CAMBRIDGE

Cambridge University Press
978-0-521-88709-0 - Maternal-Fetal Nutrition During Pregnancy and Lactation
Edited by Michael E. Symonds and Margaret M. Ramsay
Index
More information

Index

AA (arachidonic acid), 19, 20, 76–7, 110

AAP (American Academy of Pediatrics), 68, 77, 133

Abrams, B., 151

absorption
  iron, 131
  mineral, during pregnancy, 29

acrodermatitis enteropathica, 26, 28

active transport, of minerals, 30

activity, maternal, and birth size, 47–8

acupuncture, 140

acute lymphoblastic leukemia (ALL), 157

adaptation to pregnancy
  changes in maternal physiology, 1–2
  early pregnancy, and placental and fetal growth, 3
  endocrinology, 2
  maternal nutrient availability, 3–4
  maternal nutrition and fetal growth, 4
  metabolic changes, 2–3
  mineral requirements
    absorption, 29
    excretion, 29
    overview, 29
    placental transfer, 30
    recommended daily intake, 30
    utilization and redistribution of body stores, 29–30
  overview, 1

adipokines, 5–6

adiponectin, 5–6

adiposity, fetal, 18. *See also* fat

adjustable fortification of human milk, 86–7

adolescent pregnancies. *See* teenage pregnancies

agouti viable yellow (A^{vy}) mouse, 184–5, 191, 192

Agtr1b (angiotensin II receptor, type 1b gene), 188

ALA (alpha-linolenic acid), 66, 134

α-linolenic acid (LNA), 76–7

ALL (acute lymphoblastic leukemia), 157

allergies
  and breast-feeding, 66, 68
  introduction of complementary foods, 103
  peanuts and other nuts, 133–4

alpha-linolenic acid (ALA), 66, 134

alternative therapies, for HG, 140

American Academy of Pediatrics (AAP), 68, 77, 133

American Dietetic Association, 100

American Society of Parenteral and Enteral Nutrition (ASPEN), 141

amino acids
  abnormal delivery of to fetus with IUGR, 17
  arginine, and pre-eclampsia, 55
  fetal metabolism, 16–17
  formulas based on, 97
  neonate nutritional requirements, 76
  placental and fetal metabolism, 12, 17–18
  placental transport capacity, 7
  placental transport from mother to fetus, 16
  preterm infant requirements, 83–4
  protein requirements during pregnancy, 15–16
  transport across placenta, 7

anabolic hormones, 12. *See also* insulin

Anderson, A.S., 125

anemia. *See* iron

anencephaly, 28

Angelman syndrome (AS), 186

angiotensin II receptor, type 1b gene (*Agtr1b*), 188

animal studies
  agouti viable yellow mouse, 184–5, 191, 192
  $Axin1^{Fu}$ mouse, 185, 191–2
  cow and sheep IVF, 187
  diet-associated hypomethylation in sheep, 183–4
  embryo culture, 186–7
  maternal nutrient availability, 3
  transgenerational epigenetic modification, 191–2

antenatal estimates of fetal growth, 34–5

antibodies, in breast milk, 66

antiemetics, 139

antihistamines, 139

antioxidants, 54–5. *See also specific antioxidants by name*

antral follicle development, 168

appropriateness of fetal growth
  birthweight versus estimated fetal weights and statistically modelled trajectories, 37–8
  importance of accurate data for gestational duration, 34–5
  nonpathological determinants, 36–7
  overview, 34
  selecting standard of growth, 35–6
  ways to measure, 38–9

arachidonic acid (AA), 19, 20, 76–7, 110

arginine
  and preeclampsia, 55
  for preterm infants, 83–4

ART (assisted reproduction), 174. *See also* egg and embryo quality

arterial blood pressure, during pregnancy, 1

AS (Angelman syndrome), 186

ascorbic acid. *See* vitamin C

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-88709-0 - Maternal-Fetal Nutrition During Pregnancy and Lactation
Edited by Michael E. Symonds and Margaret M. Ramsay
Index
More information

ASPEN (American Society of Parenteral and Enteral Nutrition), 141

assisted reproduction (ART), 174. *See also* egg and embryo quality

asthma, and breast-feeding, 111

atopic diseases
  and breast-feeding, 66, 68
  introduction of complementary foods, 103
  peanuts and other nuts, 133–4

Australian Breastfeeding Association, 76, 78

aversions, 133

A^{vy} (agouti viable yellow) mouse, 184–5, 191, 192

AXIN1 methylation, variation in human, 185

Axin1^{Fu} mouse, 185, 191–2

Beckwith-Wiedemann syndrome (BWS), 174, 186

best growth, of neonates, 73. *See also* individualized fetal growth curves

birth defects. *See also specific defects by name*
  and mineral deficiencies, 28
  and vitamin A, 158

birth weight. *See also* fetal growth; low birth weight; maternal diet
  and hyperemesis gravidarum, 141
  maternal nutrition and, 29
  metabolic programming, 73
  multiple pregnancy, 151–2
  teenage pregnancies, 122
  vegetarian/vegan pregnancies, 130

birth weight ratio, 39

bisphenol A (BPA), 185

blood pressure
  impact of breast-feeding on adult, 111
  lactation and, 114
  during pregnancy, 1

blood volume, increase in during pregnancy, 1

body fat. *See also* fat
  fetal, 18
  preterm infant, 83

body mass index (BMI)
  teenage pregnancies, 122
  weight gain guidelines specific to, 151

body stores
  mineral, in infants, 28–9
  redistribution of during pregnancy, 29–30

body weight, parental, 36. *See also* birth weight; weight

Botto, L. D., 156

Boyd Orr Cohort, 111

BPA (bisphenol A), 185

brain, impact of mineral deficiencies on, 29

brain tumors, 157

breast cancer, and breast-feeding
  in child, 111
  in mother, 112–13

breast milk. *See* human milk

breast-feeding
  benefits for child
    asthma, 111
    breast cancer, 111
    cardiovascular disease, 111
    cognition, 110–11
    immune function, 108–9
    overweight and obesity, 109–10
    type I diabetes, 111–12
    type II diabetes, 112
  benefits for mother
    breast cancer, 112–13
    cardiovascular disease, 114–15
    diabetes, 114
    postpartum weight loss, 113–14
  versus formula-feeding, 66–7, 92, 99–100
  milk production and composition, 63–5
  and mineral deficiencies, 28
  nutritional requirements
    beyond 6 months of age, 78–9
    carbohydrate, 77
    fat and fatty acids, 76–7
    fluids, 77
    micronutrients, 77–8
    overview, 72
    protein, 76
    6 months debate regarding energy requirements, 75–6
    targets for, 73–5
  overview, 106–8
  preterm infants
    early nutrition and later health, 88–9
    important considerations, 65
    nutritional requirements, 86
    postdischarge, 88

Bunin, G. R., 157

B-vitamins in periconceptional diet, 174–5. *See also specific B-vitamins by name*

BWS (Beckwith-Wiedemann syndrome), 174, 186

calcium
  in breast milk, 28
  importance during pregnancy, 24
  mineral deficiencies, 26
  neonate nutritional requirements, 78
  placental transfer, 30
  and preeclampsia, 40, 55–6
  preterm infant requirements, 84–5
  supplementation during multiple pregnancy, 150
  transport across placenta, 7
  utilization and stores of during pregnancy, 30
  vegetarian and vegan pregnant women, 132

calcium signalling, 171–2

calcium soaps, 84

California Birth Defects Monitoring Program, 159

Callins, K. R., 123

cancers
  breast, and breast-feeding
    in child, 111
    in mother, 112–13
  folate and, 160
  pediatric, 156–7

carbohydrates
  in cow's milk–based formulas, 95
  multiple pregnancy, 148–9
  neonate nutritional requirements, 77
  vegetarian/vegan pregnancies, 131

CARDIA (Coronary Artery Risk and Development in Young Adults Study), 114

cardiac output, during pregnancy, 1

cardiovascular disease, and breast-feeding
  in child, 111
  in mother, 114–15

cardiovascular system, changes in maternal, 1

carnitine palmitoyl transferase 1 (CPT1), 20

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-88709-0 - Maternal-Fetal Nutrition During Pregnancy and Lactation
Edited by Michael E. Symonds and Margaret M. Ramsay
Index
More information

Carter, J. P., 58
case-control studies, 106
casein, 64, 93
catch-up growth, 73
cell differentiation, 181–2
Centers for Disease Control and Prevention (CDC)
  BMI percentiles, 122
  breast-feeding, 106
  growth references, 99–100
CESDI (Confidential Enquiry into Stillbirths and Deaths in Infancy), 53
CHDs (congenital heart defects), 156
cheeses, 134
Chinese herbal medicine, 56
chloride-deficient formulas, 97
cholesterol
  infant requirements, 65
  low-density lipoprotein, 19
clefts, 155–6
cobalamin. *See* vitamin B_{12}
Cochrane reviews
  antioxidants and preeclampsia, 40, 54
  calcium and preeclampsia, 55–6
cognition, and breast-feeding, 110–11
cohort studies, 106
colostrum, 63
Committee on Toxicity, UK, 134
compaction, 173
complementary feeding, 100–3. *See also* weaning
conception, maternal undernutrition before, 45–7
Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI), 53
conflict theory of imprinting evolution, 189
congenital heart defects (CHDs), 156
congenital malformations, and vitamin A, 158
Consumer Attitudes Survey 2007, UK Food Standards Agency, 125–6
continuum theory, preeclampsia, 53
cooking skills program, 125
copper
  excretion during pregnancy, 29
  importance during pregnancy, 24
  mineral deficiencies, 28
  placental transfer, 30
  teenage pregnancies, 123
Coronary Artery Risk and Development in Young Adults Study (CARDIA), 114
corticosteroids, for HG, 139–40
cow in vitro fertilization, 187
cow's milk
  fatty acids in, 102
  as formula replacement, 97
  formulas based on, 93–95
  versus human milk, 106
  teenage pregnancies, consumption during, 124
CpGs (cytosine guanine dinucleotides), 181
CPT1 (carnitine palmitoyl transferase 1), 20
cravings, 133
Cropley, J. E., 192
Crowther, C. A., 57
cultural beliefs and practices, and undernutrition, 47
culture, embryo
  epigenetic aberrations after animal, 186–7
  preimplantation development, 173–4
cycloheximide-activated embryos, 171
cytokines, 172
cytosine guanine dinucleotides (CpGs), 181
Czeizel, A. E., 155, 156

daily intake, of minerals, 25–6, 30
dairy products, 134
Daly, S., 160
DBM (donor breast milk), 87
deficiencies, nutritional
  effects of, 27–9
  extent of, 25–7
  overview, 25
  and preeclampsia
    antioxidants, 54–5
    arginine, 55
    calcium, 55–6
    Chinese herbal medicine, 56
    fish oil, 56
    folic acid, 56
    garlic, 56
    iron, 57
    Japanese herbal medicine, 57
    magnesium, 57
    multiple micronutrient supplementations, 57
    overview, 53–4
    salt intake, 57
    zinc, 58
Department of Health Services, 106
developing world
  breast-feeding and immune function in, 109
  maternal diets in
    macronutrients, 47–8
    maternal undernutrition before conception, 45–7
    micronutrients, 48–50
    overview, 44
    prevalence of LBW in, 45
    reappraisal of maternal interventions, 50
  teenage pregnancies in, 120
  use of formula in, 100
developmental legacy of calcium signalling, 171–2
DHA (docosahexaenoic acid)
  cognition and, 110
  fetal accumulation of, 20
  infant requirements, 66, 76–7
  maternal needs during lactation, 68
  transfer by placenta, 19
  vegetarian and vegan pregnant women, 134–5
diabetes mellitus
  environmental effects during embryogenesis, 187–8
  maternal, and breast-feeding, 114
  type I, 111–12
  type II, 15, 112, 114
diarrhea, and breast-feeding, 108–9
diet, maternal. *See* maternal diet
diet-associated hypomethylation in sheep, 183–4
diet-induced hypermethylation in agouti^{vy} mouse, 184–5
Dietary Guidelines for Americans 2005, 130
dietary manipulations, and epigenetics, 180

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-88709-0 - Maternal-Fetal Nutrition During Pregnancy and Lactation
Edited by Michael E. Symonds and Margaret M. Ramsay
Index
More information

differentiation, cell, 181–2
diseases. *See also specific diseases by name*
  and mineral deficiencies, 27
  and neonate nutritional requirements, 73
DNA methylation. *See also* epigenetics
  B-vitamins in periconceptional diet, 174–5
  epigenetic variation in human *AXIN1*, 185
  and histone modification, 182
  hypermethylation in agouti^{vy} mouse, 184–5
  hypomethylation in sheep, 183–4
  maternal nutrition and, 4
  overview, 181–2
  transcriptional activity and, 167–8, 173
docosahexaenoic acid. *See* DHA
donor breast milk (DBM), 87
Doyle, W., 125
D-penicillamine, 27
drugs. *See also specific drugs by name*
  for hyperemesis gravidarum, 139–40
  and mineral deficiencies, 26–7
  and vitamin deficiency, 157
Dudley, N., 38
Dupont, C., 76
duration of gestation (GA)
  growth charts, 37–8
  importance of accurate data for, 34–5
  nonpathological determinants of fetal growth, 36
  overview, 34
duration of lactation
  and breast cancer risk, 112–13
  and diabetes, 114
  and postnatal weight loss, 113–14
Dutch famine, 3, 39

early nutrition, preterm infant, 88–9
early pregnancy
  as determinant of placental and fetal growth, 3–4
  nutrition during and birth weight, 48
  weight gain during, for multiple pregnancy, 151–2
economic consequences, of HG, 139
education, maternal, 47
EFAs. *See* essential fatty acids; long-chain polyunsaturated fatty acids
EFNEP (Expanded Food and Nutrition Education Program), 124–5
egg and embryo quality
  fertilization, 171–2
  ovarian folliculogenesis and oocyte maturation, 167–71
  overview, 167
  preimplantation development, 172–5
11-βHSD enzyme, 4
Elster, A. D., 152
embryo, epigenetics of early. *See also* egg and embryo quality
  aberrations after animal culture, 186–7
  changes restricted to subset of genes, 185
  cow and sheep IVF, 187
  diet-associated hypomethylation in sheep, 183–4
  diet-induced hypermethylation in agouti^{vy} mouse, 184–5
  environmental effect on human IVF, 186
  neural tube defects, 185
  variation in human *AXIN1* methylation, 185
  zygote, 183
embryogenesis, environmental effects during, 187–9
Emmett, P. M., 77
endocrinology, of pregnancy, 2
endometrial glands, 3
endothelial dysfunction, 53
energy cost of lactation, 67
energy density, of milk, 64
energy requirements
  infant, 65–6
  during lactation, 67–8
  macronutrient needs in developing countries, 47
  for preterm infants, 83, 84
  6 months debate regarding, 75–6
  vegetarian and vegan pregnant women, 130–1
enteral nutrition
  for preterm infants, 86–7
  as therapy for hyperemesis gravidarum, 141–2
environmental effects, and epigenetics
  animal aberrations, 186–7
  during embryogenesis, 187–9
  on human IVF, 186
  overview, 180
enzymes, antioxidant, 54
epigenetics. *See also* egg and embryo quality
  of early embryo
    aberrations after animal culture, 186–7
    changes restricted to subset of genes, 185
    cow and sheep IVF, 187
    diet-associated hypomethylation in sheep, 183–4
    diet-induced hypermethylation in agouti^{vy} mouse, 184–5
    environmental effect on human IVF, 186
    neural tube defects, 185
    variation in human *AXIN1* methylation, 185
    zygote, 183
  embryogenesis, environmental effects during, 187–9
  during germ cell development, 189–90
  growth of placenta and transport capacity, 12
  maternal nutrition and fetal growth, 4
  modifications
    cycles of, 182–3
    DNA methylation, 181–2
    histone, 182
  overview, 180–1
  transgenerational modification, 190–2
ESPGHAN Committee on Nutrition, 79
essential fatty acids (EFAs). *See also* long-chain polyunsaturated fatty acids
  fetal accumulation of, 20
  maternal diet and supply of, 19–20
  metabolism and transfer by placenta, 19
  multiple pregnancy, 150–1
estrogen, 2
ethnicity, and fetal growth, 36–7
exaggerated inflammatory response, 53
exclusive breast-feeding, 107. *See also* breast-feeding
excretion, mineral, during pregnancy, 29

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-88709-0 - Maternal-Fetal Nutrition During Pregnancy and Lactation
Edited by Michael E. Symonds and Margaret M. Ramsay
Index
More information

exercise, and preeclampsia, 58

Expanded Food and Nutrition Education Program (EFNEP), 124–5

FABPs (fatty acid binding proteins), 19

famine, Dutch, 3, 39

FAO (fatty acid oxidation), in fetus, 20

farming activities, and birth size, 47–8

fat
  in cow's milk-based formulas, 95
  fetal body, 18
  infant requirements, 65–6, 76–7
  in milk, 64–5
  preterm infant body, 83
  preterm infant requirements, 84

fatty acid binding proteins (FABPs), 19

fatty acid oxidation (FAO), in fetus, 20

fatty acids. *See also* essential fatty acids
  complementary feeding, 101–3
  in cow's milk-based formulas, 95
  early pregnancy, 3
  infant requirements, 66, 76–7
  during lactation, 68
  in milk, 65
  multiple pregnancy requirements, 150–1
  placental and fetal metabolism, 12
  placental lipid metabolism and fetal lipid supply, 18
  placental uptake, synthesis, and metabolism of, 18–19
  preterm infant requirements, 84
  from soya, 134
  transport across placenta, 7
  vegetarian and vegan pregnant women, 134–5

FDA (Food and Drug Administration), 97

ferritin levels, serum, 149–50

fertilization, 171–2

fetal growth. *See also* placenta
  macronutrients
    amino acids, 15–18
    glucose, 12–15
    lipids, 18–20
    overview, 12
  measuring appropriateness of
    birth weight versus estimated fetal weights and statistically modelled trajectories, 37–8
    importance of accurate data for gestational duration, 34–5
    nonpathological determinants of, 36–7
    overview, 34
    selecting standard of, 35–6
    ways to measure, 38–9
  mechanisms linking maternal nutrition and, 4
  metabolic programming, 73
  nutrient supplementation and, 40–1
  overview, 41
  role of maternal nutrition in, 39–40

fetal programming, 29

fetometry, ultrasound, 34

fetus. *See also* fetal growth; mineral requirements; placenta
  accumulation of essential fatty acids, 20
  amino acid metabolism, 16–17
  fatty acid oxidation in, 20
  glucose production by, 14
  glucose utilization by, 13–14
  insulin secretion, 14
  lipid metabolism, 20
  lipid supply, 18
  outcome of mineral deficiencies, 28
  vascular development in, 4

FFAs (free fatty acids), 18

fiber intake, vegetarian/vegan, 131

fish oil
  and preeclampsia, 56
  vegetarian and vegan pregnant women, 134–5

flora, intestinal, and breast milk, 66

fluids
  during lactation, 67
  neonate nutritional requirements, 77

folate
  childhood insulin resistance and, 188
  methyl deficiency, 183–4
  neural tube defects and, 28, 155
  and preeclampsia, 56
  supplementation during pregnancy, 40, 50, 159–60
  teenage pregnancies, 123
  vegetarian and vegan pregnant women, 131–2

folate antagonists, 160

folliculogenesis, ovarian, 167–71

follow-up formulas, 97

Fomon, S. J., 92

Food and Drug Administration (FDA), 97

food safety advice, 134

Food Standards Agency, 125–6, 133, 134

food vouchers, WIC, 124

food-based maternal interventions, 50

formula feeding
  versus breast-feeding, 66–7, 109
  complementary feeding, 100–3
  composition of formulas, 93–7
  fatty acids in infants receiving, 84
  growth of infants, 99–100
  history of formulas, 92–3
  overview, 92
  postdischarge formulas, 88, 89
  preterm infant formulas, 87, 88, 89
  regulation of formulas, 97–9
  term formulas for preterm infants, 87, 88

fortified human milk, 86–7

free fatty acids (FFAs), 18

free radical scavengers, 54

free radicals, 57

GA. *See* duration of gestation

gametogenesis, 189

garlic, and preeclampsia, 56

Garza, C., 73

gastrointestinal infections, and breast-feeding, 108

gastrostomy tubes, 142

gender bias, 46–7

gene promoters, 181

gene silencing, 181

genes, imprinted, 12, 169, 174, 181, 189–90. *See also* epigenetics

genetic disorders of dietary deficiencies, 26, 28

genetic factors, and vitamin deficiency, 157

genetic predisposition toward preeclampsia, 59

genistein, 185

Gerber Products Company, 100

germ cell development, altered epigenetics during, 189–90

gestation, undernutrition during periods of, 47

gestational duration. *See* duration of gestation

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-88709-0 - Maternal-Fetal Nutrition During Pregnancy and Lactation
Edited by Michael E. Symonds and Margaret M. Ramsay
Index
More information

gestational hypertension. *See* preeclampsia
GH (growth hormone), placental, 4–5
ghrelin, 3
ginger, for HG, 140
glucocorticoid receptor gene (*GR*), 188
glucocorticoids, maternal, 4
gluconeogenesis, 14
glucose
  fetal insulin secretion, 14
  fetal production, 14
  fetal utilization, 13–14
  intrauterine growth restriction, 14–15
  placental and fetal metabolism, 12
  placental transport and metabolism, 12–13
  placental transport capacity, 7
  transport across placenta, 7
glucose transport protein isoform 1 (GLUT1), 12–13
glucose transport protein isoform 3 (GLUT3), 12
glycemic control, maternal, 4
glycogen, 14
GM-CSF (granulocyte-macrophage colony-stimulating factor), 172
Goodwin, T. M., 138
GR (glucocorticoid receptor gene), 188
grandparental food supply, 190
granulocyte-macrophage colony-stimulating factor (GM-CSF), 172
Groth, S. G., 122
growth. *See also* fetal growth; infant growth
  catch-up, 73
  placental, impact of imprinted genes on, 189–90
growth charts, 37–8, 73
growth factors, placental, 6
growth hormone (GH), placental, 4–5
growth potential, parental, 36
Gunnarsson, B. S., 78

Haaf, T., 169
hem iron, 26, 149
hCG (human chorionic gonadotropin), 2
hCS (human chorionic somatomammotropin), 4–5
Hct (hematocrit), 149–50
healthy growth, of neonates, 73
Hediger, M. L., 149–50
HELLP syndrome, 55
hematocrit (Hct), 149–50
hemoglobin (Hgb), 149–50
herbal medicine
  Chinese, 56
  Japanese, 57
HG. *See* hyperemesis gravidarum
Hgb (hemoglobin), 149–50
histone modifications, 181, 182
HIV (human immunodeficiency virus), 157
HMF (human milk fortifier), 86–7
homocysteine, 56, 160–1
Howie, L. A., 122
human *AXIN1* methylation, variation in, 185
human chorionic gonadotropin (hCG), 2
human chorionic somatomammotropin (hCS), 4–5
human immunodeficiency virus (HIV), 157
human milk. *See also* breast-feeding; cow's milk; formula feeding; lactation
  and mineral deficiencies, 28
  as model for formula composition, 93
  prepartum, 63
  preterm infants
    early nutrition and later health, 88–9
    enteral nutrition for, 86–7
  production and composition, 63–5
human milk fortifier (HMF), 86–7
humanized milk fortifier, 87
Hunt, D. J., 123–4
hydrocortisone, 140
hydrolyzed formulas, 95–7
hyperemesis gravidarum (HG)
  and nutrition, 141–3
  overview, 138–9
  treatment of, 139
hyperhomocysteinemia, 56, 160–1
hypermethylation, diet-induced, 184–5
hyperpyloric stenosis, 156
hypertension. *See also* preeclampsia
  environmental effects during embryogenesis, 188
  lactation and, 114
hypoglycemia, fetal, 14–15
hypomethylation, diet-associated, 183–4

ICSI (intracytoplasmic sperm injection), 172
IGF-1 (insulin-like growth factor 1), 4, 6, 16–17
IGF-2 (insulin-like growth factor 2), 6
Igf2 gene, 12, 189–90
IGFBP (insulin-like growth factor binding proteins), 6
illness
  and mineral deficiencies, 27
  and neonate nutritional requirements, 73
immune function, and breast-feeding, 66, 108–9
immunoglobulins, 108
imperforate anus, 156
imprinted genes, 12, 169, 174, 181, 189–90. *See also* epigenetics
in vitro fertilization (IVF)
  animal, 186–7
  human, 186
in vitro maturation (IVM), 169
individualized birth weight ratio, 39
individualized fetal growth curves
  measuring appropriateness of growth
    birth weight versus estimated fetal weights and statistically modelled trajectories, 37–8
    importance of accurate data for gestational duration, 34–5
    nonpathological determinants of, 36–7
    overview, 34
    selecting standard of, 35–6
    ways to measure, 38–9
  nutrient supplementation, 40–1
  overview, 41
  role of maternal nutrition, 39–40
Infant Formula Act of 1980, 97–9

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-88709-0 - Maternal-Fetal Nutrition During Pregnancy and Lactation
Edited by Michael E. Symonds and Margaret M. Ramsay
Index
More information

infant growth. *See also* neonatal nutrition
  formula-fed infants, 99–100
  macronutrients for
    breast-fed versus formula-fed infants, 66–7
    human milk production and composition, 63–5
    infant nutritional requirements, 65–6
    mammary growth, 63
    maternal malnutrition and restrictions, 69
    maternal needs, 67–8
infants. *See* breast-feeding; formula feeding; infant growth; neonatal nutrition; preterm infants; weaning
infections, breast-feeding and, 108–9
inflammatory response, exaggerated, 53
Institute of Medicine (IOM) BMI cutoffs, 122
insulin
  and egg quality, 169
  fetal amino acid metabolism, 16–17
  fetal glucose utilization and, 13–14
  fetal secretion, 14
  maternal nutrition and fetal growth, 4
  metabolic changes during pregnancy, 2–3
  sensitivity to, and intrauterine growth restriction, 14–15
insulin resistance, 187–8
insulin-like growth factor 1 (IGF-1), 4, 6, 16–17
insulin-like growth factor 2 (IGF-2), 6
insulin-like growth factor binding proteins (IGFBP), 6
intercourse, 172
International Society for the Study of Hypertension in Pregnancy, 53
intestinal flora, and breast milk, 66
intracytoplasmic sperm injection (ICSI), 172
intrauterine growth restriction (IUGR)
  abnormal delivery of amino acids to fetus with, 17
  epigenetic modification and, 187
  overview, 14–15
introduction of complementary foods, 103. *See also* weaning
involution after lactation, 113
iodine
  importance during pregnancy, 24–5
  mineral deficiencies, 26, 29
  vegetarian and vegan pregnant women, 132
IOM (Institute of Medicine) BMI cutoffs, 122
iron
  absorption during pregnancy, 29
  in breast milk, 29
  complementary feeding, 100–1
  and folate, 28
  importance during pregnancy, 25
  mineral deficiencies, 26, 27–8, 29
  multiple pregnancy, 149–50
  neonate nutritional requirements, 78
  and preeclampsia, 57
  preterm infant requirements, 85
  stores of during pregnancy, 29–30
  supplementation during pregnancy, 40, 50
  teenage pregnancies, 123
  vegetarian and vegan pregnant women, 131
IUGR. *See* intrauterine growth restriction
IVF. *See* in vitro fertilization
IVM (in vitro maturation), 169

Japanese herbal medicine, 57
jejunal feeding, 142

Kampo medicines, 57
keto acids, 18
kidneys
  adaptation to pregnancy, 2
  epigenetic modification and, 188
kinship theory of imprinting evolution, 189
Korean Women's Health study, 114

LA (linoleic acid), 66, 76–7
La Leche League, 109
labels, infant formula, 99
lactation. *See also* breast-feeding
  daily intake of minerals during, 30
  macronutrients for
    breastfed versus formula-fed infants, 66–7
    human milk production and composition, 63–5
    infant nutritional requirements, 65–6
    mammary growth, 63
    maternal malnutrition and restrictions, 69
    maternal needs, 67–8
  supplementation during, 158
lactoferrin, 108
lactogenesis, 63
lacto-ovo vegetarians (LOVs). *See* vegetarian/vegan pregnant women
lactose, 64, 77
large offspring syndrome (LOS), 174, 187
last normal menstrual period (LNMP) method, 34
Lawlor, D. A., 119
LBW. *See* low birth weight; maternal diet
LCPUFAs. *See* long-chain polyunsaturated fatty acids
lean body weight, parental, 36
Leeda, M., 56
leptin, 4, 6, 122
leucine, 17
levomepromazine, 139
lifestyle factors, and preeclampsia, 58
limb defects, 156
linoleic acid (LA), 66, 76–7
linolenic acid, 19
lipids
  essential fatty acid metabolism and transfer by placenta, 19
  fatty acid oxidation in fetus, 20
  fetal accumulation of essential fatty acids, 20
  fetal lipid metabolism, 20
  fetal lipid supply, 18
  infant requirements, 65–6
  maternal diet and essential fatty acid supply, 19–20
  in milk, 64–5
  placental lipid metabolism, 18, 20
  placental transport capacity, 7
  placental uptake, synthesis, and metabolism of fatty acids, 18–19
lipolysis, 18
lipoprotein cholesterol, low-density, 19

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-88709-0 - Maternal-Fetal Nutrition During Pregnancy and Lactation
Edited by Michael E. Symonds and Margaret M. Ramsay
Index
More information

lipoprotein lipase activity, 18

listeria, 134

literacy, maternal, 47

LNA (α-linolenic acid), 76–7

LNMP (last normal menstrual period) method, 34

long-chain polyunsaturated fatty acids (LCPUFAs)
  atopic diseases and, 66
  complementary feeding, 102–3
  in cow's milk-based formulas, 95
  fetal accumulation of, 20
  in human milk, 65
  infant requirements, 66, 76–7
  during lactation, 68
  maternal diet and supply of, 19–20
  metabolism and transfer by placenta, 19
  multiple pregnancy, 150–1
  preterm infant requirements, 84
  reactive oxygen species production, 171–2
  from soya, 134
  vegetarian and vegan pregnant women, 134–5

LOS (large offspring syndrome), 174, 187

LOVs (lacto-ovo vegetarians). *See* vegetarian/vegan pregnant women

low birth weight (LBW). *See also See* maternal diet
  in developing world, 44, 45
  teenage pregnancies, 122

low-density lipoprotein cholesterol, 19

lower respiratory tract infections (LRTI), 108–9, 111

Lubchenco, L. O., 35, 38

Lucas, A., 88

Luke, B., 149–50

lysines, methylation of, 182

macrobiotic diets, 130. *See also* vegetarian/vegan pregnant women

macronutrients. *See also specific macronutrients by name*
  for lactation and infant growth
    breast-fed versus formula-fed infants, 66–7
    human milk production and composition, 63–5
    infant nutritional requirements, 65–6
    mammary growth, 63
    maternal malnutrition and restrictions, 69
    maternal needs, 67–8
  maternal diets in developing world, 47–8
  pregnancy and feto-placental growth
    amino acids, 15–18
    glucose, 12–15
    lipids, 18–20
    overview, 12
  role of maternal nutrition in fetal growth, 39–40
  vegetarian and vegan pregnant women, 130–1

magnesium
  importance during pregnancy, 25
  mineral deficiencies, 27
  and preeclampsia, 57
  supplementation during multiple pregnancy, 150
  utilization and stores of during pregnancy, 29–30

Maia, P. A., 123

Makrides, M., 57

malformations, and vitamin A, 158. *See also specific malformations by name*

malnutrition. *See also* maternal diet
  and hyperemesis gravidarum, 141–3
  and lactation, 69
  maternal, before conception, 45–7

malonyl-CoA, 20

mammalian target of rapamycin (mTOR), 3, 8, 17

mammary growth, 63

mastitis, 75

maternal breast milk (MBM). *See* breast-feeding; human milk; lactation

maternal diet
  in developing world
    macronutrients, 47–8
    maternal undernutrition before conception, 45–7
    micronutrients, 48–50
    overview, 44
    prevalence of LBW in, 45
    reappraisal of maternal interventions, 50
  and egg quality, 169–70
  and embryo quality, 174
  and essential fatty acid supply, 19–20
  manipulations to, and epigenetics, 180
  multiple pregnancy, 148–49
  and preeclampsia, 58, 59

maternal nutrition. *See* mother

Maternity Alliance, 125–6

MBD (metabolic bone disease), 85

MBM (maternal breast milk). *See* breast-feeding; human milk; lactation

McCance, R. A., 47

medical risks of teenage pregnancies, 120

medications. *See also specific medications by name*
  for hyperemesis gravidarum, 139–140
  and mineral deficiencies, 26–7
  and vitamin deficiency, 157

Menkes syndrome, 26, 28

metabolic bone disease (MBD), 85

metabolic programming, 73

metabolic syndrome, 187–8

metabolism
  carbohydrate, and multiple pregnancy, 148–9
  changes in gestation, 2–3
  essential fatty acid, and transfer by placenta, 19
  fetal
    amino acid, 16–18
    lipid, 20
    nutrient substrates for, 12
  placental
    amino acid, 17–18
    fatty acid, 18–19
    glucose, 12–13
    lipid, 18
    nutrient substrates for, 12

methionine, 95, 159, 183–4

methyl deficiency, 183–4

methylation. *See* DNA methylation; epigenetics

methylprednisolone, 140

metoclopramide, 139

MI (myocardial infarction), 114

mice
  agouti viable yellow, 184–5, 191, 192
  Axin1^{Fu}, 185, 191–2

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-88709-0 - Maternal-Fetal Nutrition During Pregnancy and Lactation
Edited by Michael E. Symonds and Margaret M. Ramsay
Index
More information

Michalek, A. M., 157

micronutrients. *See also specific micronutrients by name*
  depletion of, and teenage pregnancy outcome, 123
  maternal diets in developing world, 48–50
  multiple supplementations, and preeclampsia, 57
  neonate nutritional requirements, 77–8
  reappraisal of maternal interventions, 50
  role of maternal nutrition in fetal growth, 40

milk, human. *See also* breast-feeding; cow's milk; formula feeding; lactation
  fortified, 86–7
  and mineral deficiencies, 28
  as model for formula composition, 93
  prepartum, 63
  preterm infants
    early nutrition and later health, 88–9
    enteral nutrition for, 86–7
  production and composition, 63–5

Milman, N., 40

Milunsky, A., 155

mineral absorption, and cow's milk–based formulas, 95

mineral content of soy-based formulas, 95

mineral requirements. *See also See* supplementation
  adaptations during pregnancy and lactation
    absorption, 29
    excretion, 29
    overview, 29
    placental transfer, 30
    recommended daily intake, 30
    utilization and redistribution of body stores, 29–30
  deficiencies
    effects of, 27–9
    extent of, 25–7
    overview, 25
  overview, 24
  for pregnancy, 24–5

minimal enteral feeding, for preterm infants, 86

mirtazapine, 139

miscarriage, and mineral deficiencies, 27

morbidity, LBW-related, 45

mortality
  LBW-related, 45
  preeclampsia, 53

mother. *See also* adaptation to pregnancy; lactation; maternal diet; mineral requirements; multiple pregnancy; vegetarian/vegan pregnant women
  benefits of breast-feeding
    breast cancer, 112–13
    cardiovascular disease, 114–15
    diabetes, 114
    postpartum weight loss, 113–14
  nonpathological determinants of fetal growth, 36
  nutrition of, and fetal growth, 4, 39–40
  placental lipid metabolism and fetal lipid supply, 18
  placental uptake, synthesis, and metabolism of fatty acids, 18–19
  resources, and gene imprinting, 189–90
  well-being of, and mineral deficiencies, 27–8

mTOR (mammalian target of rapamycin), 3, 8, 17

Multicenter Growth Reference Study, WHO, 99–100

multimineral supplementation. *See* supplementation

multiple pregnancy
  calcium supplementation, 150
  carbohydrate metabolism, 148–9
  essential fatty acid requirements, 150–1
  and fetal growth, 37
  iron status, 149–50
  key clinical points, 152
  magnesium supplementation, 150
  maternal weight gain, 151–2
  multivitamin and multimineral supplementation, 150
  overview, 147
  zinc supplementation, 150

multivitamin supplementation. *See* supplementation

myocardial infarction (MI), 114

n-3 fatty acids, 65, 66. *See also* long-chain polyunsaturated fatty acids

n-6 fatty acids, 65. *See also* long-chain polyunsaturated fatty acids

nasogastric enteral nutrition, 141–2

nasojejunal feeding, 142

National Diet and Nutrition Survey (NDNS) of Young People aged 4 to 18 years, 121

National Institute for Health and Clinical Excellence (NICE), 129–30

neonatal estimates of fetal growth, 34–5

neonatal nutrition. *See also* breast-feeding; formula feeding
  beyond 6 months of age, 78–9
  carbohydrate, 77
  fat and fatty acids, 76–7
  fluids, 77
  micronutrients, 77–8
  overview, 28–9, 72
  protein, 76
  6 months debate regarding energy requirements, 75–6
  targets for, 73–5

neural tube defects (NTDs)
  epigenetics of early embryo, 185
  folate in decreased risk of, 159–60
  and mineral deficiencies, 28
  supplementation and prevention of, 155

neuroblastoma, 157, 160

NHS (Nurses' Health Study), 111, 112, 114

NHS II (Nurses' Health Study II), 109–10, 111, 113, 114

niacin (vitamin B_3), 159

NICE (National Institute for Health and Clinical Excellence), 129–30

Nielson, J., 125

nitrogen
  nonprotein, 64
  requirements during pregnancy, 15–16

non-hem iron, 26, 149

nonprotein nitrogen, 64, 76

NTDs. *See* neural tube defects

nucleosomes, 182

Nurses' Health Study (NHS), 111, 112, 114

Nurses' Health Study II (NHS II), 109–10, 111, 113, 114

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-88709-0 - Maternal-Fetal Nutrition During Pregnancy and Lactation
Edited by Michael E. Symonds and Margaret M. Ramsay
Index
More information

nutrients. *See also* macronutrients; micronutrients; mineral requirements; neonatal nutrition; nutritional deficiencies; *specific nutrients by name*; supplementation
  complementary feeding, 100–3
  in formulas, regulation of, 99
  maternal availability of, 3–4
  partitioning across placenta, 6–7
  placental transport of
    of amino acids from mother to fetus, 16
    capacity, and fetal growth, 7–8
    growth of placenta and, 12
    minerals, 30
    regulation of, 8
  requirements
    infant, 65–6
    teenage pregnancies, 120–3
    term versus preterm infant, 86

nutrition education, WIC, 124

nutritional deficiencies
  contribution to preeclampsia
    antioxidants, 54–5
    arginine, 55
    calcium, 55–6
    Chinese herbal medicine, 56
    fish oil, 56
    folic acid, 56
    garlic, 56
    iron, 57
    Japanese herbal medicine, 57
    magnesium, 57
    multiple micronutrient supplementations, 57
    overview, 53–4
    salt intake, 57
    zinc, 58
  effects of, 27–9
  extent of, 25–7
  overview, 25

nuts, 133–4

obesity
  and breast-feeding, 109–10
  and egg quality, 169–70
  and intrauterine growth restriction, 15
  and preeclampsia, 58
  teenage pregnancies, 122

observational studies, 106–7

odansetron, 139

offspring development, and mineral deficiencies, 29

oleic acid, 65

oligosaccharides, 64, 108

Olshan, A. F., 157

omega-3/6 fatty acids. *See* long-chain polyunsaturated fatty acids

omphalocele, 156

oocyte maturation, 167–71

optimal growth trajectory, 36. *See also* individualized fetal growth curves; neonatal nutrition

optimal nutrition in preterm infants, 86–8

oral clefts, 155–6

otitis media, and breast-feeding, 108

Oumachigui, A., 120

output, cardiac, during pregnancy, 1

ovarian folliculogenesis, 167–71

ovarian stimulation, and oocyte maturation, 168–9

overgrowth syndromes, 174

overweight
  and breast-feeding, 109–10
  and egg quality, 169–70
  and intrauterine growth restriction, 15
  and preeclampsia, 58
  teenage pregnancies, 122

ovulations, 112

oxidation
  amino acid, 16
  fatty acid, 20

palmitic acid, 65

pantothenic acid (vitamin B_5), 159

parental growth potential, 36

parenteral nutrition
  for preterm infants, 86
  as therapy for hyperemesis gravidarum, 142–3

parity, and fetal growth, 37

pathogenesis, of preeclampsia, 53

PCOS (polycystic ovary syndrome), 169–70

PDF (postdischarge formulas), 88, 89

peanuts, 133–4

pediatric cancers, 156–7

percentiles, fetal growth and birth weight, 38–9

percutaneous endoscopic gastrostomy (PEG), 142

percutaneous endoscopic gastrostomy with a jejunal port (PEGJ), 142

periconceptional diet, B-vitamins in, 174–5

peroxisome proliferator-activated receptor gamma (PPAR gamma), 19, 169

pharmaceutical therapy. *See* medications

phosphorus, 84–5

physiology, changes in maternal, 1–2. *See also* adaptation to pregnancy

placenta. *See also* macronutrients
  adipokines, role of, 5–6
  essential fatty acid metabolism and transfer by, 19
  glucose transport and metabolism, 12–13
  growth factors, 6
  impact of imprinted genes on growth of, 189–90
  lipid metabolism, 18, 20
  multiple pregnancy, 152
  nutrient partitioning across, 6–7
  nutrient transport
    capacity and fetal growth, 7–8
    minerals, 30
    regulation of, 8
  placental-fetal amino acid cycling, 16
  secretion of hCS and growth hormone, 4–5
  transport of amino acids from mother to fetus, 16
  uptake, synthesis, and metabolism of fatty acids, 18–19
  vascular development in, 4

plant-based LCPUFAs, 135

plasma, seminal, 172

PLCζ, 171

PMNS (Pune Maternal Nutrition Study), 46, 48, 50

polycystic ovary syndrome (PCOS), 169–70

postdischarge breast-feeding, 88

postdischarge formulas (PDF), 88, 89

postdischarge nutrition, in preterm infants, 87–8, 89

postnatal feeding practices, for IUGR, 15

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-88709-0 - Maternal-Fetal Nutrition During Pregnancy and Lactation
Edited by Michael E. Symonds and Margaret M. Ramsay
Index
More information

postnatal programming, 188–89
postpartum weight loss, 67, 113–14
PPARα gene (*PPARA*), 188
PPAR gamma (peroxisome proliferator-activated receptor gamma), 19, 169
prednisolone, 140
preeclampsia
  defined, 53
  dietary advice, 59
  future research, 59
  genetic predisposition, 59
  implications of, 53
  key clinical points, 59
  and mineral deficiencies, 27
  nutrient supplementation, 40
  pathogenesis of, 53
  potential contribution to
    antioxidants, 54–5
    arginine, 55
    calcium, 55–6
    Chinese herbal medicine, 56
    fish oil, 56
    folic acid, 56
    garlic, 56
    iron, 57
    Japanese herbal medicine, 57
    magnesium, 57
    multiple micronutrient supplementations, 57
    overview, 53–4
    salt intake, 57
    zinc, 58
  role of diet and lifestyle factors, 58
  vitamin C and prevention of, 161
preemptive therapy, for HG, 140
pregnancy, adaptation to. *See* adaptation to pregnancy
pre-implantation development, 172–5
premature birth, 28. *See also* preterm infants
prenatal growth. *See* fetal growth
prenatal supplementation. *See* supplementation
prenatal treatment of IUGR, 15
prepartum milk, 63
pre-pregnancy undernutrition, 45–7
preterm infant formulas (PTF), 87, 88, 89
preterm infants
  breast-feeding, 65
  growth of, 38
  mineral deficiencies and premature birth, 28
  versus term infants
    early nutrition and later health, 88–9
    nutritional requirements, 86
    optimal nutrition in preterm infants, 86–8
    overview, 82
primary mineral deficiencies, 25–6
primordial-to-primary follicle transition, 167
PROBIT (Promotion of Breastfeeding Intervention Trial), 79, 108
progesterone, 2
promoters, gene, 181
proportion of optimal birth weight, 39
protein. *See also* amino acids
  in cow's milk-based formulas, 93–5
  macronutrient needs in developing countries, 47
  in milk, 64
  requirements
    infant, 65, 76
    during lactation, 68
    during pregnancy, 15–16
    for preterm infants, 83
  in soy-based formulas, 95
  vegetarian/vegan pregnancies, 131
protein hydrolysate formulas, 95–7
protein:energy ratio, 66–7
proteinuria. *See* preeclampsia
PTF (preterm infant formulas), 87, 88, 89
Pune Maternal Nutrition Study (PMNS), 46, 48, 50
pyloric stenosis, 156
pyridoxine (vitamin B_6), 139, 159
pyridoxine-metoclopramide, 139

RDA (recommended dietary allowance), 30
reactive oxygen species (ROS), 171–2
reappraisal of maternal interventions, 50
recommended daily intake of minerals, 30
recommended dietary allowance (RDA), 30
red blood cell mass, during pregnancy, 1
redistribution of body stores, during pregnancy, 29–30
regulation, of formulas, 97–9
relaxin, 2
renal system
  changes in maternal, 2
  epigenetic modification, 188
resistant hyperemesis gravidarum, 139
respiratory tract infections, and breast-feeding, 108
rest, and preeclampsia, 58
retinoid syndrome, 158
riboflavin (vitamin B_2), 159
Rogers, I. S., 77
ROS (reactive oxygen species), 171–2
rosiglitazone, 169
Rothman, K. J., 158

S-adenosyl methionine (SAM), 183
salmonella, 134
salt intake, and preeclampsia, 57
Sarasua, S., 157
Schanler, R. J., 87
Scholl, T. O., 122, 150, 151
secondary mineral deficiencies, 25, 26–7
selenium
  excretion during pregnancy, 29
  importance during pregnancy, 25
  mineral deficiencies, 26, 27
  placental transfer, 30
  utilization and stores of during pregnancy, 30
Selvin, S., 151
seminal plasma, 172
serum, within culture media, 186
serum ferritin levels, 149–50
SES (socioeconomic status), 109
Shaw, G. M., 156
Shaw, M., 119
sheep
  diet-associated hypomethylation in, 183–4
  in vitro fertilization, 187
Shi, W., 169
silencing, gene, 181
Sinclair, K. D., 183–4

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-88709-0 - Maternal-Fetal Nutrition During Pregnancy and Lactation
Edited by Michael E. Symonds and Margaret M. Ramsay
Index
More information

6 months debate regarding energy requirements, 75–6
size at birth. *See* birth weight; fetal growth
Slc38a4 gene, 189–90
small antral follicles, 168
Smithells, R. W., 155
soaps, calcium, 84
sociodemographic factors, and maternal undernutrition, 46–7
socioeconomic status (SES), 109
solid foods, introduction of, 88. *See also* weaning
soya, 134
soy-based formulas, 95
Spatone iron supplement, 131
Special Supplemental Food Program for Women, Infants and Children (WIC), 124
spina bifida, 28
ST (syncytiotrophoblast), 6–7
"Starting Well" intervention scheme, 125
stores, body
  mineral, in infants, 28–9
  redistribution of during pregnancy, 29–30
sudden death, cardiac, 114
Sukalich, S., 122
supplementation
  and fetal growth, 40–1
  long-chain polyunsaturated fatty acids, 135
  during multiple pregnancy, 150
  and nausea and vomiting, 140
  overview, 155–8
  during pregnancy, 59
  role of maternal nutrition in fetal growth, 39
  vegetarian and vegan pregnant women, 131, 134–5
  vitamin A, 158
  vitamin B_1, 158–9
  vitamin B_{12}, 160–1
  vitamin B_2, 159
  vitamin B_3, 159
  vitamin B_5, 159
  vitamin B_6, 159
  vitamin B_9, 159–60
  vitamin C, 161
  vitamin D, 161
  vitamin E, 161
syncytiotrophoblast (ST), 6–7
synthesis, placental, of fatty acids, 18–19
systematically underestimated gestations, 38
systemic vascular resistance, during pregnancy, 1

TIDM (type I diabetes mellitus), 111–12
TIIDM (type II diabetes mellitus), 15, 112, 114
taurine, 83
teenage pregnancies
  interventions to improve nutritional intake, 123–6
  key clinical messages, 119
  medical risks of, 120
  nutritional requirements of, 120–3
  overview, 119–20
term formulas (TF), 87, 88
term infants. *See* breast-feeding; formula feeding; infant growth; neonatal nutrition; preterm infants; weaning
TGFβ (transforming growth factor beta), 172
therapeutic drugs. *See* drugs
thiamine (vitamin B_1), 138, 158–9
Thorsdottir, I., 78
thyroxine, 24–5
timing of maternal nutrition interventions, 50
TNFα (tumor necrosis factor-alpha), 5
tocopherol. *See* vitamin E
Tokishakuyaku-san (TS), 57
toxoplasmosis, 134
trans fatty acids, 68
transcriptional activity, 167–8, 173
transforming growth factor beta (TGFβ), 172
transgenerational epigenetic modification, 190–92
transitional milk, 63
transport, placental nutrient
  of amino acids from mother to fetus, 16
  capacity, and fetal growth, 7–8
  glucose, 12–13
  growth of placenta and, 12
  minerals, 30
  regulation of, 8
transporters, glucose, 12–13
treatment, hyperemesis gravidarum, 139
tree nuts, 133
triglycerides, 18, 65
triiodothyronine, 24–5
triplet pregnancies. *See* multiple pregnancy
true protein content, of milk, 64
TS (Tokishakuyaku-san), 57
tumor necrosis factor-alpha (TNFα), 5
tumors, pediatric, 156–7
twin pregnancies. *See* multiple pregnancy
two-stage process, preeclampsia, 53
type I diabetes mellitus (TIDM), 111–12
type II diabetes mellitus (TIIDM), 15, 112, 114

UK Committee on Toxicity, 134
UK Food Standards Agency, 125–6, 133, 134
ultrasound fetometry, 34
undernutrition, maternal. *See also* maternal diet
  before conception, 45–7
  and hyperemesis gravidarum, 141–3
  and lactation, 69
United Kingdom Medical Research Council, 155
University of Dundee, 125
University of Helsinki, 79
University of Iowa, 100
uptake, placental, of fatty acids, 18–19
urea, 64
urinary tract anomalies, 156
U.S. Department of Health Services, 106
U.S. Special Supplemental Food Program for Women, Infants and Children (WIC), 124
utilization, mineral, during pregnancy, 29–30

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-88709-0 - Maternal-Fetal Nutrition During Pregnancy and Lactation
Edited by Michael E. Symonds and Margaret M. Ramsay
Index
More information

van de Ven, C. J. M., 142
vascular development, placental and fetal, 4
vegetarian/vegan pregnant women
  clinical approach, 129–30
  health professional concerns
    calcium, 132
    energy and macronutrients, 130–1
    folate, 131–2
    iodine, 132
    iron, 131
    pregnancy outcome, 130
    vitamin B_{12}, 132
    vitamin D, 132
    zinc, 132
  overview, 129
  women's concerns
    cravings and aversions, 133
    impact of food safety advice, 134
    overview, 133
    peanuts and other nuts, 133–4
    soya, 134
    supplements, 134–5
venous thrombosis, 142
vitamin A
  preterm infant requirements, 85–6
  supplementation, 158
  toxicity of during pregnancy, 150
vitamin B_1 (thiamine), 138, 158–9
vitamin B_{12} (cobalamin)
  and birth weight, 48
  childhood insulin resistance and, 188
  imbalance between folate and, 50
  methyl deficiency, 183–4
  supplementation, 160–1
  vegetarian and vegan pregnant women, 132
vitamin B_2 (riboflavin), 159
vitamin B_3 (niacin), 159
vitamin B_5 (pantothenic acid), 159
vitamin B_6 (pyridoxine), 139, 159
vitamin B_9. *See* folate
vitamin C (ascorbic acid)
  and preeclampsia, 40, 54–5, 161
  supplementation during pregnancy, 161
vitamin D
  neonate nutritional requirements, 77–8
  supplementation during pregnancy, 161
  toxicity of during pregnancy, 150
  vegetarian and vegan pregnant women, 132
vitamin E (tocopherol)
  and preeclampsia, 40, 54–5, 161
  preterm infant requirements, 86
  supplementation during pregnancy, 161
vitamin K, 77
vitamins. *See also* micronutrients; *specific vitamins by name*; supplementation
  preterm infant requirements, 85–6
  in soy-based formulas, 95
volume, milk, 63–4
vomiting. *See* hyperemesis gravidarum

water requirements
  during lactation, 67
  neonate, 77
weaning
  defined, 72
  nutritional requirements beyond 6 months, 78–9
  overview, 75
  preterm infants, 88
  6 months debate, 75–6
weight. *See also* birth weight; fetal growth
  gain, maternal
    and fetal growth, 36
    multiple pregnancy, 151–2
    teenage pregnancies, 122
  parental body, 36
  postpartum loss of, 67, 113–14
well-being, maternal, 27–8
Wen, W., 157
Wernicke's encephalopathy, 138
Wharton, B. A., 83
whey proteins, 64, 93
WHO (World Health Organization), 78, 99–100, 107
WIC (Special Supplemental Food Program for Women, Infants and Children), 124
Widdowson, E. M., 47
Williams, R. L., 152
women. *See* mother
work, maternal, and birth size, 47–8
World Health Organization (WHO), 78, 99–100, 107

"Yom Kippur effect," 148

zinc
  importance during pregnancy, 25
  mineral deficiencies, 28
  and preeclampsia, 58
  preterm infant requirements, 85
  supplementation during multiple pregnancy, 150
  teenage pregnancies, 123
  utilization and stores of during pregnancy, 29–30
  vegetarian and vegan pregnant women, 132
zygote, epigenetic programming in, 183

© in this web service Cambridge University Press www.cambridge.org