

Baby Formula Basics

Every parent has to decide how to feed their baby. The one resounding option that tops the list by far is breastfeeding. Simply put, “breast is best”. For situations where breastfeeding is just not possible, and donor human milk is not available, there are many different formulas options. Which one should you choose? And when should you switch?



Information about which formula to use (often written by formula companies who want you to buy their product) can be quite confusing. When combined with misinformation about which is better and when to switch, parents are often confused and end up using a formula that is either inappropriate or unnecessary. Often, switching formulas can cause even more digestive distress than was present in the first place. Most of the time, infants grow out of gassiness as they mature, and parents are usually more bothered by periods of fussiness and digestive distress than the baby.

Nutrition Basics of Infant Formulas

As stated above, no infant formula is nutritionally comparable to breast milk. It simply isn't possible to re-create human milk with all of its living, bioactive components. Feeding human infants anything but human milk increases the risk of many illnesses and conditions, because the infant has to adapt to digesting and metabolizing nutrition not designed by nature for them to live and grown on (i.e. the milk of another species). All formulas marketed and sold in the U.S. meet a minimum nutritional requirement set forth by the FDA, so no one brand that is endorsed by the AAP (American Academy of Pediatrics). For normal full term infants, there are 3 basic types of formulas:

- Cow's milk-based formula
- Hydrolyzed or Elemental cow's milk-based formula
- Soy-based formula

All formulas, no matter which group, are made up of 4 main nutrition components:

- Carbohydrate
- Protein
- Fat
- Electrolytes/minerals

What differentiates each formula is what KIND of each of the above and in what ratio.

Carbohydrate

This is the main energy source for humans. We've all heard of different kinds of carbohydrates, for example sucrose, fructose, glucose and dextrose. The main carbohydrate in all mammals' milk is lactose. It is important for many reasons. It helps to absorb calcium and iron effectively. It's important in brain development in infants. It's also important in helping to maintain a good environment for “good bacteria” to grow in the intestinal tract. Soy-based formulas are made with sucrose and corn syrup as their carbohydrate, and contain no lactose. Hydrolyzed and elemental formulas can vary, but most are made with corn syrup and none contain lactose.

Protein

All milk contains protein. Casein and whey are found in breast milk as well as in regular cow's milk formula. Hydrolyzed and elemental formula may have either casein and/or whey proteins that are already partially or wholly broken down into amino acids or small chains of amino acids (the building blocks of proteins). In other words, the protein is already partially digested, and the baby's immune system is much less likely to react to pieces of proteins compared to an intact protein as found in regular formulas. Hydrolyzed and elemental

formulas are used for infants with diagnosed allergy to cow's milk. Soy milk has soy protein, which is an entirely different protein from the plant kingdom.

Fat

All formulas have a variety of types of fat. These are mostly made up of oils such as coconut oil, soy oil, MCT oil (medium-chain triglycerides), and others. DHA and ARA are essential fatty acids that are found naturally in breast milk in direct relation to the mother's diet (fish is a primary source). These are especially important in infant brain development and eye acuity. In formulas, DHA and ARA are derived from sea algae.

Electrolytes/Minerals/Vitamins

All formulas have varying amounts of sodium, potassium, calcium, phosphorus, iron, and vitamins, but all meet the minimum requirements set by the FDA.

Cow's Milk Based Formula

Almost all babies tolerate regular cow's milk based formula (containing complete, intact protein). If your baby is younger than about 2 months old, you may consider using a hydrolyzed formula (see below); there is evidence that suggests younger babies (with less mature digestive and immune systems) have lower risk of certain illnesses when fed hydrolyzed formula. While various brands have differing ratios of the above nutrients, the differences are not significant and all provide adequate nutrition for infants. This is the reason why the AAP does not endorse a specific brand. This is also the reason why switching from one brand of cow's milk formula to another brand of cow's milk formula for "tolerance" issues really doesn't make much sense. They might be different cows but are essentially the same recipe. All babies are gassy and fussy with some digestive issues no matter what they are fed. Even breastfed babies are gassy sometimes! It has more to do with the immaturity of the baby's digestive tract and their normal flora development than anything else.

Soy Based Formula

There are a few rare medical reasons to use soy formula. Unless you are trying to raise your child as a vegan, there is really no reason to ever use anything but a cow's milk formula. There may be risks involved with using soy formulas compared to cow's milk formula as well. First, soy-based formula lacks lactose. As described above, this is what is found in breast milk and it has many helpful properties for developing babies. There are also components in soy formula that are not found in cow's milk formula such as phytoestrogens and increased aluminum that may lead to decreased immune system function, improper thyroid function, and decreased bone mineralization. Soy formulas are never used for premature babies because of documented inadequate bone mineralization. Finally, soy has less fat and a different kind of fat than cow's milk. Fat (and the type of fat) is important for brain development in children up to 3 years old. The complete list of reasons cited by the AAP for use of soy formula is:

- Congenital Lactose intolerance (very rare)
- Galactosemia (very rare)
- Vegan Diet Preference

Congenital Lactose Intolerance

"Lactose intolerance" is a common phrase that we hear; many of us either suffer from it or know someone that does. However, lactose intolerance in the sense that most of us know it is very, very rare in infants. This "congenital" form (i.e. born with) will show symptoms of diffuse diarrhea in the first few days of life. "Acquired" lactose intolerance, or what we normally think of when we think of lactose intolerance, almost never develops before 4-7 years of age (and often not until adolescence). Thus, it is highly unlikely that your infant has lactose intolerance and would need to change to a soy-based formula. Breast milk has very high levels of lactose; it is essential in infant brain development and digestive health (as mentioned earlier).

Galactosemia

This is also a very rare disorder (1 in 60,000 births) where infants cannot digest galactose, another sugar in cow's milk formula. This disease is part of the newborn screen that is done on infants before they leave the hospital and is definitely a reason to switch to a soy-based formula. However, again, this is quite rare and not often encountered.

Secondary Lactose Intolerance

“Secondary” means a temporary condition caused by something else. Secondary lactose intolerance is a much more common condition, but unfortunately many people believe it is permanent. It usually manifests after a period of GI illness/diarrhea and can last for 1 – 2 weeks. It resolves on its own as the baby's GI tract recovers, without any changes needed to the formula or breast milk. Symptoms include watery/greenish and/or foul-smelling explosive stools, increased digestive distress, bloating, gassiness and fussiness.

Cow's Milk-Protein Allergy

Unfortunately, some infants are misdiagnosed with a milk-protein allergy based simply on spitting up, colic, or increased gassiness. Cow's milk protein allergy can only be diagnosed by a board-certified allergist who administers and interprets allergy testing in a clinical setting. Symptoms of cow's milk allergy can include skin reactions (rash, hives, eczema), breathing problems (wheezing, cough, sneezing, persistent runny nose), abdominal symptoms (vomiting, profuse watery diarrhea, bloody stools, failure to gain weight), and behavior issues (persistent irritability, refusal to eat, poor sleeping). In other words, the symptoms are oftentimes quite serious. In particular, these infants usually do not gain weight well. Some of these symptoms are similar to those seen with **secondary lactose intolerance**, causing widespread confusion about the two very different conditions and sometimes resulting in misdiagnosis. It is important to note that it is possible for an infant with untreated cow's milk allergy to also suffer from secondary lactose intolerance because of the damage caused by the allergy to their GI tract (where the lactase enzyme is produced). Also, 30 - 50% of infants with a true milk-protein allergy are also allergic to soy protein. Thus, changing to a soy-based formula for an infant who has a milk-protein allergy is usually not the best choice. These children often require hydrolyzed or elemental based formulas until they outgrow their milk allergy (which most do by age 3-4).

If your baby has persistent symptoms as listed above and/or has been diagnosed with a cow's milk allergy, the following formulas are usually tried first (in this order):

- Gerber Good Start Gentle (hydrolyzed whey proteins, contains lactose)
- Nutramigen or Alimentum (partially hydrolyzed whey and casein protein, does not contain lactose)
- EleCare (amino acid protein, no lactose)

Summary

Unless your child has a milk-protein allergy (which should include symptoms more severe than simple gassiness, fussiness, or spitting up), then changing formulas from one brand to another, or from cow's milk to soy milk, is not recommended. In addition to added cost and inconvenience, these changes require time for infants' digestive systems readjust, and sometimes make the initial symptoms worse. If you feel that there may be a reason to change your formula, then you should do so in consultation with your pediatrician or pediatric dietitian.

Sources:

<http://www.healthychildren.org/English/ages-stages/baby/feeding-nutrition/Pages/Choosing-a-Formula.aspx>

<http://pediatrics.aappublications.org/content/121/5/1062.full?sid=b4b5c3fa-676a-435e-a69b-f0256f65637d>