

SPECIALIST INFANT FORMULAS



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'Breastfeeding is the most appropriate method of feeding the normal infant and may be suitable for sick infants with a variety of clinical conditions.' (1) However, there are numerous clinical conditions where specialist infant formulas play an important role.

In these circumstances breast milk has some limitations. For example, in preterm infants with a birth weight less than 1,500g (1), some rare metabolic conditions such as phenylketonuria (PKU) and in children with allergy, breast milk may need to be limited, fortified or excluded all together either through necessity or due to mother's choice.

Over the last 20 years, specialist infant formulas have evolved to meet the diverse and complex range of nutritional requirements that we are presented with in clinical practice. Getting the correct nutritional balance for our most vulnerable infants is a challenge, but the current range of specialist infant formulas can provide a helping hand.

Regularly reviewing feed requirements ensures that the infant is receiving the most appropriate formula for their nutritional needs. They may benefit from the temporary support of a specialist formula, for example, for a few months to manage acute lactose intolerance, or for a longer term where the infant will remain on the specialist formula until they are over one year of age, or until other suitable alternatives can be introduced. This article will look at the current range of specialist infant formulas that are available and their intended uses.

PRETERM INFANT FORMULAS AND BREAST MILK FORTIFIERS

Preterm and low birth weight infants are some of the most nutritionally vulnerable patients a dietitian will care for. Breast milk offers numerous benefits for these infants and maternal or donor breast milk is advocated wherever possible. The breast milk is often given as expressed breast milk (EBM) but may be referred to as MEBM (mother's expressed breast milk), or DBM (donor breast milk). The incidence of necrotising enterocolitis (NEC) and respiratory infections can be significantly reduced in preterm infants when breast milk is given. Other benefits can include improved bone mineralisation and neurological development (2). Many very premature infants require parenteral nutrition and minimal amounts of breast milk can be given as trophic feeds via the oral or enteral tube feeding route. The use of breast milk may help to reduce the duration of the parenteral nutrition as breast milk is better tolerated than preterm formula.

However, breast milk does have its limitations in preterm nutrition. Breast milk fortifier may be used to increase calorie and protein content, which is often required by low weight preterm infants to ensure nutritional needs are

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Table 1: Preterm formulas and breast milk fortifiers

Product name (manufacturer)	Usage
Preterm formulas	
Aptamil Preterm (Milupa)	Hospital only
Nutriprem 1 (Cow & Gate)	
SMA Gold Prem (SMA Nutrition)	
Nutriprem 2 (Cow & Gate)	Post discharge
SMA Gold Prem (SMA Nutrition)	
Breast milk fortifiers	
Cow & Gate Nutriprem Breast Milk Fortifier (Cow & Gate)	Hospital only
SMA Breast Milk Fortifier (SMA Nutrition)	

met and growth is adequate. Breast milk fortifiers are only available for hospital use, see Table 1. Additional vitamin and iron supplementation is required by all preterm infants who are breast fed, which are prescribed by medical staff.

Preterm formulas are used when breast milk is not available. These formulas are more calorie dense than standard infant formulas and contain increased amounts of various nutrients, e.g. protein, iron, calcium and vitamin A and D. They are designed to promote growth and development similar to that of a foetus in the womb (3). There are two types of preterm formulas 1) Preterm/low birth weight formula for hospital use only and 2) nutrient enriched post discharge formula (see Table 1). Prior to discharge, post discharge formula will be introduced and preterm infants can be prescribed this formula up to six months of corrected age. Some infants require nutritional support from specialist formulas, for example, high energy formulas, for longer than six months and this should be reviewed regularly by their dietitian and medical team.

HIGH ENERGY FORMULAS

High energy formulas are useful when feeding infants with various feeding complications, such as fluid restrictions or those who have limited oro-motor skills when feeding, which can lead to fatigue during feeds. High energy formulas offer more calories and protein than standard formulas. Standard infant formulas

provide approximately 66-68kcal per 100ml and around 1.3-1.5g protein per 100ml*. However, for some infants with increased energy needs, e.g. infants with cystic fibrosis, prematurity or those who need to achieve catch up growth, this is not always sufficient. See Table 2 for the current range of high energy formulas plus their calorie and protein content.

**based on standard first stage and follow-on formulas from SMA and Cow and Gate - April 2015.*

ALLERGY AND INTOLERANCE FORMULAS

This is the largest range of specialist formulas available today. For many years, soya based formulas, e.g. Cow and Gate Infasoy or SMA Wysoy were used as a first line treatment for infants with cows' milk protein allergy (CMPA) or lactose intolerance. However, they have been superseded by specialist formulas which are better tailored to the infant's diagnosis. Soya formulas are no longer recommended for most infants who are less than six months due to the potential risk of developing a secondary sensitivity to soya and the undesirable exposure to phytoestrogens, which may cause developmental changes in infants less than six months old (4). It is thought that between seven and 50 percent of children with CMPA may have a secondary soya allergy (5), which throws a questionable light on whether soya formula is appropriate to use in these patients beyond the age of six months. Sheep and goats milks are not advised due to their similar allergenicity as cows' milk (6).

However, in infants with galactosaemia, soya formulas are often used from birth. Although there are specialist formulas available for infants with galactosaemia, use of soya formulas is supported by ESPGHAN (European Society for Paediatric Gastroenterology, Hepatology and Nutrition Committee on Nutrition) (7). They may be used in infants with CMPA or lactose intolerance above six months who do not have sensitivity to soya but are not considered to be a first line choice.

Lactose intolerance can be a short-term condition and infants may be prescribed low lactose formula to treat symptoms and standard formula can be reintroduced after six to eight weeks. Lactose-free formulas such as SMA LF or Enfamil O-Lac are cows' milk based, but their carbohydrate source is glucose rather than lactose. Long-term

Table 2: High energy formulas

Product name (manufacturer)	Calories/100ml	Protein (g)/100ml	Features
Infatrini (Nutricia SHS)	100	2.6	Contains LCPS*. Suitable for preterm infants
Similac High Energy (Abbott Nutrition)			Contains LCPS. Suitable for preterm infants
SMA High Energy (SMA Nutrition)	91	2	Contains LCPS. Not suitable for preterm infants

*LCP – Long Chain Polyunsaturated Fatty Acids

Table 3: Allergy and intolerance formulas

Product name (manufacturer)	Composition	Indications for use
Lactose-Free Formulas		
SMA LF (SMA Nutrition)	<6.7mg lactose per 100ml	Lactose intolerance, galactosae-mia
Enfamil O-lac (Mead Johnson Nutrition)	<7.0mg lactose per 100ml	
Extensively Hydrolysed Formulas		
SMA Althera (Nestle Health Science)	Extensively hydrolysed whey protein with LCPS	From six months. Cow's milk protein allergy/intolerance
Aptamil Pepti 1 Aptamil Pepti 2 (>6 months) (Aptamil)	100% hydrolysed whey protein. Contains lactose	Cow's milk protein allergy/intolerance
Infatrini Peptisorb (Nutricia SHS)	1kcal/ml ready-made feed. Extensively hydrolysed whey protein. Contains lactose	Whole protein intolerance, short bowel syndrome, malabsorption, catch-up growth
MCT Peptide MCT Peptide 1+ (>12 months) (Nutricia SHS)	Main fat source is MCT. Protein source is hydrolysed pork collagen and soya	Whole protein intolerance and/or fat malabsorption, short bowel syndrome, pancreatic insufficiency
Nutramigen Lipil 1 Nutramigen Lipil 2 (>6 months) (Mead Johnson Nutrition)	Extensively hydrolysed casein protein	Whole protein and/or disaccharide intolerance
Peptide Peptide 1 + (>12 months) (Nutricia SHS)	Contains small amount of MCT* fat. Protein source from soya & hydrolysed pork collagen	Whole protein and/or disaccharide intolerance, short bowel syndrome, malabsorption
Pepti-Junior (Cow & Gate)	50% of fat content is MCT. Semi-elemental	
Pregestimil Lipil (Mead Johnson Nutrition)	55% of fat content is MCT. Extensively hydrolysed casein	
Amino Acid Formulas		
SMA Alfamino (Nestle Health Science)	Free amino acid. High MCT content	Whole protein/hydrolysate intolerance, short bowel syndrome, malabsorption
Neocate LCP (Nutricia SHS) Neocate Active (Nutricia SHS)	Free amino acid. Contains a small amount of MCT	
Puramino (formerly Nutramigen Lipil AA) (Mead Johnson Nutrition)	Free amino acids. No peptide chains. Contains MCT	

MCT* - Medium Chain Triglycerides

Table 4: GOR formulas and thickeners

Product name (manufacturer)	Composition	Advantages	Disadvantages
Enfamil AR (Maed Johnson Nutrition)	Pre-gelatinised rice starch	Nutritionally balanced with the same energy content as standard formula, thickens on contact with the stomach, teat size may not need to be increased	May cause colic, wind and constipation
SMA Staydown Infant Milk (SMA Nutrition)	Pre-cooked corn starch		

use of lactose-free formula is required if there is a diagnosis of congenital lactase deficiency, which is rare. This is a permanent condition and the infant will need to remain on lactose-free formula until over 12 months when adult lactose-free milk can be introduced. Lactose-free formulas are also used where primary lactose intolerance is indicated. However, this condition is rare in children below two years of age.

Extensively hydrolysed protein formulas (see Table 3) are suitable for use in some infants with CMPA. Symptoms such as vomiting, diarrhoea, reflux and eczema can be relieved by introducing these formulas which contain peptides as opposed to whole proteins. Peptides are less likely to promote an allergic response and they are more palatable than amino acid (AA) based formulas. AA based formulas (see Table 3) are used in infants with CMPA if symptoms are not resolved by introducing the extensively hydro-

lysed protein formula, or the infant’s symptoms are considered to be severe at diagnosis. However, their use and efficacy has been under closer scrutiny in recent years due to their high cost. A significant amount of any specialist infant formula budget is spent on cows’ milk allergy and lactose intolerance formulas. It is estimated that up to almost five percent of young children are allergic to cows’ milk protein (8) and as many as one in five patients will experience symptoms indicating lactose intolerance (9).

GASTRO-OESOPHAGEAL REFLUX (GOR) FORMULAS

GOR is a common condition in infants where regurgitation and vomiting can compromise growth and development. Thicker formulas (see Table 4) may help to reduce these symptoms, but are unlikely to reduce the volume of acid reflux for the infant (10).

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Questions relating to: *Specialist infant formulas*

Type your answers below and then **print for your records** or print and complete answers by hand.

Q.1	What are the nutritional benefits of breast milk for low weight preterm infants?
A	
Q.2	Give two examples of when breast milk may not be nutritionally adequate for an infant.
A	
Q.3	Explain why breast milk fortifier can be of benefit to low weight preterm infants.
A	
Q.4	What are the benefits of preterm formulas?
A	
Q.5	Explain the difference between standard infant formulas and high energy formulas.
A	
Q.6	Why are soya-based formulas no longer recommended to treat infants with cows' milk protein allergy (CMPA)?
A	
Q.7	When would soya formulas be an appropriate feed for infants?
A	
Q.8	Describe lactose-free formulas and when would their use be recommended?
A	
Q.9	Explain why extensively hydrolysed protein formulas are suitable for some infants with CMPA.
A	

Please type additional notes here . . .