



Biologic substances present in human colostrums demonstrate the evolution of this essential nutrient for growth and development: Insulin-like growth factor-I and prolactin[☆]

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Abstract

The aim of the present study was to see whether the level of both insulin-like growth factor-I (IGF-I) and prolactin (PRL) present in the colostrums of women coming from fairly different environmental conditions showed any significant difference. To this end, the IGF-I and PRL levels of African and Italian women still living in their countries of origin were determined. The IGF-I levels of African women turned out to be lower than those of Italian women (11.53 ± 8.67 vs 29.16 ± 14.39 ng/mL) and, in addition, decreased significantly and progressively within the first 3 days after delivery. The IGF-I levels in the colostrums of Italian women who delivered by cesarean delivery were comparable to that of African women who delivered by spontaneous delivery. However, because the colostrum volume and the IGF-I level of African women are larger and lower, respectively, than those typical of Italian women, Italian and African newborns end up receiving roughly the same amount of IGF-I on day 1 after birth. Prolactin levels in Italian and African women were comparable (85.16 ± 29.14 and

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74.88 ± 27.97 ng/mL) and were significantly reduced in 10 Italian women 2 days after the cesarean delivery (59.22 ± 12.96 ng/mL). The progressive decrease of IGF-I level detected in the first 3 days of life demonstrates the crucial role of IGF-I in the development of both gastrointestinal and immune systems. In addition, the stability of PRL levels in the first 3 days of life underlines the essential role of this hormone in the switching on of lactation as well as in the regulation of immune response.

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1. Introduction

Milk, originally regarded as a food furnishing essential nutrients to infant growth, is nowadays known to contain a large number of chemicals that provide immune protection to suckling newborns and that may also promote the development of neonatal immune competence [1]. In addition, these specialized components are essential to hormone-regulated events that prepare the breast to lactation and protect the mammary gland from pathogen colonization [2]. They also cooperate or compete with other growth factors (ie, epidermal growth factor, fibroblast growth factor, platelet-derived growth factor, and transforming growth factors α and β) to induce either growth stimulation or growth inhibition, as well as differentiation, preservation, and apoptosis [3,4].

Insulin-like growth factor-I (IGF-I) and prolactin (PRL), protein hormones present at the start of lactation, subserve also as immunoregulatory mediators [5,6]. In fact, IGF-I is mainly involved in the growth and development of newborns' gastrointestinal tract [7,8]. Moreover, IGF-I can stimulate milk yield and blood flow in goats when directly infused into the mammary gland, suggesting that it plays an important role in supporting lactation [8].

Prolactin is generally associated with the start of lactation; however, there are evidences clearly indicating that milk PRL is also involved in a variety of physiological functions including differentiation and maturation of neonatal neuroendocrine and immune systems [1-9].

The role of IGF-I and PRL in the immune system derives from the identification of IGF-I and PRL receptors immunocompetent cells, leading to the hypothesis that PRL and IGF-I possess a direct effect on the immune system [5,6]. Based on this statement, the function of IGF-I and PRL in the human milk may be particularly determinant for neonates who are born in the African countries by spontaneous delivery, considering the environmental conditions and the absence of elementary hygienic norms.

The aim of the present study was to determine PRL and IGF-I in colostrum of African women compared with Italian women living in Europe, to evaluate differences, if any, between these 2 groups, and to correlate these parameters to the neonate requirements.

2. Methods and materials

2.1. Colostrum sample collection

Fifty-three African women (Centre Medical St Camille Maternity, Ouagadougou, Burkina Faso) and 30 Italian women (S. Bambino Maternity, Catania, Italy) were investigated. The

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