Immune-related MicroRNAs are Abundant in Breast Milk Exosomes

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Abstract:

Breast milk is a complex liquid rich in immunological components that affect the development of the infant's immune system. Exosomes are membranous vesicles of endocytic origin that are found in various body fluids and that can mediate intercellular communication. MicroRNAs (miRNAs), a well-defined group of non-coding small RNAs, are packaged inside exosomes in human breast milk. Here, we identified 602 unique miRNAs originating from 452 miRNA precursors (pre-miRNAs) in human breast milk exosomes using deep sequencing technology. We found that, out of 87 well-characterized immune-related pre-miRNAs, 59 (67.82%) are presented and enriched in breast milk exosomes ($P < 10^{-16}$, $\chi^2$ test). In addition, compared with exogenous synthetic miRNAs, these endogenous immune-related miRNAs are more resistant to relatively harsh conditions. It is, therefore, tempting to speculate that these exosomal miRNAs are transferred from the mother's milk to the infant via the digestive tract, and that they play a critical role in the development of the infant immune system.

Key Word: breast milk, exosome, immune-related miRNAs, deep sequencing.