**Supplementary Table 1.**A list of the final selection of 40 papers, along with a short description of the main findings/focus.

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| **Authors** | **Year of Publication** | **Title** | **Main Findings/Focus** |
| Aparicio *et al.* | 2020 | Human milk cortisol and immune factors over the first three postnatal months: Relations to maternal psychosocial distress. | No evidence for an association between natural variations in maternal distress and immune factor concentrations in milk. In contrast, maternal psychosocial distress was positively related to higher milk cortisol concentrations at week 2 post-delivery. |
| Bautista *et al.* | 2016 | Changes in milk composition in obese rats consuming a high-fat diet. | Maternal obesity induced by an obesogenic diet negatively affects maternal liver and MG function with the production of significant changes in milk composition. Maternal obesity adversely affects offspring metabolism and development. |
| Berger *et al.* | 2020 | Linking human milk oligosaccharides, infant fecal community types, and later risk to require antibiotics. | Human milk oligosaccharides (HMOs) may provide health benefits to infants partly by shaping the development of the early-life intestinal microbiota. Microbiota changes were observed upon feeding a formula with 2 HMOs in comparison to breastfed reference infants' microbiota. |
| Bernstein & Hinde | 2016 | Bioactive factors in milk across lactation: Maternal effects and influence on infant growth in rhesus macaques (Macaca mulatta). | Results suggest that maternal origin bioactive factors contribute to rhesus macaque infant growth and, potentially also other aspects of development. |
| Browne *et al.* | 2019 | Human milk microbiome and maternal postnatal psychosocial distress. | Suggests a potential relation between maternal psychosocial distress and milk microbiota, providing first evidence of a possible mechanism through which post-partum psychological symptoms may affect infant development and health. |
| Carney *et al.* | 2017 | Metabolism-related microRNAs in maternal breast milk are influenced by premature delivery. | Premature delivery results in a unique maternal breast milk (MBM) microRNA profile with metabolic targets. This suggests that preterm milk may have adaptive functions for growth in premature infants. |
| Chen, D. *et al.* | 1998 | Stress during labor and delivery and early lactation performance. | Primiparity, long labor, stress to the mother and fetus during labor and delivery, and elevated cord glucose concentrations are risk factors for delayed lactogenesis. |
| Chen, Y. *et al.* | 2017 | Effect of high-fat diet on secreted milk transcriptome in midlactation mice.  | Maternal high fat diet impacts mRNA and miRNA content of milk, if bioactive nucleic acids are absorbed by neonate differences may affect development. |
| Dettmer *et al.* | 2018 | Cortisol in Neonatal Mother’s Milk Predicts Later Infant Social and Cognitive Functioning in Rhesus Monkeys. | Cortisol concentrations in milk during the neonatal period predicted impulsivity on a cognitive task, but not global social behaviors, months later. |
| Ellsworth *et al.* | 2020 | Impact of maternal overweight and obesity on milk composition and infant growth. | Human milk composition is associated with maternal pre‐pregnancy weight status and composition may be a contributing factor to early infant growth trajectory. |
| Fujimori *et al.* | 2016 | Cytokine and adipokine are biofactors can act in blood and colostrum of obese mothers. | Obesity changes hormonal and immunological components of maternal serum and colostrum. The modifications can have short-term and long-term effects on newborn development. |
| Grey *et al.* | 2013 | Human milk cortisol is associated with infant temperament. | Suggests that mothers have the ability shape offspring phenotype through the transmission of biologically active components in milk. |
| Groer *et al.* | 2004 | Associations between human milk SIgA and maternal immune, infectious, endocrine, and stress variables. | Milk SIgA is primarily affected by maternal immune/infection status, but several other stress and mood variables may potentially influence the concentration of milk SIgA. |
| Hahn-Holbrook *et al.* | 2016 | Cortisol in Human Milk Predicts Child BMI. | Cortisol exposure through human milk may help to program metabolic functioning and childhood obesity risk. Further, because infant formula contains only trace amounts of glucocorticoids, this finding represents a novel biological pathway through which breastfeeding may protect against later obesity. |
| Hernandez *et al.* | 2012 | High fat diet alters lactation outcomes: Possible involvement of inflammatory and serotonergic pathways. | Consumption of high fat diet (HFD) impairs mammary parenchymal tissue and impedes its ability to synthesize and secrete milk, possibly through an increase in 5-HT production within the mammary gland leading to an inflammatory process. |
| Hinde *et al.* | 2015 | Cortisol in mother’s milk across lactation reflects maternal life history and predicts infant temperament. | Suggests that mothers with fewer somatic resources, even in captivity, may be “programming” through cortisol signaling, behaviorally cautious offspring that prioritize growth.  |
| Kugananthan *et al.* | 2017 | Associations between maternal body composition and appetite hormones and macronutrients in human milk. | The level of maternal adiposity during lactation may influence the early appetite programming of breastfed infants by modulating concentrations of human milk components. |
| Lee *et al.* | 2018 | Effect of bovine milk fat globule membranes as a complementary food on the serum metabolome and immune markers of 6-11-month-old Peruvian infants. | Consumption of MFGM with complementary food may reverse the metabolic abnormalities found in marginally nourished infants, thereby improving metabolic regulation, which may lead to enhanced immunity. |
| Lemas *et al.* | 2016 | Alterations in human milk leptin and insulin are associated with early changes in the infant intestinal microbiome. | Although maternal obesity may adversely affect the early infant intestinal microbiome, human milk insulin and leptin are independently associated with beneficial microbial metabolic pathways predicted to increase intestinal barrier function and reduce intestinal inflammation. |
| Li *et al.* | 2019 | Improved neurodevelopmental outcomes associated with bovine milk fat globule membrane and lactoferrin in infant formula: a randomized, controlled trial. | Infants receiving formula with added bovine milk fat globule membrane and bovine lactoferrin had an accelerated neurodevelopmental profile at day 365 and improved language subcategories at day 545. Formulas were associated with age-appropriate growth and significantly fewer diarrhea and respiratory-associated adverse events through 545 days of age. |
| Ma *et al.* | 2017 | Exosomal microRNAs in giant panda (*Ailuropoda melanoleuca*) breast milk: potential maternal regulators for the development of newborn cubs. | Findings indicated that breast milk may facilitate the dietary intake of maternal miRNAs by infants for the regulation of postnatal development, and the potential role of exosome-loaded exogenous bamboo miRNAs in the postnatal development of giant panda cubs. |
| Melo *et al.* | 2009 | Effects of prolactin deficiency during the early postnatal period on the development of maternal behavior in female rats: mother's milk makes the difference. | Prolactin is a bioactive component of maternal milk that participates during the early postnatal development of the neuronal system of the offspring that underlie the control of maternal behavior. |
| Mirza *et al.* | 2019 | Breast milk-derived extracellular vesicles enriched in exosomes from mothers with type 1 diabetes contain aberrant levels of microRNAs. | Findings suggest a role of breast milk-derived exomiRs in modulating the infant's immune system. |
| Monks *et al.* | 2018 | Maternal obesity during lactation may protect offspring from high fat diet-induced metabolic dysfunction. | Exposure to maternal over-nutrition, through the milk, is sufficient to shape offspring health outcomes in a sex- and organ-specific manner, and milk from a mother who is obesity-prone may partially protect the offspring from the insult of a poor diet. |
| Munblit *et al.* | 2017 | Immune components in human milk are associated with early infant immunological health outcomes: A prospective three-country analysis. | Differences in the individual immune composition of human milk may have an influence on early life infant health outcomes. |
| Munch *et al.* | 2013 | Transcriptome profiling of microRNA by Next-Gen Deep Sequencing reveals known and novel miRNA species in the lipid fraction of human breast milk. | Findings suggest that known and novel miRNAs are enriched in breast milk fat globules, and expression of several novel miRNA species is regulated by maternal diet, notably following a high-fat intake. |
| Nolvi *et al.* | 2018 |  Human milk cortisol concentration predicts experimentally induced infant fear reactivity: moderation by infant sex. | Mothers may "communicate" vital information about stressful environments via cortisol contained in breast milk, shaping girls' early emotional reactivity. |
| Oben *et al.* | 2010 | Maternal obesity during pregnancy and lactation programs the development of offspring non-alcoholic fatty liver disease in mice. | Maternal obesity in the context of a postnatal hypercalorific obesogenic diet aggressively programs offspring non-alcoholic fatty liver disease (NAFLD) associated with innate immune dysfunction, resulting in a comprehensive phenotype that accurately reflects the human disease. |
| O'Rourke *et al.* | 2018 | Tryptophan metabolic profile in term and preterm breast milk: implications for health | Breast milk is the only source of the essential amino acid tryptophan (TRP) in breast-fed infants. Increased availability of total TRP, lower levels of free TRP and alterations in the temporal dynamics of TRP metabolism in preterm compared with term expressed breast milk (EBM), coupled with higher EBM inflammatory markers on day 7, may have implications for the neurological development of exclusively breast-fed preterm infants. |
| Panagos *et al.* | 2016 | Breastmilk from obese mothers has pro-inflammatory properties and decreased neuroprotective factors. | Breastmilk from obese mothers has a pro-inflammatory fatty acid profile and decreased concentrations of fatty acids and carotenoids that have been shown to have a critical role in early visual and neurodevelopment. |
| Pomar *et al.* | 2019 | Cafeteria Diet Consumption during Lactation in Rats, Rather than Obesity Per Se, alters miR-222, miR-200a, and miR-26a Levels in Milk. | Cafeteria diet intake in nursing rats, rather than obesity per se, leads to alterations in specific miRNA levels, which, through the milk supply, may alter expression of target genes and potentially affect offspring phenotype. |
| Purcell *et al.* | 2011 | Maternal stress and high-fat diet effect on maternal behavior, milk composition, and pup ingestive behavior | Suggests that gestational dietary or stress manipulations can alter the rat offspring's developmental environment, evidence of which is apparent by post-natal day (PND) 3. Alterations in maternal care, milk composition, and pup consumption during the early postnatal period may contribute to long-term changes in body weight and adiposity induced by maternal prenatal stress or high-fat diet. |
| Sullivan *et al.* | 2011 | Cortisol Concentrations in the Milk of Rhesus Monkey Mothers are Associated with Confident Temperament in Sons, but not Daughters. | Naturally occurring variation in endogenous glucocorticoid concentrations in milk are associated with infant temperament. |
| Thibeau *et al.* | 2016 | Relationships of maternal stress with milk immune components in African American mothers of healthy term infants. | There was at least one statistically significant correlation of a maternal stressor with nine of the 10 milk immune components (MICs) (effect sizes ranging from r = 0.22 to 0.38) on Days 3 and 9. Of all MICs, epidermal growth factor had the most associations with maternal stress indicators. No mediational relationship of cortisol with MICs was observed. |
| van Rossem *et al.* | 2019 | Does breast milk adiponectin affect BMI and cardio-metabolic markers in childhood? | With follow-up until 17 years of age, breast milk adiponectin has no long-term effect on BMI and cardio-metabolic health during childhood. |
| Willumsen *et al.* | 2003 | Breastmilk RNA viral load in HIV-infected South African women: effects of subclinical mastitis and infant feeding. | Breast milk HIV RNA viral load in the first 14 weeks of life varied; high levels were associated with subclinical mastitis and severe maternal immunosuppression. |
| Xi *et al.* | 2016 | The levels of human milk microRNAs and their association with maternal weight characteristics.  | Adipogenesis miRNAs were expressed in both colostrum and mature milk and were related to maternal weight and infant gender. |
| Young *et al.* | 2017 | Markers of Oxidative Stress in Human Milk do not Differ by Maternal BMI But are Related to Infant Growth Trajectories. | Human milk (HM) composition was relatively stable between normal weight (NW) and overweight/obese (OW/Ob) women. In exclusively breastfed infants, HM concentrations of lactose and 8OHdG, a marker of oxidative stress, may contribute to regulation of infant weight gain, especially among infants of OW/Ob women. |
| Yu *et al.* | 2018 | Associations of breast milk adiponectin, leptin, insulin and ghrelin with maternal characteristics and early infant growth: a longitudinal study. | Maternal BMI and gestational diabetes mellitus are important determinants of breast milk hormone concentrations. Milk-borne adiponectin is determined by maternal metabolic status and plays an independent down-regulating role in early infant growth. |
| Zamanillo *et al.* | 2019 | Breast milk supply of microRNA associated with leptin and adiponectin is affected by maternal overweight/obesity and influences infancy BMI. | A set of microRNAs (miRNAs) present in breast milk, in close conjunction with leptin and adiponectin, are natural bioactive compounds with the potential to modulate infant growth and brain development. This interplay is disturbed in the case of maternal overweight/obesity. |

Note: The list contains all 40 papers identified in the final selection of primary literature included in this scoping review. The list is organized alphabetically based on the last name of the first author.