deficiency affects the regulation of Ca^{2+} and P_i , and understand the involvement of hormones such as PTH, FGF-23 and vitamin D in mediating these changes.

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