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Editorial

MicroRNAs and their role in newborn weight

Cristina García-Muro ^a 

^a Department of Pediatrics, Hospital San Pedro, Logroño, Spain

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MicroRNAs (miRNAs) are small RNA molecules, typically about 22 nucleotides in length that play a crucial role in the post-transcriptional regulation of gene expression. They have emerged as key players in various cellular processes, including fetal development and growth. Understanding the involvement of miRNAs in newborn weight regulation is a topic of increasing interest, as it provides insights into the molecular mechanisms governing healthy fetal growth and potential implications for neonatal health [1].

Several studies have identified specific miRNAs associated with fetal growth and birth weight. For example, the miR-379 cluster has been implicated in the regulation of fetal growth, particularly through its influence on placental development. Aberrant expression of miR-379 has been associated with intrauterine growth restriction (IUGR), a condition where the fetus fails to achieve its expected growth potential, resulting in lower birth weight [2].

* Corresponding author.

E-mail address: cristina.garciamuro@gmail.com

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Conversely, certain miRNAs act as promoters of fetal growth. The miR-17-92 cluster, also known as the oncomir-1 cluster, has been linked to the regulation of placental development and fetal growth. Dysregulation of this miRNA cluster has been observed in cases of macrosomia, where newborns exhibit unusually high birth weight [3]. These findings emphasize the intricate regulatory roles of miRNAs in maintaining a balance between underweight and overweight newborns.

The impact of maternal health on miRNA-mediated regulation of fetal growth is a critical aspect of this dynamic interplay. Maternal factors such as nutrition, stress levels, and overall well-being can influence the miRNA landscape within the developing fetus. Studies have indicated that maternal obesity, for instance, can alter the expression of specific miRNAs, potentially contributing to macrosomia or large-for-gestational-age newborns [4].

Moreover, miRNAs are implicated in metabolic pathways that influence fetal growth. MiRNAs such as miR-122, miR-33, and miR-375 play roles in regulating lipid metabolism, insulin sensitivity, and glucose homeostasis. Dysregulation of these miRNAs may contribute to conditions like gestational diabetes, impacting fetal growth and birth weight [5].

The intricate web of miRNA-mediated regulation extends beyond fetal development to encompass the potential impact on birth weight and neonatal outcomes. Low birth weight is associated with increased risks of developmental issues, while high birth weight can lead to complications during delivery and potential long-term health consequences. Recognizing the role of miRNAs in these processes opens avenues for targeted interventions to ensure optimal fetal growth and mitigate adverse outcomes [6].

Understanding miRNA dynamics in the context of newborn weight regulation also holds promise for the development of diagnostic tools. MiRNAs can serve as biomarkers for various conditions, allowing for early detection and monitoring of diseases associated with abnormal fetal growth. This potential application underscores the

translational relevance of miRNA research in the field of perinatal medicine [7].

In conclusion, microRNAs play a crucial role in the regulation of fetal growth and, consequently, birth weight. Their intricate involvement in processes such as placental development, nutrient metabolism, and response to maternal factors highlights their significance in ensuring a healthy newborn. Unraveling the complexities of miRNA-mediated regulation offers promising insights for addressing issues related to underweight and overweight newborns, ultimately contributing to advancements in maternal and neonatal healthcare.

1. CONFLICT OF INTERESTS

The authors have no conflict of interest to declare. The authors declared that this study has received no financial support.

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