



Behaviour and nutrition New insights for better solutions?

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Prebiotic and probiotic approaches in an acute leukemia mouse model

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Introduction: Since the gut microbiota is able to regulate host energy homeostasis and immunity, we hypothesized that changes in the gut microbial ecosystem might be involved in leukemia progression and associated metabolic disorders (fat mass loss, muscle atrophy).

Methods: The gut microbiota composition was assessed in a mouse model mimicking acute leukemia (transplantation of BaF3 cells containing ectopic expression of Bcr-Abl) using PCR-Denaturing Gradient Gel Electrophoresis and quantitative PCR. Probiotics (*Lactobacillus reuteri* 100-23 and *Lactobacillus gasseri* 311476) and prebiotics (inulin-type fructans) were administrated in the drinking water.

Results: BaF3 cells transplantation altered the gut microbiota composition. The *Lactobacillus* spp. level was decreased by 50-fold, due to a selective decrease in *L. reuteri* and *L. johnsonii/gasseri*. The oral supplementation with *L. reuteri* 100-23 and *L. gasseri* 311476 reduced the systemic inflammation and the atrophy markers expression in the gastrocnemius muscle of leukemic mice, whereas the supplementation with inulin-type fructans reduced BaF3 cells progression into the liver, without changing the *Lactobacillus* spp. count. *In vitro* data suggest that the propionate, produced by bacterial fermentation of fructans, might be responsible for the control of BaF3 cells progression through a GPR43-dependent pathway.

Conclusion: selected probiotic and prebiotic approaches appear as an innovative tool to modulate cancer cells progression and the associated inflammation and muscle atrophy. These data also support the concept that systemic health effects for the host can be generated through the modulation of gut microbiota by pro- and prebiotics.

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