

Tracing the flow of dietary carbon in amino acids from breast milk to infant tissue

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The duration of breastfeeding and the timing and types of weaning foods consumed by infants represent critical periods in infant health and nutrition that can have profound consequences on individual survival. This research has been primarily the focus of medical, biochemical, and social anthropology literature, but the development of new isotopic techniques has given archaeologists and anthropologists the ability to reconstruct ancient breastfeeding and weaning practices from past populations. To date these studies have only used bulk protein isotopic values (carbon, nitrogen, and oxygen), and little research has been conducted at the level of single amino acids. This pilot study examines how the carbon isotopic ratios of amino acids in modern human breast milk fractionate as they are incorporated into infant tissue (hair and nails), using the technique of Liquid Chromatography – Isotope Ratio Mass Spectrometry (LC-IRMS). The results of this research will be used to better understand the bulk carbon diet to tissue trophic level effect (1 per mil) in humans during breastfeeding and weaning. In addition, these data will be used to develop better methods of detecting breastfeeding and weaning patterns in skeletal remains.