BOX 67-2 **DRUG EFFECTS IN PREGNANCY (*Continued*)**

should be closely observed for signs of adrenal insufficiency. *Betamethasone* is used to promote fetal production of surfactant to increase lung maturity in the preterm infant. Inhaled corticosteroids (eg, those used to treat allergic rhinitis or asthma) are less likely to cause adverse effects in the fetus because of less systemic absorption.

Digoxin

Digoxin is apparently safe for use during pregnancy. It crosses the placenta to reach fetal serum levels that are 50% to 80% those of maternal serum. Fetal toxicity and neonatal death have occurred with maternal overdose. Dosage requirements may be less predictable during pregnancy, and serum drug levels and other assessment parameters must be closely monitored. Digoxin also has been administered to the mother for treatment of fetal tachycardia and heart failure.

Diuretics

Thiazides (eg, *hydrochlorothiazide*) cross the placenta. They are not associated with teratogenesis, but they may cause other adverse effects. Because the drugs decrease plasma volume, decreased blood flow to the uterus and placenta may occur with resultant impairment of fetal nutrition and growth. Other adverse effects may include fetal or neonatal jaundice, thrombocytopenia, hyperbilirubinemia, hemolytic jaundice, fluid and electrolyte imbalances, and impaired carbohydrate metabolism. These drugs are not indicated for treatment of dependent edema caused by uterine enlargement and restriction of venous blood flow. They also are not effective in prevention or treatment of pregnancy-induced hypertension (preeclampsia). They may be used for treatment of pathologic edema.

Loop diuretics (eg, *furosemide*) are not considered teratogenic, but animal studies indicated fetal toxicity and death. Like the thiazides, loop diuretics may decrease plasma volume and blood flow to the placenta and fetus.

Potassium-conserving diuretics (eg, *triamterene*, an ingredient in Dyazide and Maxide) cross the placenta in animal studies, but effects on the human fetus are unknown.

Dyslipidemics

Cholestyramine and *colestipol* are considered safe because they are not absorbed systemically. HMG-CoA reductase inhibitors or "statins" (eg, *lovastatin*) are FDA category X and contraindicated during pregnancy. They should be given to women of childbearing age only if they are highly unlikely to become pregnant and are informed of potential hazards. If a woman becomes pregnant while taking one of these drugs, the drug should be stopped and the patient informed of possible adverse drug effects on the fetus.

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)

Use of NSAIDs (eg, *ibuprofen*) should generally be avoided, especially during the third trimester. All of the drugs are FDA category D in the third trimester or near delivery. If these drugs are taken in the third trimester, effects on human fetuses include constriction of the ductus arteriosis prenatally, nonclosure of the ductus arteriosus postnatally, impaired function of the tricuspid valve in the heart, pulmonary hypertension, degenerative changes in the myocardium, impaired platelet function with resultant bleeding, intracranial bleeding, renal impairment or failure, oligohydramnios, gastrointestinal (GI) bleeding or perforation, and increased risk of necrotizing enterocolitis, a life-threatening disorder. If taken near delivery, maternal effects include delayed onset of labor and delivery and increased risk of excessive bleeding. The newer COX-2 inhibitors (eg, *celecoxib*) have not been studied in pregnant women; *diclofenac* is contraindicated in pregnant women.

Thyroid Hormone

Levothyroxine does not readily cross the placenta and it seems safe in appropriate dosages. However, it may cause tachycardia in the fetus. When given as replacement therapy in hypothyroid women, the drug should be continued through pregnancy.

effects on mother and fetus are even more likely to occur with "crack" cocaine, a highly purified and potent form.

Marijuana impairs formation of DNA and RNA, the basic genetic material of body cells. It also may decrease the oxygen supply of mother and fetus. **Heroin** ingestion increases the risks of pregnancy-induced hypertension, third trimester bleeding, complications of labor and delivery, and postpartum morbidity.

FETAL THERAPEUTICS

Although the major concern about drugs ingested during pregnancy is adverse effects on the fetus, a few drugs are given to the mother for their therapeutic effects on the fetus. These include digoxin for fetal tachycardia or heart failure, levothyroxine for hypothyroidism, penicillin for exposure to maternal syphilis, and prenatal corticosteroids to promote surfactant production to improve lung function and decrease respiratory distress syndrome in preterm infants.

MATERNAL THERAPEUTICS

Thus far, the main emphasis on drug use during pregnancy has related to actual or potential adverse effects on the fetus. Despite the general principle that drug use should be avoided when possible, pregnant women may require drug therapy for various illnesses, increased nutritional needs, pregnancy-associated problems, chronic disease processes, treatment of preterm labor, induction of labor, and pain management during labor.

Herbal and Dietary Supplements

Pregnancy increases nutritional needs and vitamin and mineral supplements are commonly used. **Folic acid** supplementation is especially important, to prevent neural tube birth defects (eg, spina bifida). Such defects occur early in pregnancy, often before the woman realizes she is pregnant. For this reason, it is recommended that all women of childbear-