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Underfeeding increases ex-vivo blood cell responsiveness to bacterial challenges in dairy cows

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In dairy cattle, underfeeding is known to influence cow's homeostasis by inducing body reserve mobilization and by reducing milk production. However, its impact on cow's immune responses is less known. This study aimed to examine blood cell responsiveness to ex-vivo bacterial challenges in cows fed a standard or a low energy diet. Fifty-four Prim'Holstein at mid lactation received a standard diet (based on corn silage) from calving to 201 days in milk, and then were fed a lower energy diet (14.5% concentrates replaced by 11.5% straw and 3% dehydrated alfalfa) for 5 wk. Milk yield was recorded daily. Blood samples collected at wk -2, -1 and 1, 2 and 5 after diet change were incubated ex-vivo with heat-killed *Escherichia coli* or *Staphylococcus aureus* bacteria, or saline as a control for 23h at 38.5°C. Plasma Interleukin 8 (CXCL8), an indicator of the inflammatory response, was then measured by ELISA. Plasma haptoglobin, glucose, urea and NEFA concentrations were determined. Data were analysed using a mixed model of variance testing the effect of week with a cow week random effect. The decrease in energy diet content was associated with a loss of 3 kg/d milk yield ($P < 0.001$) and reduced glucose and urea plasma concentrations ($P < 0.01$) while plasma NEFA and haptoglobin concentrations did not vary. A higher production of CXCL8 was observed after *E. coli* and *S. aureus* stimulations during the underfeeding period ($P < 0.01$), being maximal 2 and 5 wk after diet change, for *E. Coli* and *S. Aureus* respectively. Thus, a moderate underfeeding of dairy cows could modify the cow's inflammatory response.