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After conception, the corpus luteum, placenta, and developing embryo release hormones, growth factors, and other substances into the maternal circulation. These substances trigger a cascade of events that transform the functioning of the maternal cardiovascular, respiratory, and renal systems, which in turn alter the physicochemical determinants of [H(+)]. Following implantation, maternal adaptations fulfill 4 important functions that support fetal growth. Increased availability of substrates and precursors for fetal–placental metabolism and hormone production is mediated by increases in dietary intake, as well as endocrine changes that increase the availability of glucose and low–density lipoprotein (LDL) cholesterol. Transport capacity is enhanced by increases in cardiac output, facilitating the transport of substrates and precursors to the placenta, and fetal waste products to maternal organs for disposal. Maternal–fetal exchange is regulated by the placenta after 10–12 weeks gestation, but it may occur through histiotrophic mechanisms before this time. Disposal of additional waste products (heat, carbon dioxide, and metabolic byproducts) occurs through peripheral vasodilation and increases in skin blood flow, ventilation, and renal filtration. The maternal physiological adaptations described above must meet the combined demands of maternal exercise and fetal growth. More research is needed to formulate evidence–based guidelines for healthy physical activity in early pregnancy.

Pregnancy is marked by physiological metabolic adaptations. During this period, there is adipose tissue expansion, and hepatic lipid synthesis increases. Pregnant women experience peripheral insulin resistance, and levels of hormones such as leptin and insulin are higher in this period than in the non–pregnant state. ...