



Figure 8-5. The metabolic speedometer. How hard and how long we exercise directly affects which metabolic pathways our bodies use to fuel the activities. All physical activity lies along a continuum, from rest to all-out maximal effort. All activities are powered by the ATP already present in the muscle, and all bioenergetic activity acts to replenish these stores. Low-intensity exercise depends on cardiopulmonary delivery and muscular uptake of oxygen, the ready availability of which enables the body to utilize aerobic pathways and fatty acids as substrate. These aerobic processes take place inside the mitochondria within the muscle cells. As activity levels and energy requirements increase, the ability of the heart and lungs to deliver oxygen and facilitate sufficient levels of aerobic metabolism to meet the increased demand for ATP is exceeded. Weight training or other forms of high-intensity training exists at the anaerobic end of the continuum, utilizing substrate that does not require added O₂. The diagram above represents the relationships between the energy substrates and the metabolic pathways in which they are used in different types of exercise. With the exception of short-duration all-out maximal effort, no activity uses only one metabolic pathway, so the scale above represents a sliding scale of continually increasing intensity of activity.