

白蟻腸道菌代謝物抑制3T3-L1 前脂肪細胞 分裂與分化

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摘要

畜產動物體內過多的脂肪組織會減低其能量代謝效率，使飼養成本提高。近幾年越來越多的報告指出，腸道微生物發酵產生的代謝物可以影響動物的脂肪組織發育。本研究目的在探討取自白蟻後腸道的地衣芽孢桿菌 (*Bacillus licheniformis*) 之發酵代謝物對前脂肪細胞分裂與分化的影響。以3T3-L1 前脂肪細胞培養為試驗模式，在細胞分裂與誘發分化過程中，分別添加1%或10%地衣芽孢桿菌發酵代謝物。經細胞計數分析發現，添加10%發酵代謝物處理組，其細胞數目顯著低於對照組，顯示前脂肪細胞增生作用受到抑制。而oil-Red O 脂質染色結果顯示，添加10%發酵代謝物處理組細胞有顯著較低的脂質堆積。同時，聚合酶鏈鎖反應分析結果也顯示其分化相關基因表現比未處理之對照組細胞顯著較低。這些結果指出，白蟻後腸道的地衣芽孢桿菌代謝物會影響3T3-L1 前脂肪細胞的分裂及分化，可能因此抑制脂肪細胞增生。

關鍵詞：脂肪細胞、分化、分裂、白蟻腸道菌

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Metabolites of Termite Gut Microorganisms Reduces Proliferation and Differentiation of 3T3-L1 Preadipocytes

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Abstract

Excess amounts of adipose tissues decrease the efficiency of energy metabolism in livestock animals, resulting in increases of feeding costs. Gut microbes influence the digestion and utilization of food in animals. And it is increasingly evident that these microbes may affect the host metabolic activity and ultimately influence the adipose accretion and growth. This study aims to explore the effects of termite gut microorganisms (*Bacillus licheniformis*) metabolites on the division and differentiation of 3T3-L1 preadipocytes. Total bacterial metabolites were collected and applied at the concentration of 1 or 10% (v/v) to the media during differentiation of 3T3-L1 cells. Cell number decided by cell number counting was significantly lower in the 10% bacterial metabolites-treated groups than those in 1% and control groups. The results of oil-Red O staining demonstrated that the 10% treated adipocytes had reduced levels of fat accumulation compared with the 1% and control cells. Additionally, The mRNA levels of adipocyte differentiation-related genes were lower in the 10% bacterial metabolites-treated cells than those in the 1% and control cells, as measured by RT-PCR analysis. Taken together, these results suggest that termite gut bacterial metabolites may attenuate the proliferation and differentiation of adipocytes, and therefore affect the energy metabolism of animals.

Key words: adipocyte, differentiation, proliferation, termite gut bacteria

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