Short-term administration of rhGH increases markers of cellular proliferation but not milk protein gene expression in normal lactating women.

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Short-term administration of rhGH increases markers of cellular proliferation but not milk protein gene expression in normal lactating women.

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Abstract
Growth hormone is one of few pharmacologic agents known to augment milk production in humans. We hypothesized that recombinant human GH (rhGH) increases the expression of cell proliferation and milk protein synthesis genes. Sequential milk and blood samples collected over four days were obtained from five normal lactating women. Following 24 h of baseline milk and blood sampling, rhGH (0.1 mg/kg/day) was administered subcutaneously once daily for 3 days. Gene expression changes were determined by microarray studies utilizing milk fat globule RNA isolated from each milk sample. Following rhGH administration, DNA synthesis and cell cycle genes were induced, while no significant changes were observed in the expression of milk synthesis genes. Expression of glycolysis and citric acid cycle genes were increased by day 4 compared with day 1, while lipid synthesis genes displayed a circadian-like pattern. Cell cycle gene upregulation occurred after a lag of ∼2 days, likely explaining the failure to increase milk production after only 3 days of rhGH treatment. We conclude that rhGH induces expression of cellular proliferation and metabolism genes but does not induce milk protein gene expression, as potential mechanisms for increasing milk production and could account for the known effect of rhGH to increase milk production following 7-10 days.

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