

How Does a Bottle of Milk Transform into a Baby's Body?



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Milk can provide all the nutritional needs for the first months of a human baby's life.

Humans are part of the group of animals called **mammals**, which includes animals that have fur or hair, complex brain structures, and three bones in their ears, and also produce milk to feed their young offspring.

Human Milk

Nutrition Facts	
Serving Size 1 cup (246 g)	
Amount Per Serving	
Calories 171	
	% Daily Value*
Total Fat 11g	16%
Saturated Fat 4.9 g	24%
Cholesterol 34 mg	11%
Sodium 42 mg	1%
Potassium 125 mg	3%
Total Carbohydrate 17 g	1%
Dietary Fiber 0g	0%
Sugars 17 g	
Protein 12.5g	5%
Vitamin C	20%
Iron	0%
Vitamin B-6	0%
Magnesium	1%
Calcium	7%

Cow Milk

Nutrition Facts	
Serving Size 1 cup (244 g)	
Amount Per Serving	
Calories 148	
	% Daily Value*
Total Fat 8 g	12%
Saturated Fat 4.6 g	22%
Cholesterol 24 mg	8%
Sodium 105 mg	4%
Potassium 322 mg	9%
Total Carbohydrate 12 g	4%
Dietary Fiber 0 g	0%
Sugars 12 g	
Protein 8 g	16%
Vitamin C	0%
Iron	0%
Vitamin B-6	5%
Magnesium	6%
Calcium	27%

Goat Milk

Nutrition Facts	
Serving Size 1 cup (244 g)	
Amount Per Serving	
Calories 168	
	% Daily Value*
Total Fat 10 g	15%
Saturated Fat 7 g	35%
Cholesterol 27 mg	9%
Sodium 122 mg	5%
Potassium 498 mg	14%
Total Carbohydrate 11 g	3%
Dietary Fiber 0 g	0%
Sugars 11 g	
Protein 9 g	18%
Vitamin C	5%
Iron	0%
Vitamin B-6	5%
Magnesium	8%
Calcium	32%

The composition of milk produced by mammal parents varies from species to species. On the left are nutrition facts for human breast milk; center, cow milk; and right, goat milk.

Worldwide, milk typically makes up all of a human baby's first meals. This milk most often is produced by a parent. As an alternative or in addition to human milk, many babies drink infant formula, a milk substitute made from cow milk or soybeans that is designed to provide nutrition similar to human milk.

A baby's body grows and develops rapidly in the first months of life, especially the brain. Fats make up a large part of the developing brain. A baby's developing brain cells also demand a lot of fuel. The brain almost entirely relies on a simple carbohydrate called **glucose** as a source of fuel. Luckily, human milk is high in fats and carbohydrates to support this rapid growth and development.

Milk may be listed as a single ingredient on a recipe, but milk is actually a mixture of many things: different types of protein, carbohydrates, and fats, as well as other **micronutrients** like iodine and vitamin E. There are over 200 components in human milk, providing nearly all a human baby needs from food to grow and develop for the first months of life.

Over 200 components may sound like a lot. However, there are even more types of proteins, carbohydrates, and fats found in a growing baby's body! A human body is estimated to contain over 80,000 different types of proteins alone.

How do 200 components in milk become the thousands of types of molecules in a growing human being? A baby's body must first break down the components in milk into smaller molecules. Then, the body needs to absorb these smaller molecules into the bloodstream. Finally, many of these smaller molecules need to be reassembled into the many different body proteins, carbohydrates, and fats needed for growth.

Examples	Proteins	Carbohydrates	Fats
Inside a bottle of human milk	β-Casein Serum albumin	Lactose Oligosaccharides (not digestible by humans)	Cholesterol Triglycerides
Inside the body of a human baby	Hemoglobin (transport protein) Amylase, pepsin (digestive proteins) Actin, myosin (structural proteins)	Glucose (in bloodstream) Glycogen (in liver and muscles)	Cholesterol (in cell membranes) Omega-3 fatty acids (in eye and brain cells)

After 4–6 months, a baby's needs from food grow beyond what milk alone can provide. One reason is that human milk is very low in iron, and eventually babies need additional sources of food to get enough of this important **micronutrient**. Eventually, a baby needs to expand the menu beyond milk in order to get everything needed to maintain and develop a growing body.