

Physiologic Development

- Length of gestation, the mother's prepregnancy weight, and the mother's weight gain during gestation determine an infant's birth weight
- After birth, the infant's growth is influenced by genetics and nourishment

Low-Birth-Weight Infant-cont'd

- Infancy: birth to 1 year of age
- Term infant: born 37 to 42 weeks' gestation
- Premature: an infant born before 37 weeks' gestation

Low-Birth-Weight Infant

- Low birth weight: an infant who weighs less than 2500 g (5½ lb) at birth
- Very low birth weight: an infant who weighs less than 1500 g (3⅓ lb) at birth
- Extremely low birth weight: an infant who weighs less than 1000 g (2½ lb) at birth

Low-Birth-Weight Infant-cont'd

- Gestational age: the age of the infant at birth, determined by length of pregnancy
- Small for gestational age (SGA): weight <10th percentile of standard weight for gestational age
 - Intrauterine growth restriction (IUGR)
- Appropriate for gestational age (AGA): weight 10th to 90th percentile
- Large for gestational age (LGA): weight > 90th percentile

Prematurity



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Energy Requirements

- Infants adjust intake to meet energy needs
- Sensitivity to hunger and satiety cues
- Monitor gains in weight and length over time
- Formula-fed infants consume more kcals than breast-fed infants

Protein Requirements

- Higher per kg weight than for adults because of rapid growth
- Recommendations based on composition of human milk
- Require large percentage of essential amino acids than adults
- Human milk or infant formula; supplemental protein sources after age 6 months

Lipid Requirements

- Minimum of 30 g fat per day
- Essential fatty acid content of human milk vs infant formula: linoleic and linolenic acids, as well as longer chain arachidonic and docosahexaenoic acids
- Linoleic acid should provide 3% of total kcals
- Long-chain polyunsaturated fatty acids; visual acuity and neural development

Carbohydrate Requirements

- 30% to 60% of energy intake
- Lactose tolerance
- Avoid honey and corn syrup; source of botulism spores

Water Requirements

- 0.7 L/day up to age 6 months; 0.8 L/day for age 7 to 12 months
- Renal concentrating capacity may be less than for adults
- May require additional water in hot, humid environments
- Hypernatremic dehydration; neural consequences

Mineral Requirements

- Calcium: more is retained from breast milk than from infant formula
- Iron: supplement with iron-fortified cereal or fortified infant formula by 4 to 6 months; deficiency has cognitive effects
- Zinc
- Fluoride

Vitamin Requirements

- Vitamin D: Supplements recommended for breast-fed infants, especially those with dark skin
- ✓ Vitamin B₁₂: Depends on maternal diet and status
- Vitamin K: Hemorrhagic disease of the newborn; preventive injection at birth or supplements
 - Supplementation issues

Human Milk

- Food of choice for infants
- Provides appropriate energy and nutrients
- Specific and nonspecific immune factors
- Prevents diarrhea and otitis media
- Allergic reactions are rare
- Attachment and bonding
- Maternal health benefits

Support for Breast-Feeding

- Benefits for cognitive development, prevention of asthma and overweight
- ADA and AAP support exclusive breast-feeding for 6 months and breast-feeding plus weaning foods for the next 6 months
- Contraindications to breast-feeding: certain maternal infections (e.g., HIV), maternal use of psychotropic or some other drugs

Human vs Cow's Milk

- Amount and type of protein affects digestibility
- Lactose content
- Essential fatty acids, cholesterol, lipase
- Vitamins and minerals
- Renal solute load (protein, sodium, potassium)

Antiinfective Factors in Human Milk and Colostrum

- __ Antibodies and antiinfective factors
- Secretory immunoglobulin A (sIgA)
- Lactoferrin
- Lysozymes
- Enhances growth of *Lactobacillus bifidus*

Formulas

- Based on cow's milk or soy products
- Regulated by FDA through the Infant Formula Act, 1985
- Decrease in anemia with use of ironfortified formulas
- Questions associated with soy-based formulas
- Special needs formulas



- Fresh cow's milk and imitation milks not recommended before age 1 year
- Formula preparation: cleanliness, refrigeration, warming, discarding used formula

Infant Foods

- Dry cereal fortified with electrolytically reduced iron
- Jars for fruits and vegetables provide carbohydrates and vitamins A and C
- Issues with mixed foods and desserts
- Home-prepared infant food: avoid added salt and sugar

Feeding

- Early feeding patterns
- Development of feeding skills
- Addition of semisolid foods
- Weaning from breast or bottle to cup
- Early childhood caries
- Feeding older infants: type of food, serving size, forced feeding, environment

Focal Points

- Basic concepts of infant growth, development and nourishment are related.
- Nutrient needs of infants reflect rates of growth, energy expended in activity, basal metabolic needs, and the interaction of nutrients consumed.
- Infants grow rapidly in the first year of life; thus the types of infant feedings (human milk or formula), the composition of feedings, and the addition of solids to infants' diets are important considerations.
- Human milk is the food of choice for infants; commercially prepared infant formulas, manufactured to approximate human milk, also promote typical growth and development.
- The use of solid foods (with thought given to the types of foods and portion sizes served) to support nourishment and developmental progress sets the stage for lifelong food habits.